



City of Sandy

Agenda

Planning Commission Meeting

Meeting Location: City Hall- Council Chambers, 39250 Pioneer Blvd., Sandy, Oregon 97055

Meeting Date: Tuesday, February 11, 2020

Meeting Time: 7:00 PM

Page

1. ROLL CALL

2. APPROVAL OF MINUTES

2.1. January 23, 2020 Draft Minutes

2 - 10

[Planning Commission - 23 Jan 2020 - Minutes - Pdf](#)

3. REQUESTS FROM THE FLOOR - CITIZEN COMMUNICATION ON NON- AGENDA ITEMS

4. OLD BUSINESS

4.1. 19-023 SUB/VAR/TREE Bailey Meadows Subdivision Feb. 11

11 - 1165

[19-023 SUB/VAR/TREE Bailey Meadows Subdivision \(Feb. 11th\) - Pdf](#)

5. NEW BUSINESS

5.1. 20-002 UGB Expansion for Gunderson Road

1166 - 1340

Staff recommends the Planning Commission open a public hearing to receive public testimony. Staff recommends the Planning Commission forward a recommendation of approval to City Council.

[20-002 UGB Expansion for Gunderson Road - Pdf](#)

6. ITEMS FROM COMMISSION AND STAFF

7. ADJOURN



MINUTES
Planning Commission Meeting
Thursday, January 23, 2020 City Hall- Council
Chambers, 39250 Pioneer Blvd., Sandy,
Oregon 97055 6:30 PM

COMMISSIONERS PRESENT: Don Carlton, Commissioner, Ron Lesowski, Commissioner, Hollis MacLean-Wenzel, Commissioner, Jerry Crosby, Commissioner, John Logan, Commissioner, Chris Mayton, Commissioner, and Todd Mobley, Commissioner

COMMISSIONERS ABSENT:

STAFF PRESENT: Kelly O'Neill, Development Services Director and Emily Meharg, Associate Planner, David Doughman, City Attorney

MEDIA PRESENT:

1. Roll Call

2. Select Chair and Vice Chair

Motion: To select Commissioner Crosby as the chair for 2020.

Moved By: Commissioner Carlton

Seconded By: Commissioner MacLean-Wenzel

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed.

To select vice chair for 2020.

5 voted for Commissioner Carlton (Carlton, Lesowski, Crosby, Logan, and Mayton)

2 voted for Commissioner MacLean-Wenzel (MacLean-Wenzel and Mobley)

Motion: To select Commissioner Carlton as the vice chair for 2020.

Moved By: Commissioner Logan

Seconded By: Commissioner Mayton

Yes votes: All Ayes

No votes: None

Abstention: None

The motion passed.

3. Approval of Minutes

3.1. Approval of Minutes - December 3, 2019

Motion: To approve minutes for December 3, 2019

Moved By: Commissioner Carlton

Seconded By: Commissioner Logan

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed.

3.2. Approval of Minutes - December 17, 2019

Motion: To approve minutes for December 17, 2019

Moved By: Commissioner Mayton

Seconded By: Commissioner Maclean-Wenzel

Yes votes: Lesowski, MacLean-Wenzel, Crosby, Logan, and Mayton

No votes: None

Abstentions: Mobley and Carlton

The motion passed.

4. Requests From the Floor - Citizen Communication on Non- Agenda Items

None

5. OLD BUSINESS

5.1. 19-023 SUB/VAR/TREE Bailey Meadows Subdivision

Staff Report - 0217

Chairman Crosby opened the public hearing on File No. 19-023 SUB/VAR/TREE at 6:46 p.m. Crosby called for any abstentions, conflicts of interest, ex-parte contact, challenges to the jurisdiction of the Planning Commission, or any challenges to any individual member of the Planning Commission. No challenges were made, and no declarations were made by the Planning Commissioners.

Commissioner Mobley recused himself as the applicant's transportation engineer.

Commissioner Carlton stated that he viewed the December 17 Planning Commission hearing video and reviewed the packet since he was not at the

December 17 hearing.

City Attorney Doughman explained the applicant's request to have the record remain open. They are treating tonight's hearing as the first evidentiary hearing. After tonight's meeting, there will be a 7-day period where anyone can submit testimony into the record. This will be followed by a second 7-day period for anyone to submit testimony in response to anything submitted in the first 7 days (new issues cannot be raised). Usually there's a third 7-day period solely for the applicant but, given the time frame, the applicant is waiving the right to final argument. The Planning Commission will reconvene on February 11, 2020 to deliberate amongst themselves with staff, but no additional public or applicant testimony will be heard.

Staff Report:

Since the publication of the report, there are 4 new exhibits that were provided to Planning Commission. Development Services Director Kelly O'Neill Jr. summarized the staff report and addressed the background, factual information, and presented a brief slide show.

Attorney Doughman provided additional information regarding PC's ability to change conditions.

Applicant Testimony:

Mike Robinson
1211 SW 5th Ave, Suite 1900
Portland, OR 97204

Attorney Robinson introduced the applicant's team and provided a brief background of the applicant's request. He stated they are looking for solutions through the UGB expansion to provide parkland and Gunderson Road. Robinson addressed the neighbors stating the applicant understands the concerns and commits to doing their best to minimize disruption and to get the UGB expansion to occur for parkland and Gunderson Road. Robinson cited Oregon statutes related to needed housing. Robinson also explained the application is a limited land use application, so the applicant only needs to adhere to what's in the code, not the TSP. For needed housing, cities can only apply clear and objective criteria. Robinson responded to issues raised in the previous hearing, many of which are subjective or are not in the subdivision approval criteria. Robinson explained that the traffic analysis was reviewed by multiple professionals and found to be sound. Robinson made a formal request that the Planning Commission close the public hearing but keep the record open for the two 7-day periods as explained by Attorney Doughman. The applicant will extend the 120-clock by 14 days.

Chris Goodell
AKS Engineering and Forestry
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Goodell talked about specifics of the subdivision, including circulation and infrastructure. Mr. Goodell presented a brief slideshow.

Proponent Testimony:

None

Opponent Testimony:

Makoto Lane
37828 Rachael Drive
Sandy, OR 97055

Concerned about traffic. Applicant's attorney alluded to litigation against the City, which is not indicative of a good neighbor. The traffic study appears to be partial to the developer. If a kid gets hit on Melissa Avenue, do the parents sue the City because they allowed it? 30th house tied to Gunderson Road doesn't work because developer will just continue to develop beyond that. Applicant needs to get UGB expansion approved and construct Gunderson Road before any houses are constructed. Mr. Lane does not want motor vehicle access to Melissa Avenue and doesn't understand why the TSP can be ignored.

Erin Findlay
37616 Rachael Drive
Sandy, OR 97055

In support of UGB expansion. Safety is the number one priority. Requests a 4 way stop at Melissa Avenue and Rachael Drive. Wants to know participation in UGB expansion at County level.

Kathleen Walker
15920 Bluff Road
Sandy, OR 97055

Thanked the applicant for working with City, ODOT, and Clackamas County. 900 pages is a lot to review. Concerned about the applicant's plan being in so many pieces, which makes it difficult to see how everything's connected and what the actual proposal is. Gunderson Road and the UGB expansion need to get done or the subdivision should not be approved. Parkland should also be conditioned for approval. Applicant's submittal only includes half a road for Gunderson Road; it's not clear what they are actually proposing. There should

be bike lanes and curb and sidewalk on at least one side of Gunderson Road.

Carol Cohen
37537 Rachael Drive
Sandy, OR 97055

900 pages is a lot to review. Is Gunderson Road going to happen? Lots of confusion. Parkland should be dedicated prior to occupancy. Gunderson Road should be completed before building permits are issued to provide access for construction vehicles.

Kelly Whitlock
17975 422nd Avenue
Sandy, OR 97055

Who pays for the park and who pays for Gunderson Road?

Gigi Duncan
18275 Rachael Drive
Sandy, OR 97055

City has a vision and a higher responsibility. We've learned from Nicolas Glen that one street in and out of a subdivision doesn't work and that there should have been a park. Bailey Meadows is not affordable housing. Safety should be the ultimate litmus test. House Bill 2001 - Oregon working on up-zoning to create denser, greener, and more affordable housing.

Laura Kvamme
37438 Rachael Drive
Sandy, OR 97055

Melissa Avenue already carries too much traffic. Curious about elevation that parallels Rachael Drive and how drainage will work. Can't allow any new development; already exceeding capacity on Melissa Avenue. How will student buses navigate? Wants to see a clear plan.

Brad Robison
37412 Rachael Drive
Sandy, OR 97055

Just because you can do something doesn't mean you should. Afraid that if Gunderson Road doesn't go through, the applicant will still be able to build the subdivision. Subdivision needs to be thought out and impact on existing neighbors needs to be considered, not just profit.

Neutral Testimony

Makoto Lane
37828 Rachael Drive
Sandy, OR 97055

He stated he wants to advocate for keep the hearing open.

Staff Recap:

Development Services Director O'Neill stated that some items will be addressed later and the City Attorney will need to address ORS provisions. O'Neill clarified that needed housing is related to growth projected in a 20-year planning horizon, not affordable housing. O'Neill reiterated that the proposed lots meet the 7,500 square foot lot requirement in the applicable zoning district. A 4-way stop could be considered and evaluated. Gunderson Road is proposed at a 24-foot-wide asphalt section (two 12 foot travel lanes). The 30 house limit can be changed by the Planning Commission. Each house will pay SDCs for parks, which will eventually be used to develop the park. The City will be paying for a significant portion of Gunderson Road and the Highway 211 improvements. Staff can't support closing off Melissa Avenue to vehicles because that would go against the TSP and the development code. All Oregon cities will need to update their code to allow duplexes anywhere a single-family home is allowed.

City Attorney Doughman will put together a public memo to the Planning Commission that responds to some legal issues raised. There's an increasingly magnified focus on housing regulations, including clear and objective standards and needed housing. If the applicant is right and there are laws that entitle them to build a subdivision and take all access from Melissa Avenue, then the consequence could be a neighborhood with 100 new homes taking sole access from Melissa Avenue. The City is working to get a second access. Doughman stated there is risk in denying the application. The City would not be liable for exceeding ADT standard because it qualifies for discretionary immunity. The Planning Commission has a choice to continue the hearing in its entirety to February 11, 2020 or the Commission can close the hearing but keep the record open for written testimony. Doughman prefers closing the hearing and keeping the written record open.

Commissioner Carlton asked about the variance that would be required in relation to having houses face the park. Does that variance need to be addressed now? O'Neill stated the code diagram could be subjective, but the Planning Commission could pose a condition that the houses along the park must face the park. Doughman doesn't think the park has to be surrounded by streets and houses on all sides of the park. The Planning Commission can condition that if the UGB expansion occurs and the park is dedicated then the

houses would have to face the parkland.

Applicant Rebuttal:

Attorney Robinson stated they're glad the public came out and he didn't mean to threaten to sue the City. Their intent is to comply with the law and find a way to get this done. Robinson doesn't think the park would be subject to code standards because it's part of the UGB expansion. Robinson wants to keep the written record open. Needed housing is not just affordable housing. City traffic engineer Replinger's comments reach the same conclusion as the applicant's traffic engineer. Robinson cited Patterson vs. City of Bend case law stating the TSP doesn't have to be adhered to if specific standards are not in the municipal code. The applicant accepts condition G.1. The need for the 30th house is so there's enough generation of revenue to get Gunderson Road started. Gunderson Road will be 30 percent cheaper if they construct it than if the City does. The applicant is trying to get parkland as part of the UGB expansion. They will address drainage in a written response. They will try to provide more information on the Gunderson Road proposal.

O'Neill stated the Clackamas County staff person for UGB expansion is Glen Hamburg. O'Neill will testify on behalf of the applicant and neighbors in support of the UGB expansion for Gunderson Road and the parkland.

Discussion:

The Planning Commission decided to close the public hearing. Commissioner Crosby gave the Planning Commission members one final chance to ask the applicant questions as the hearing will be closed.

Motion: Motion to close the public hearing at 9:15 p.m.

Moved By: Commissioner Carlton

Seconded By: Commissioner Mayton

Yes votes: Carlton, Lesowski, Maclean-Wenzel, Crosby, Logan, and Mayton

No votes: None

Abstentions: None

The motion passed at 9:15 p.m.

Motion: Keep the public record open for 7 days (ends January 30, 2020 at 5 pm, anyone can submit written evidence), followed by a 7 day response period (ends February 6, 2020 at 5pm, responses to issues brought up during first 7 days, but no new issues). Applicant waives right of rebuttal.

Moved By: Commissioner Lesowski

Seconded By: Commissioner Maclean-Wenzel

Yes votes: All Ayes
No votes: None
Abstentions: None
The motion passed at 9:17 p.m.

6. Items from Commission and Staff

O'Neill went over upcoming meetings. The March date will be the 30th, not the 23rd. City Council goal setting was last week. They have a new planning goal related to economic development. New associate planner Shelley starts on February 10. Commissioner Crosby asked when a quorum is established, before or after recusal. City Attorney Doughman will need to look into it. Crosby requested a taller microphone for the public podium. Lesowski asked about a newspaper article that alluded to making adjustments to Sandy Style. O'Neill stated that staff will be evaluating small code modifications to Sandy Style in 2020. Mobley asked about the status of the TSP update. O'Neill stated he would provide a TSP update at a future meeting.

7. Adjourn

Motion: To adjourn
Moved By: Commissioner Lesowski
Seconded By: Commissioner Logan
Yes votes: All Ayes
No votes: None
Abstentions: None
The motion passed.

Chairman Crosby adjourned the meeting at 9:35 p.m.



Chair, Jerry Crosby

Planning Commission
January 23, 2020



Planning Director, Kelly O'Neill Jr

Draft



Staff Report

Meeting Date: February 11, 2020

From Kelly O'Neill, Development Services Director

SUBJECT: 19-023 SUB/VAR/TREE Bailey Meadows Subdivision (Feb. 11th)

Background:

At the January 23, 2020 public hearing the City Attorney, David Doughman, explained the applicant's request to have the record remain open. Since the applicant did not present at the December 17, 2019 meeting Mr. Doughman recommended the Planning Commission treat January 23, 2020 as the first evidentiary hearing. Following the January 23, 2020 meeting, there was a 7-day period where anyone could submit testimony into the record. The City called this first 7-day period Open Record Period #1. This was followed by a second 7-day period for anyone to submit testimony in response to anything submitted in the first 7 days. The City called this second 7-day period Open Record Period #2. Typically, there is a third 7-day period solely for the applicant, but given the time frame, the applicant waived the right to final argument. The Planning Commission decided in light of the open record periods they would reconvene on February 11, 2020 to deliberate amongst themselves with staff and City Attorney input, but no additional public or applicant testimony would be heard.

Open Record Period #1 ended on January 30, 2020 at 5:00 PM. The City posted all materials from Open Record Period #1 on the City of Sandy website on January 31, 2020.

Open Record Period #2 ended on February 6, 2020 at 5:00 PM. The City posted all materials from Open Record Period #2 on the City of Sandy website on February 7, 2020.

The decision by the Planning Commission will become the final decision on this land use matter unless the applicant or someone from the public appeals the decision to City Council. If someone wishes to appeal the decision to City Council that party will have 12 days from the issuance of the decision.

Revised February 7, 2020 (new text in red and removed text in ~~black strikethrough~~)
This is a revision from the January 17, 2020 staff report as reviewed at the January 23, 2020 Planning Commission meeting.

**REVISED STAFF REPORT
PLANNING COMMISSION
TYPE III LAND DIVISION DECISION**

DATE: February 7, 2020 ~~January 17, 2020~~

FILE NO.: 19-023 SUB/TREE

PROJECT NAME: Bailey Meadows Subdivision

OWNER/APPLICANT: Allied Homes & Development

LEGAL DESCRIPTION: T2S R4E Section 23 Tax Lots 800, 801, 802, 803, 804

The above-referenced proposal was reviewed as a Type III Subdivision and Type II Tree Removal Permit. The following Findings of Fact are adopted supporting denial of the Tentative Plat in accordance with Chapter 17 of the Sandy Municipal Code.

EXHIBITS:

Applicant's Submittals

- A. Land Use Application Form
- B. Narrative
- C. Project Plan Set
 - Sheet P1-01: Cover Sheet with Site & Vicinity Maps & Legend
 - Sheet P1-02: Preliminary Existing Conditions Plan
 - Sheet P1-03: Preliminary Existing Conditions Plan
 - Sheet P1-04: Preliminary Subdivision Plat with Future Building Setbacks
 - Sheet P1-05: Preliminary Grading & Erosion & Sediment Control Plan
 - Sheet P1-06: Preliminary Grading & Erosion & Sediment Control Plan
 - Sheet P1-07: Preliminary Composite Utility Plan
 - Sheet P1-08: Preliminary Composite Utility Plan
 - Sheet P1-09: Preliminary Street Plan
 - Sheet P1-10: Preliminary Street Plan
 - Sheet P1-11: Preliminary Street Cross Sections & Profiles
 - Sheet P1-12: Preliminary Street Profiles
 - Sheet P1-13: Preliminary Street Profiles
 - Sheet P1-14: Preliminary Street Profiles
 - Sheet P1-15: Conceptual Future Street Plan

- Sheet P1-16: Preliminary Tree Preservation & Removal Plan & Arborist Report
 - Sheet P1-17: Preliminary Tree Preservation & Removal Plan & Arborist Report
 - Sheet P1-18: Preliminary Tree Preservation & Removal Table & Arborist Report
 - Sheet P1-19: Preliminary Tree Preservation & Removal Table & Arborist Report
 - Sheet P1-20: Preliminary Demolition Plan
 - Sheet P1-21: Preliminary Demolition Plan
 - Sheet P1-22: Preliminary Street Tree and Stormwater Screening Planting Plan
 - Sheet P1-23: Preliminary Landscape Notes and Details
 - Sheet P1-24: Preliminary Parking Plan
 - Sheet P1-25: Preliminary Emergency Vehicle Access Plan
 - Sheet P1-26: Preliminary Emergency Vehicle Access Plan
- D. Conceptual Connectivity Plan
- E. Preliminary Numbered Parking Plan
- F. Traffic Impact Analysis
- G. Preliminary Stormwater Report
- H. Flood & Slope Hazard (FSH) Analysis
- I. Geotechnical Engineering Report
- J. Letter from Michael Robinson (July 2, 2019)
- K. Mailing Labels
- L. Applicant Submittal Checklist
- M. Warranty Deed
- N. Clackamas County Assessor's Map
- O. Documentation of Plat Name Reservation
- P. Letter from Michael Robinson with Exhibits (August 20, 2019)
- Q. 120 Day Extension Letter (October 15, 2019)
- R. Letter from Michael Robinson (November 21, 2019)
- S. Updated Sheet P1-04 (Plan Dated November 15, 2019)
- T. Updated Sheet P1-15 (Plan Dated November 21, 2019)
- U. Updated Narrative (November 21, 2019)
- V. Gunderson Extension Exhibit from Todd Mobley (November 22, 2019)
- W. Letter from Michael Robinson with Exhibits (November 25, 2019)
- X. Trip Distribution with Gunderson Road Email from Todd Mobley (December 5, 2019)

Agency Comments Received Prior to November 2019 Updated Submittal

- Y. City Engineer (September 27, 2019)
- Z. PGE (September 18, 2019)
- AA. ODOT (October 4, 2019)
- BB. Parks and Trails Advisory Board (October 9, 2019)
- CC. ODOT Design Speed Email (November 19, 2019)

Public Comments Received Prior to November 2019 Updated Submittal

- DD. Paul and Jolette Owen, 37189 Rachael Drive (September 14, 2019)
- EE. Paul Savage, 37506 Rachael Drive (September 26, 2019)
- FF. Sarah Bettey, 18195 Melissa Avenue (September 26, 2019)
- GG. Tiffany Harris, Rachael Drive (September 27, 2019)
- HH. Todd Cooper, 18190 Melissa Avenue (September 27, 2019)

- II. Tom Newell, 18007 Rachael Drive (September 27, 2019)
- JJ. Cary Mallon, corner of Melissa Avenue and Rachael Drive (September 28, 2019)
- KK. Lonnie McVey, No address provided (September 28, 2019)
- LL. John and Carol Dick, 18255 Grey Avenue (September 29, 2019)
- MM. Marilyn and Treena Siewell, No address provided (October 1, 2019)
- NN. Marguerite Wadkins, 18291 Myra Court (October 1, 2019)
- OO. Doris E. Rooney, 37214 Rachael Drive (October 1, 2019)
- PP. Susan Hebb, Reich Court and Dubarko Road (October 1, 2019)
- QQ. Dawn and Jordan Allen, Melissa Avenue (October 1, 2019)
- RR. Dave Meeker, 18198 Grey Avenue (October 1, 2019)
- SS. Carol Hassebroek, 39400 SE Trubel Road (October 1, 2019)
- TT. Karen Higgins, 37487 Rachael Drive (October 2, 2019)
- UU. The Molcany Family, Wewer Avenue (October 2, 2019)
- VV. Esther Naomi Quick, 18214 Grey Avenue (October 2, 2019)
- WW. Edith Newton, 18246 Grey Avenue (October 2, 2019)
- XX. Lori Graham, 37322 Rachael Drive (October 3, 2019)
- YY. Jeff Conder, 36345 Dubarko Road (October 3, 2019)
- ZZ. Belus and Juanita Schonek, 18102 Wewer Avenue (October 3, 2019)
- AAA. Danielle and Oliver Mullon, Myra Court (October 3, 2019)
- BBB. Corri Baldwin, 37524 Rachael Drive (October 3, 2019)
- CCC. Mike Schell, 37524 Rachael Drive (October 3, 2019)
- DDD. Ashley Parrish, 37356 Rachael Drive (October 3, 2019)
- EEE. Guimar and James DeVaere, 18176 Rachael Drive (October 3, 2019)
- FFF. Erin Findlay, 37616 Rachael Drive (October 3, 2019)
- GGG. Krista and Gabriel Stone, 18111 Rachael Drive (October 4, 2019)
- HHH. Faith Egli, 37708 Rachael Drive (October 4, 2019)
- III. Tim Sellin, 18256 Melissa Avenue (October 4, 2019)
- JJJ. Nicole Sellin, 18256 Melissa Avenue (October 4, 2019)
- KKK. Barbara Coutts, 37265 Solso Drive (October 4, 2019)
- LLL. Roberta (Shelly) Evett, 18192 Rachael Drive (October 4, 2019)
- MMM. Laura Kvamme, 37438 Rachael Drive (October 11, 2019)
- NNN. Kelli Acord, 36366 Industrial Way Ste B (October 18, 2019)
- OOO. Elizabeth A. (Libby) Burke, 37412 Rachael Drive (October 20, 2019)
- PPP. Brad Robison, 37412 Rachael Drive (October 20, 2019)
- QQQ. Laurie Gilbert, 18392 SE 370th Avenue (November 4, 2019)

Agency Comments Received After November 2019 Updated Submittal

- RRR. ODOT (December 17, 2019)
- SSS. ODOT (January 15, 2020)
- TTT. Public Works Director (*placeholder for comments*)
- UUU. City Transportation Engineer (**January 20, 2020**) (*placeholder for comments*)

Public Comments Received After November 2019 Updated Submittal

- VVV. Sarah Bettey, 18195 Melissa Avenue (December 11, 2019)
- WWW. Les and Kathy Geren, 37721 SE Ponder Lane (December 12, 2019)
- XXX. Gigi Duncan, 18275 Rachael Drive (December 14, 2019)

YYY. Tom Newell, 18007 Rachael Drive (December 17, 2019)
ZZZ. Barnes Family, Rachael Drive (December 17, 2019)
AAAA. Kathleen Walker, 15920 Bluff Road (December 17, 2019)

Documents Submitted at the December 17, 2019 Planning Commission Hearing

BBBB. Letter on behalf of the Parks and Trails Advisory Board

Additional Documents Submitted from the Applicant

CCCC. Continuance Request and second 120 Day Extension Letter (December 17, 2019)
DDDD. Addendum to Traffic Impact Analysis for UGB Expansion
EEEE. Land Use Application – File No. 20-002 UGB (January 7, 2020)
FFFF. Land Use Application – File No. 20-001 ANN/CPA/ZC (January 7, 2020)
GGGG. Bailey Meadow letter response to Curran-Mcleod (January 13, 2019)

Staff Report from December 17, 2019 Planning Commission Hearing

HHHH. Staff Report from December 17, 2019

Additional Public Comments

III. Les and Kathy Geren, 37721 Ponder Lane (January 16, 2020)
JJJ. Melissa and Brian Crosswhite (January 20, 2020)
KKKK. Emily Sheldon (January 22, 2020)
LLLL. Kathleen Walker, 15920 Bluff Road (January 23, 2020)

Additional Comment from Applicant

MMMM. Email from Michael Robinson (January 23, 2020)

Public Testimony – Open Record Period #1 (January 24, 2020 – January 30, 2020 at 5:00 p.m.)

NNNN. Marie Debatty (January 27, 2020)
OOOO. Karen Higgins (January 27, 2020)
PPPP. Erin Findlay, 37616 Rachael Drive (January 27, 2020)
QQQQ. Tom Newell (January 27, 2020)
RRRR. Cary Mallon (January 28, 2020)
SSSS. Les and Kathy Geren, 37721 SE Ponder Lane (January 29, 2020)
TTTT. Robert Mottice (January 28, 2020)
UUUU. Paul Savage, 37506 Rachael Drive (January 28, 2020)
VVVV. Marguerite Wadkins (January 28, 2020)
WWWW. Sarah Bettey, 18195 Melissa Avenue (January 29, 2020)
XXXX. Paul Savage, 37506 Rachael Drive (January 29, 2020)
YYYY. Corri Schell, 37524 Rachael Drive (January 29, 2020)
ZZZZ. Mike Schell, 37524 Rachael Drive (January 29, 2020)
AAAAA. Cary Mallon (January 29, 2020)
BBBBB. Gretchen M. Benson (January 29, 2020)
CCCCC. Marilyn Siewell (January 29, 2020)
DDDDD. Treena L. Siewell (January 29, 2020)
EEEEE. Karen Higgins (January 29, 2020)
FFFFF. Matt Smith (January 29, 2020)

GGGGG. Ryan Tatlock (January 29, 2020)
HHHHH. Melissa Thompson (January 29, 2020)
IIIII. Olga M. Gergberg (January 29, 2020)
JJJJJ. Marguerite Wadkins (January 29, 2020)
KKKKK. Carol Cohen (January 29, 2020)
LLLLL. Gigi Duncan, 18275 Rachael Drive (January 30, 2020)
MMMMM. Melissa and Brian Crosswhite (January 30, 2020)
NNNNN. Bryan Weiz (January 30, 2020)
OOOOO. Jamie Weiz (January 30, 2020)
PPPPP. Erin Findlay (January 30, 2020)
QQQQQ. Emily Sheldon (January 30, 2020)
RRRRR. Kathleen Walker (January 30, 2020)
SSSSS. Tim Sellin, 18256 Melissa Avenue (January 30, 2020)
TTTTT. Richard Sheldon (January 30, 2020)
UUUUU. Laura Kvamme, 37438 Rachael Drive (January 30, 2020)
VVVVV. Martin and Nicole Van Wagner (January 30, 2020)
WWWWW. Guimar DeVaere, 18176 Rachael Drive (January 30, 2020)

Applicant Submittal – Open Record Period #1

XXXXX. Letter from AKS Engineering and Forestry (January 29, 2020)
YYYYY. Letter from Michael Robinson (January 30, 2020)

Memorandum from City Attorney’s Office – Open Record Period #1

ZZZZZ. Memorandum from David Doughman, City Attorney’s Office (January 30, 2020)

Public Testimony – Open Record Period #2 (January 31, 2020 – February 6, 2020 at 5:00 p.m.)

AAAAA. Makoto Lane, 37828 Rachael Drive (February 3, 2020)
BBBBB. Kathleen Walker, 15920 Bluff Road (February 6, 2020)
CCCCC. Emily Sheldon (February 6, 2020)

Applicant Submittal – Open Record Period #2

DDDDD. Letter from Michael Robinson (February 6, 2020)

Memorandum from City Attorney’s Office – Open Record Period #2

EEEEE. Memorandum from David Doughman, City Attorney’s Office (February 6, 2020)

Memorandum from Public Works Director – Open Record Period #2

FFFFF. Memorandum from Mike Walker, Public Works Director (February 6, 2020)

Additional Information from City Staff

GGGGG. Modified Conditions List
HHHHH. Staff Report from January 23, 2020
IIIII. Planning Commission minutes for December 17, 2019
JJJJJ. Draft Planning Commission minutes for January 23, 2020

FINDINGS OF FACT

General

1. Allied Homes & Development submitted an application to subdivide 23.42 acres into a 100-lot residential subdivision. The 100 proposed lots vary in size from 7,500 to 8,659 square feet. The proposal also includes a 22,521 square foot stormwater detention tract. The proposed development includes removal of trees to accommodate the extension and/or construction of rights-of-way. There are no existing structures on the subject property. The application as originally submitted proposed to rely solely on using Melissa Avenue in the Nicolas Glen subdivision to access the 100 lots in this subdivision.
2. The city received the application on July 5, 2019 and notified the applicant that it was incomplete. The applicant responded with a letter and additional submittal items that the city received on August 22, 2019. Under state law, the application was deemed complete on August 22, 2019 because the applicant provided some information in response to the incompleteness notice and stated that it would provide no additional information.
3. The subject site consists of five lots with a total area of approximately 23.42 acres. The site is located north of Highway 211, south of Rachael Drive, and west of Ponder Lane.
4. The parcel has a Plan Map designation of Low Density Residential and Zoning Map designation of SFR, Single Family Residential.
5. According to the applicant, the 100 proposed lots will add approximately 944 vehicle trips each weekday to Melissa Avenue. In discussions with the applicant, both during the pre-application stage and after the application was submitted, staff expressed concerns about having only one access into Bailey Meadows via Melissa Avenue.
6. One challenge in providing a second access into the proposed subdivision is the location of the subject property relative to the city's urban growth boundary ("UGB"). The city has a road identified in its transportation system plan ("TSP") that would serve as a second way to access Bailey Meadows. That road ("Gunderson Road") could connect the southern portion of the subdivision with Highway 211, as the TSP generally envisions. However, the connection from the subject property to Highway 211 would occur outside of the city's UGB. State law would only allow Gunderson Road to be built if it were either: (a) in the city's UGB; or (b) Clackamas County approved an "exception" in accordance with state law that would allow the road to be built on rural land outside the UGB.
7. Initially, during the pre-application period, the applicant considered filing an exception application with Clackamas County to extend Gunderson Road. However, senior planning staff at the county were not supportive of an exception. The applicant elaborated on the exception in more detail on page 3 of its August 20, 2019 letter to city staff (Exhibit P). After concluding that an exception would likely not be approved, the applicant submitted the Bailey Meadows land use application to City staff and proposed relying solely on Melissa Avenue for access to the subdivision. As discussed further in Exhibit P, the applicant asserts that state law prohibits the city from denying the application for only proposing one access point from Melissa Avenue.

8. After the application was deemed complete, the applicant chose to hold a neighborhood meeting regarding the proposed subdivision, which occurred on September 18, 2019 at the Sandy library. Subsequent to that meeting, on September 26, the applicant, its representatives and its attorney met with city staff and the city attorney to discuss issues related to the application. The parties discussed the impacts to Melissa Avenue and the residents of Nicolas Glen if a second access was not provided. At the conclusion of that meeting, the applicant agreed to explore a UGB expansion that would, if approved, permit the construction of Gunderson Road and provide a second access into and out of the proposed subdivision.
9. Ideally, a UGB expansion and the specifics of how Gunderson Road could be built and financed would occur prior to considering the subdivision application. However, this approach does not work for the applicant. Instead, the applicant is proposing that the city impose a condition of approval on its subdivision application that would require the applicant to seek, in a subsequent application process, an expansion of the UGB to allow the applicant to construct Gunderson Road, subject to certain contingencies. The applicant summarizes this proposal in a November 25, 2019 letter to the city (Exhibit W).
10. The specific details of the second access intersecting with Highway 211 are still being defined by the City of Sandy, the Oregon Department of Transportation (“ODOT”), and the applicant. The city, the county, the Oregon Department of Land Conservation and Development (“DLCD”) and ODOT have discussed the concept of a possible UGB expansion to accommodate a Gunderson Road connection. While the county had some procedural questions, these agencies have not expressed opposition to the concept and DLCD understood the justification for it. The land to be added to the UGB, and upon which Gunderson Road would be built, is under the control of the applicant. The amount of land added to the UGB would essentially be limited to the right-of-way necessary to accommodate constructing Gunderson Road from the subdivision to Highway 211 in accordance with the city’s right-of-way standards for a minor arterial road. The basis for adding the land to the UGB would be to satisfy an unmet need for a transportation facility and it would not justify any other type of development (e.g. additional housing or commercial development). On January 7, the applicant submitted a UGB expansion application to the city to accommodate Gunderson Road. The city would need to hold at least two hearings on the proposed UGB expansion – one before the planning commission and one before the city council. If approved, the county would also need to hold hearings to amend its comprehensive plan map to account for the change to Sandy’s UGB. The applicant has also submitted a concurrent application to Clackamas County, which would hold its hearings in March if the application to the city is approved.
11. The Planning Commission hearing was originally scheduled to be held on October 28, 2019. The applicant agreed to postpone the original hearing to a later date to consider a second access into the proposed subdivision. The original 120-day deadline was December 20, 2019. On October 15, 2019 the City of Sandy received a notice from the applicant’s attorney granting an extension of the 120-day clock to February 8, 2020 (Exhibit Q). On December 17, 2019 the City of Sandy received a notice from the applicant’s attorney requesting to continue the initial evidentiary hearing and granting an extension of the 120-day clock to March 31, 2020 (Exhibit CCCC).

12. Notification of the proposal was originally mailed to property owners within 500 feet of the subject property and to affected agencies on September 12, 2019 regarding the October 28, 2019 public hearing. On October 16, 2019 a notice was mailed to property owners within 500 feet of the subject property stating that the October 28, 2019 meeting was cancelled. On November 27, 2019 notification of the revised proposal was mailed to property owners within 500 feet of the subject property and a legal notice was published in the Sandy Post on December 4, 2019 regarding the rescheduled public hearing on December 17, 2019.
13. Agency comments were initially received from the City Engineer, PGE, the Parks and Trails Advisory Board, and ODOT. On November 21, 2019, the applicant submitted updated materials to city staff (Exhibits R-U). On November 25, 2019, the applicant through its legal counsel clarified its intention to seek a UGB expansion to allow a Gunderson Road connection, subject to certain conditions (Exhibit W). On December 5, 2019, the applicant's traffic consultant submitted a memo (Exhibit X) that outlines anticipated changes in trip distributions from the subdivision if Gunderson Road were built and connected to Highway 211. ODOT submitted a revised comment on January 15, 2020.
14. Forty written comments were received prior to the November 2019 as listed in Exhibits DD. through QQQ. Six additional written comments were received, Exhibits VVV. through AAAA., between publication of the December 17, 2019 staff report on December 10, 2019 and the start of the public hearing on December 17, 2019 at 7:00 PM.
15. One additional public comment was received between the December 17, 2019 public hearing and the publication of this staff report. The public comment is Exhibit IIII. This public comment speaks to Ponder Lane access and a seasonal spring along Ponder Lane.
16. The Planning Commission heard an abbreviated version of the request from staff and the applicant at a public hearing on December 17, 2019. At the hearing, the Planning Commission heard public testimony and granted the applicant their requested continuance. The Planning Commission granted the continuance to January 23, 2020.
17. The following individuals spoke at the December 17, 2019 public hearing:
 - Applicant and Applicant Representatives:
 - Michael Robinson
 - Public:

| | |
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| <ul style="list-style-type: none"> ▪ Tony Profit ▪ Makoto Lane ▪ Richard Sheldon ▪ Cary Mallon ▪ Kathleen Walker ▪ Gigi Duncan ▪ Erin Findlay ▪ Don Robertson ▪ Tim Sellin ▪ Marie DeBatty | <ul style="list-style-type: none"> ▪ Mike Schell ▪ Laura Kvamme ▪ Kelli Acord ▪ Carol Cohen ▪ Mark Miller ▪ Robert Fisher ▪ Brad Robison ▪ Les Geren ▪ Calvin McKiness |
|--|---|

18. The following individuals spoke at the January 23, 2020 public hearing:

Applicant and Applicant Representatives:

- Michael Robinson
- Chris Goodell

Public:

- Makoto Lane
- Erin Findlay
- Kathleen Walker
- Carol Cohen
- Kelly Whitlock
- Gigi Duncan
- Laura Kvamme
- Brad Robison

19. At the January 23, 2020 public hearing the City Attorney, David Doughman, explained the applicant's request to have the record remain open. Since the applicant did not present at the December 17, 2019 meeting Mr. Doughman recommended the Planning Commission treat January 23, 2020 as the first evidentiary hearing. Following the January 23, 2020 meeting, there was a 7-day period where anyone could submit testimony into the record. The City called this first 7-day period Open Record Period #1. This was followed by a second 7-day period for anyone to submit testimony in response to anything submitted in the first 7 days. The City called this second 7-day period Open Record Period #2. Typically, there is a third 7-day period solely for the applicant, but given the time frame, the applicant waived the right to final argument. The Planning Commission decided in light of the open record periods they would reconvene on February 11, 2020 to deliberate amongst themselves with staff and City Attorney input, but no additional public or applicant testimony would be heard.

20. Open Record Period #1 ended on January 30, 2020 at 5:00 PM. The City posted all materials from Open Record Period #1 on the City of Sandy website on January 31, 2020.

21. Open Record Period #2 ended on February 6, 2020 at 5:00 PM. The City posted all materials from Open Record Period #2 on the City of Sandy website on February 7, 2020.

17.30 – Zoning Districts

22. The area proposed for Gunderson Road and future parkland (tax lot 701) were is not analyzed for density as the land is outside the UGB and is not permitted to include buildable lots.

23. Section 17.30.20 contains requirements for residential density calculations. The total gross acreage for the entire property inside the existing UGB is 23.42 acres. The proposal contains 5.21 acres of area dedicated for public right-of-way and 0.55 acres dedicated for public tracts (Tracts A and B) for the property inside the existing UGB. After removal of the right-of-way and public tracts the net site area for the subject property is reduced to 17.66 acres of net site area (NSA). The subject property does not contain any restricted development areas. Based on required density, the SFR land requires a minimum of 53 dwelling units (17.66 NSA x 3). The maximum allowed dwelling units is 102 (17.66 NSA x 5.8). The proposed 100 dwelling units are within the allowable density range and therefore meet the density requirement.

17.34 – SFR Single Family Residential Zoning District

24. The applicant proposes 100 single family detached dwellings in conformance with minimum and maximum density requirements, as detailed above in the analysis for Chapter 17.30.

25. Section 17.34.10 lists single family detached dwellings as a permitted use. The proposed subdivision includes 100 lots for single family detached dwellings. **All homes shall provide building design features in compliance with the standards in Section 17.90.150.**
26. The proposed lots range in size from 7,500 square feet to 9,706 square feet. **All homes shall meet the development standards of Section 17.34.30.**
27. Section 17.34.40 contains minimum requirements for development. All lots will be required to connect to City services. The applicant is also required to extend utilities to the furthest extent of the subject property.

17.80 – Additional Setbacks on Collector and Arterial Streets

29. Section 17.80.10 specifies additional setbacks for structures constructed adjacent to collector and arterial streets. The applicant is proposing to construct Gunderson Road from the southern boundary of the site to an intersection with Highway 211, but not construct the portion of Gunderson Road along Lots 55-59. Gunderson Road is classified as a minor arterial and therefore requires all lots along its right-of-way to meet the requirements of Chapter 17.80. Based on the applicant's updated proposal (Exhibit W), five of the proposed lots (Lots 55-59) will contain frontage on Gunderson Road. **All structures shall maintain a minimum 20-foot setback from the Gunderson Road public right-of-way.** The Preliminary Plat (Exhibit C, Sheet P1-04) depicts building envelopes at 20 feet from the Gunderson Road right-of-way.

17.82 – Special Setbacks on Transit Streets

30. Section 17.82.20 contains standards for building orientation on transit streets. Gunderson Road is a designated transit street. While the portion of Gunderson Road along Lots 55-59 may not have public improvements completed in conjunction with Bailey Meadows, Gunderson Road will eventually be extended along the southern edge of Lots 55-59. This is consistent with the TSP, which details Gunderson Road along the southern edge of the subject property. This is also consistent with the applicant's updated proposal (Exhibit W), which shows Lots 55-59 will ultimately have frontage on Gunderson Road. Staff asked the applicant whether they wanted to apply for a Special Variance to the requirements of Section 17.82.20 to allow the front door for the houses on lots along Gunderson Road to face the internal street network instead of Gunderson Road, which is a designated transit street. The applicant stated they did not want to apply for the variance. **The applicant shall update the Plan Set to detail the front door of the houses on Lots 55-59 to face Gunderson Road. The primary entrance shall connect directly to Gunderson Road via a pedestrian route per Section 17.82.20.**

17.84 – Improvements Required with Development

31. Section 17.84.20 contains requirements for the timing of improvements. Submission of preliminary street and utility plans during the land use review process is solely for compliance with the data requirements of Section 17.100.60 (D). **Public improvement plans are subject to a separate review and approval process. Preliminary plat approval does not connote approval of public improvement construction plans.** The applicant is proposing a phasing plan with this application. The applicant is proposing three phases and the submitted narrative (Exhibit B) states that improvements are planned to be phased with the approved plans.

32. Section 17.84.30 requires sidewalks along all public streets. Section 17.84.30(B) requires pedestrian and bicyclist facilities to minimize travel distance between residential areas, planned developments and parks. Sidewalks abutting the proposed lots shall be constructed in association with development of the lots. **The applicant shall construct sidewalks along Tract A both on Ponder Lane and Street B, prior to final plat approval. The sidewalks on local streets shall be five feet in width and separated by a five foot wide planter strip (or 6 foot wide swale) in areas not transverse by driveways.** The applicant is not proposing to construct any portion of Gunderson Road on the subject property. Based on the November 2019 updated submittal, the applicant is proposing that the portion of Gunderson Road along the southern property line would be entirely located on the property to the south rather than split across the property line. The City Engineer (Exhibit Y) submitted the following comment based on the original submittal: “Melissa Avenue is classified in the City of Sandy Transportation System Plan (TSP), figure 5, as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No. 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations. We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case an evacuation is needed. A review by the Fire Department is needed to confirm whether an additional emergency access is needed or not. However, we recommend as a minimum a temporary/ emergency access to Hwy 211.” Additional access for emergency vehicles would exist if the applicant extends Gunderson Road as proposed in the updated November 2019 submittal.
33. With the applicant’s updated submittal in November 2019, the applicant is proposing a pedestrian tract (Tract B) to connect the proposed subdivision to future development to the west. **The applicant shall construct the pedestrian tract (Tract B) improvements prior to final plat approval. Pedestrian scale lighting connected to the street light circuit shall be provided in the pedestrian easement. The Tract B walkway shall be conveyed to the City on the Final Plat. The walkway within the tract shall be constructed of concrete at 8 feet in width with a 7 foot wide area for trees and landscaping. The applicant shall install bollards at the east end of the tract to restrict vehicles from accessing the tract.**
34. Section 17.84.30(C) states that where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80. The City’s current TSP maps were created with the former UGB boundaries (pre-June 2017) and did not include the subject property that was brought into the revised UGB boundaries. Therefore, there are no trail linkages identified in the TSP for this property.
35. Section 17.84.40 contains standards for public transit and school bus transit. The Transit Director did not comment on the application. Transit amenities are not required.

36. Section 17.84.50 contains standards for street improvements and traffic evaluations. The initial Traffic Impact Analysis (Exhibit F) was completed by Lancaster Engineering and is dated June 20, 2019. The traffic assumptions are based on the 10th Edition Trip Generation handbook. The analysis is based on the construction of 100 single-family homes. The trip rates indicate that upon full occupancy the subdivision will generate about 74 trips during the morning peak hour and 99 trips during the evening peak hour, with a weekday total of 944 trips. The study looked at four intersections: SE 362nd Drive at Dubarko Road, Ruben Lane at Dubarko Road, Dubarko Road at Melissa Avenue, and Dubarko Road at Bluff Road. The study found that all study intersections are operating acceptably per City of Sandy performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development. The Traffic Impact analysis concludes that no significant safety issues or trends are evident at the study intersections, traffic signal warrants were not met at the study intersections under all analysis scenarios and left-turn warrants are not estimated to be met under any analysis scenario. The study also did not look at the intersection of Melissa Avenue and Rachael Drive. Based on the applicant's updated November 2019 submittal and the proposal to extend Gunderson, the applicant submitted a revised traffic analysis with its UGB expansion application. The revised analysis finds that with the addition of Gunderson Road, it would capture 40 percent of new trips from Bailey Meadows and 30 percent of existing trips from Melissa Avenue. According to the revised traffic analysis, the addition of Gunderson Road would result in a total daily volume of 1378 trips for Melissa Avenue. As of the date of this report, the updated traffic analysis is being reviewed by the city's consulting traffic engineer.

The City Engineer (Exhibit Y) reviewed the original Traffic Impact Analysis and noted the following: "The study doesn't identify any concerns as a result of this development." Although the TIA itself didn't identify concerns, the City Engineer cited concerns regarding further deterioration of Melissa Avenue, as well as the detrimental effect that increased traffic volumes through one access would have on overall life and safety.

37. Section 17.84.50(B) contains the spacing standards for new arterial streets. The proposed subdivision boundaries do not include any new arterial or collector streets on the subject property; however, the applicant is proposing to construct a portion of Gunderson Road on the property to the south. Gunderson Road is defined as a minor arterial in the transportation system plan.
38. Section 17.84.50(C) requires local streets to be designed to discourage through traffic and requires cul-de-sacs to not exceed 400 feet in length nor serve more than 20 dwelling units. The proposal includes a knuckle but does not include any cul-de-sacs.
39. Section 17.84.50(D) requires development sites to provide access from a public street improved to City standards. The proposed street network and improvements generally comply with City standards. There are eight local streets inside the proposed subdivision requiring the improvements listed below.
40. Ponder Lane north/south: Ponder Lane north/south requires half-street improvements including 14 feet of asphalt, concrete curbs, 5-foot wide sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. **The applicant shall install bollards along**

the east terminus of Street B, Ponder Lane east/west, Street C, and Street D. The applicant shall also install ‘no parking’ signs along the full length of Ponder Lane north/south at a spacing as determined during construction plan review.

41. Ponder Lane east/west: Ponder Lane east/west requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Ponder Lane east/west ending before the development site boundary. **The applicant shall extend the street improvements on Ponder Lane east/west to the east and west line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**
42. Street A: Street A requires full-street construction to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. Staff requested the applicant remove the proposed knuckle and extend Street A to the west to allow for future street connection. Rather than extend the entirety of Street A to the property to the west, the applicant is proposing to install a pedestrian tract (Tract B) between Lots 10 and 11 (Exhibit S). Staff is satisfied with this proposed improvement, which will improve the future bicycle and pedestrian connectivity of the area. **The applicant shall construct the pedestrian tract (Tract B) improvements prior to final plat approval.** The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street A ending before the development site boundary. Section 17.84.50(E) requires extension of street improvements “to the edge of adjacent properties.” **The applicant shall extend the street improvements on Street A to the east property line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**
43. Melissa Avenue: Melissa Avenue requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strip, street trees, ADA ramps, and public utilities. **The applicant shall install the required local street improvements north of the property boundary to connect to the existing Melissa Avenue stub.** Based on feedback from the residents in the Nichols Glen neighborhood there is concern with accidents at the intersection of Melissa Avenue and Rachael Drive. A stop sign already exists at the intersection of Melissa Avenue and Rachael Drive for southbound traffic on Melissa Avenue. Upon further analysis, staff finds that an additional stop sign could help reduce potential conflicts. A stop sign should also be installed for northbound travel on Melissa Avenue. **The applicant shall install a stop sign at the intersection of Melissa Avenue and Rachael Drive for northbound traffic.**
44. Street B: Street B requires full-street improvements to local standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street B ending before the development site boundary. **The applicant shall extend the street improvements on Street B to the east and west lines of the development**

site and obtain slope easements or construct retaining walls as necessary to comply with this section of the development code.

45. Avenue 1: Avenue 1 requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities.
46. Avenue 2: Avenue 2 requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Avenue 2 ending before the development site boundary. **The applicant shall extend the street improvements on Avenue 2 to connect with Gunderson Road on the property to the south.**
47. Street C: Street C requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street C ending before the development site boundary. **The applicant shall extend the street improvements on Street C to the east and west line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**
48. Street D: Street D requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street D ending before the development site boundary. **The applicant shall extend the street improvements on Street D to the east and west line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**
49. Gunderson Road: Subject to a UGB approval, the applicant will dedicate right-of-way to accommodate the eventual construction of Gunderson Road to a minor arterial standard, consistent with page 4, Exhibit W. Dedication of right-of-way to the City of Sandy for Gunderson Road shall include the intersection connection to Highway 211. **The applicant shall construct Gunderson Road to contain two travel lanes with at least 24 feet of paved width.** Additional Gunderson improvements (for example, a wider paved width, bicycle lanes, street trees, etc.) could occur in accordance with a development agreement the city and the applicant will execute. No public utilities are required to be installed in the Gunderson Road right-of-way at this time. **If the UGB application is approved, the applicant shall submit an analysis of the proposed Gunderson Road alignment at Highway 211 to properly connect with Cascadia Village Drive as identified in the TSP. The proposed alignment shall meet code standards such as tangency, or the applicant shall apply for a design exception. ~~The applicant shall submit an analysis of their proposed Gunderson Road alignment that confirms that if Gunderson Road intersects with Highway 211 at the location proposed by the applicant, it can still connect to Cascadia Village Drive as identified in the TSP while meeting code standards such as tangency.~~ If the UGB application is approved, the applicant shall**

dedicate the right-of-way for Gunderson Road. If the UGB application is not approved, the applicant shall grant the City an easement to permit the eventual dedication of right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City's transportation system plan.

50. Highway 211: Highway 211 will need improvements at the intersection with Gunderson Road. **The improvements to Highway 211 shall meet the requirements of ODOT -or- alternatively AASHTO standards if the highway is transferred to the City of Sandy.** The city and ODOT are currently discussing a transfer of jurisdiction of Highway 211 from ODOT to the City of Sandy. The portion that ODOT would transfer would include the Gunderson Road intersection.
51. Section 17.84.50(E) states that to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies). The applicant is not proposing any permanent dead-end streets but proposes that Street A, Street B, Ponder Lane, Street C, and Street D be temporary dead-end streets with construction of this subdivision until such a time as these streets are extended onto the adjoining properties to the west, east, and south. **The applicant shall plat a vehicle non-access reserve (VNAR) strip at the east and west ends of Streets B, C, and D, the west ends of Gunderson Road and the east/west portion of Ponder Lane, and the east end of Street A.** The applicant is proposing fire turn-arounds and an emergency access that connects to Highway 211 via Ponder Lane. **The applicant shall work with the Fire Marshall to determine if the proposed plan meets Fire Code requirements, other than second access requirements which the Fire Marshall determined to be met. Per ODOT (Exhibit AA), the applicant shall provide turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT or the City, depending on which entity has jurisdiction over the intersection. The applicant shall work with the Fire Marshal to determine if the proposed plan meets Fire Code. Per ODOT (Exhibit AA), the applicant shall provide emergency vehicle turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT.**
52. Section 17.84.50(F) requires that public street improvements may be required through a development site to provide for the logical extension of an existing street network. The proposal includes the extension of Melissa Avenue from the Nicholas Glen subdivision. The submitted Conceptual Connectivity Plan (Exhibit D) details how the proposed street network could tie into the Bornstedt Village Plan.
53. Section 17.84.50(G) states that with the exception of extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. The applicant has not proposed any new street names. **The City of Sandy reserves the right to name streets.**
54. Section 17.84.50(H) contains standards for public street locations, grades, alignment, and widths. Per the City Engineer (Exhibit Y), **the developer's engineer shall provide a profile design for a minimum of 200 feet for all future extensions of stubbed streets past the project boundary to ensure future grades can be met.**

55. Section 17.84.60 contains standards for public facility extensions. The applicant's Preliminary Street and Utility Plan (Exhibit C, Sheet 5) depicts the location and type of proposed public utilities including water, sanitary sewer, and stormwater. **All public utility installations shall conform to the City's facilities master plans. Staff recommends the applicant revise the utility plan to include broadband fiber locations as detailed by the SandyNet Manager and as required by 17.84.60(A).** Per the City Engineer (Exhibit Y), **all public sanitary sewer and waterline mains shall be a minimum of 8 inches in diameter and all stormwater drains shall be a minimum of 12 inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties. No building permits will be issued until all public utilities including sanitary sewer are available to serve the development. The applicant shall pay plan review, inspection, and permit fees as determined by the Public Works Director.** The utility improvements proposal and requirements for the Bailey Meadows subdivision are further detailed in Sections 17.100.230, 17.100.240, and 17.100.250 below. Except for the stormwater treatment and detention facility identified in Exhibit W, no city utilities will be required in the right-of-way of Gunderson Road.
56. Section 17.84.80 contains specifications for franchise utility installations. Private utility services will be submitted for review and approval by service providers and City staff in association with construction plans, and all utility lines will be extended to the perimeter of the site. **All franchise utilities shall be installed underground and in conformance with City standards.** PGE submitted a comment (Exhibit Z) stating they did not find any conflicts related to the project but that there's a PGE project located on SE Ponder Lane. Per PGE's request, **the applicant shall call the PGE Service Coordinators at (503) 323-6700 when the developer is ready to start the project.**
57. Section 17.84.90 contains requirements regarding land for public purposes. The applicant proposes a 22,521 square foot public stormwater detention pond (Tract A) and 1,460 square feet for a pedestrian access tract to the west (Tract B). The applicant is also proposing a second stormwater detention pond (Tract C) on Tax Lot 701 to the south of the Bailey Meadows. This second stormwater detention pond on Tax Lot 701 is for the collection and treatment of stormwater from Gunderson Road and Highway 211. **The applicant shall grant the stormwater pond (currently noted as Tract C) by easement.**
58. **The plat shall detail the following easements:**
- **An eight-foot wide public utility easement (PUE) along the frontage of all proposed lots;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 26-29;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 37-38 and 41-42;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 38-39 and 40-41;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 48-51;**

- **A 15-foot private storm drainage easement along the common lot lines of Lots 47-48 and 51-52;**
- **A vehicle non-access reserve (VNAR) strip in the following locations:**
 - **East end of Street A**
 - **West end of Street B**
 - **West end of Ponder Lane (east/west portion of right-of-way)**
 - **West end of Street C**
 - **West end of Street D**

59. Section 17.84.100 contains requirements for mail delivery facilities. The applicant will need to coordinate with the United States Postal Service (USPS) to locate mail facilities and these will be approved by the City and USPS. **Mail delivery facilities shall be provided by the applicant in conformance with 17.84.100 and the standards of the USPS. The applicant shall submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and USPS for review and approval prior to installation of mailboxes.**

60. All public utility installations shall conform to the city's facilities master plans. **No building permits will be issued until all public utilities including sanitary sewer are available to serve the subdivision and the Final Plat has been recorded.** Public utilities must be installed to meet City standards. **Development of this subdivision will require payment of system development charges in accordance with applicable city ordinances.**

17.86 – Parkland and Open Space

61. Section 17.86.10 contains the minimum parkland dedication requirements. The applicant proposes 100 single-family detached dwellings with this subdivision request. Based upon the calculations adopted by the City and specified within Section 17.86.10, the required dedication area is 1.29 acres of public parkland (100 proposed units x 3 persons per unit x .0043=1.29 acres to be dedicated).
62. Section 17.86.40 contains factors for the City to evaluate whether to require parkland dedication based on this formula or collect a fee in lieu of dedication. This section specifies that it is entirely at the city's discretion to accept payment of a fee in lieu of the land dedication or require the dedication. Based on the calculations specified in Section 17.86.10, the applicant is responsible for dedicating 1.29 acres of public parkland based on 100 dwelling units. No parkland is specifically identified on the subject property in the Parks Master Plan; however, a community park is identified just north of the subject property. The conceptual location of the community park is in an already-built subdivision, Nicolas Glen, that was constructed without an active park, but did include dedication of some open space along the Tickle Creek Trail. The Parks Master Plan identifies conceptual locations for parks; thus, a community park should still be located somewhere in the general vicinity of where it is conceptually located in the Parks Master Plan. The Parks and Trails Advisory Board recommended dedication of parkland rather than collecting a fee-in-lieu. In early 2019 the City Council had an opportunity to review the option of requiring parkland or accepting a fee in-lieu for the Bailey Meadows property. City Council decided that accepting a fee in-lieu was satisfactory.

63. **The applicant shall pay a fee in lieu for the required parkland dedication per the adopted Fee Resolution.** Per Resolution 2013-14, the required fee in lieu amount is \$241,000 per acre if the entire amount is paid prior to final plat approval. Therefore, **based on the current Fee Resolution, the applicant is required to pay a fee in lieu of dedication for a total of \$310,890 (1.29 acres of land to be dedicated x \$241,000).** Alternatively, Ordinance 2013-03 allows the applicant to pay a minimum of 50 percent of the fee to receive final plat approval with the remaining balance to be paid as a proportionate amount with each building permit. If a portion of the fee is deferred, Resolution 2013-14 specifies a per acre fee of \$265,000. **Currently, the Fee Resolution requires payment of \$341,850 if a portion of the fee is deferred, a minimum of 50 percent (\$170,925) paid prior to final plat approval and the remaining 50 percent (\$170,925) divided between the 100 lots (\$1,709.25/lot).**
64. An alternative to dedication of parkland in the Bailey Meadows subdivision could be a dedication of parkland on the property to the south of Bailey Meadows that is being proposed for the extension of Gunderson Road. In fact, in its January 7 UGB expansion application, the applicant included approximately 2.4 acres of TL 701 to be dedicated to the city as parkland. The applicant was subsequently asked to evaluate the proposed dedication relative to the standards in Section 17.86.20. As of the date of this report, the city has not received an evaluation from the applicant. **If the applicant dedicates parkland to the south of Bailey Meadows instead of paying the fee in-lieu the applicant and City Manager, on behalf of City Council, shall negotiate the terms of the parkland dedication.**
65. Section 17.86.50 contains standards for open space dedication. The applicant is not proposing any dedication of open space.

17.92 – Landscaping and Screening

66. Section 17.92.10 contains general provisions for landscaping. Per Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4-½ feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4-½ feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention will be discussed in more detail under Chapter 17.102 in this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
67. Section 17.92.30 specifies that street trees shall be chosen from the City-approved list. As required by Section 17.92.30, the development of the subdivision requires medium trees spaced 30 feet on center along street frontages. The submitted Street Tree Plan (Exhibit C, Sheet P1-22) identifies street trees along all of the proposed streets. The proposed plan details 115 street trees placed 50 feet on center. **The applicant shall update the Street Tree Plan to detail street trees placed 30 feet on center.**

The applicant is proposing to mass grade the buildable portion of the site. This will remove top soil and heavily compact the soil. In order to maximize the success of the required street trees, **the applicant shall aerate the planter strips to a depth of 3 feet prior to planting street trees.**

The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase. The applicant shall call for an inspection with the City after aerating the soil and before planting the street trees.

If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade and shall be planted per the City of Sandy standard planting detail. Trees shall be planted, staked, and the planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. Tree ties shall be loosely tied twine or other soft, elastic material and shall be removed after one growing season (or a maximum of 1 year).

68. Section 17.92.40 requires that all landscaping shall be irrigated, either with a manual or automatic system. **As required by Section 17.92.140, the developer and lot owners shall be required to maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.**
69. Section 17.92.50 specifies the types and sizes of plant materials that are required when planting new landscaping. Street trees are typically required to be a minimum caliper of 1.5-inches measured 6 inches from grade. **All street trees shall be a minimum of 1.5-inches in caliper measured 6 inches above the ground and shall be planted per the City of Sandy standard planting detail.** The applicant proposes eight (8) distinct street tree species with one (1) tree species per street/block face. Staff would like to see more diversity in street tree species in general and within each block. **The applicant shall update the plan set to detail a minimum of two (2) different tree species per block face for staff review and approval.**
70. Section 17.92.60 requires revegetation in all areas that are not landscaped or remain as natural areas. The applicant did not submit any plans for re-vegetation of areas damaged through grading/construction, although most of the areas affected by grading will be improved. **Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two years following the date of recording of the final plat associated with those improvements. The applicant shall maintain all unlandscaped and/or revegetated areas for a period of two (2) years following the date of recording of the final plat associated with those improvements.**
71. Section 17.92.130 contains standards for a performance bond. The applicant has the option to defer the installation of street trees and/or landscaping for weather-related reasons. Staff recommends the applicant utilize this option rather than install trees and landscaping during the dry summer months. **Consistent with the warranty period in Section 17.92.140, Staff staff recommends a two-year three-year maintenance and warranty period for street trees based on the standard establishment period of a tree. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring installation within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping**

contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a two-year ~~three-year~~ maintenance and warranty period.

17.98 – Parking, Loading, and Access Requirements

72. Section 17.98.20 requires two off-street parking spaces per single family detached dwelling unit. The 100 dwelling units proposed in this subdivision requires 200 off-street parking spaces. Each lot will have a driveway and based on lot width the ability to construct a double car garage.
73. Section 17.98.50 has specifications for parking area setbacks. Garages are required to be at least 22 feet setback from the front property line to meet setback requirements in the SFR zoning district. The Preliminary Plat (Exhibit C, Sheet P1-04) details a typical 22 foot garage setback.
74. Section 17.98.60 has specifications for parking lot design and size of parking spaces. **The applicant shall comply with the parking standards in Section 17.98.60.** The parking areas in front of the proposed garages for all lots need to be at least 10 feet in width by 20 feet in length. Driveways for single family homes are required to be at least 10 feet wide as detailed in Section 17.98.100 below. **The applicant shall comply with the parking standards in Chapter 17.98. Garages shall be at least 18 feet in depth to accommodate vehicle parking and the on-street parking spaces shall be at least 22 feet in length. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material. ~~The garages shall be adequate depth to park a vehicle and the on-street parking spaces shall be at least 22 feet in length.~~**
75. Section 17.98.80 specifies access requirements to arterial and collector streets. The applicant proposes Gunderson Road to the south of the Bailey Meadows property. Gunderson Road is defined as a minor arterial in the Transportation System Plan and will not include any proposed driveways to any of the proposed lots in Bailey Meadows.
76. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet. The Public Works driveway approach standard detail specifies a maximum of 24 feet wide for a residential driveway approach. The Preliminary Numbered Parking Plan (Exhibit E) details driveway curb cuts for all lots. The Parking Plan also details temporary emergency vehicle and franchise waste hauler turnaround locations, which also include driveway curb cuts. This results in numerous extra curb cuts. With the exception of Lot 8, it appears that all driveways are detailed at approximately 24 feet in width, but the proposed driveway spacing lacks linear space for street trees. Staff previously recommended that the applicant extend Street A to the west property boundary, which would eliminate the knuckle and the need to combine driveways on Lots 9 and 10, and the driveway on Lot 8 would no longer be on a curve. Rather than extend Street A to the west property boundary, the applicant is proposing to install a pedestrian tract (Tract B) between Lots 10 and 11. **The applicant shall update the plan set to detail all driveways at a maximum of 24 feet wide. The applicant shall combine driveways for Lots 9 and 10 into a shared driveway or reduce the width of the driveways for Lots 9 and 10 to accommodate street trees and other right-of-way amenities.** The applicant is not proposing any shared driveways; however, many of the proposed driveways on adjacent lots are located directly adjacent to each other. In order to increase on-street parking,

maximize street tree planting, and reduce pedestrian conflict, **the applicant shall submit one of the following two options for staff review and approval:**

- a. **Submit a revised plan detailing shared driveways that that do not exceed 24 feet wide with crossover easements; or,**
- b. **Submit a detailed driveway spacing plan that conserves frontage and maximizes area for street trees and on-street parking.**

77. Section 17.98.130 requires that all parking and vehicular maneuvering areas shall be paved with asphalt or concrete. As required by Section 17.98.130, **all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.**
78. Section 17.98.140 contains requirements for drainage. Other sections of this order detail the stormwater requirements.
79. Section 17.98.200 contains requirements for providing on-street parking spaces for new residential development. The Preliminary Numbered Parking Plan (Exhibit E) identifies a total of 122 on-street parking spaces with at least one (1) on-street parking space within 200 feet of each of the 100 lots. No parking courts are proposed. The location of fire hydrants will be reviewed by the Sandy Fire Department in more detail with Construction Plans. **The applicant shall revise the Parking Analysis if required fire hydrants affect on-street parking spaces.**

17.100 – Land Division

80. Submittal of preliminary utility plans is solely to satisfy the requirements of Section 17.100.60. **Preliminary plat approval does not connote utility or public improvement plan approval which will be reviewed and approved separately upon submittal of public improvement construction plans.**
81. Section 17.100.60(E) contains submittal requirements and criteria for approving residential subdivisions. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The applicant requests subdivision approval for a subdivision that is in compliance with most of the applicable development standards. The application for the subdivision is being processed through a Type III procedure. The proposal is consistent with density and other dimensional standards of the base zoning district.
82. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. Consistency with design standards in this chapter are discussed under each subsection below. Conditions of approval can be adopted where necessary to bring the proposal into compliance with applicable standards.
83. Section 17.100.60(E)(3) requires the proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy. The proposed street pattern is generally consistent with the Comprehensive Plan and the city’s standards. The exception is the fact that the subdivision as originally proposed would rely solely on Melissa Avenue for access. The applicant asserts that it is legally entitled to rely solely on Melissa Avenue based on provisions of state law that apply to applications for housing. Staff consulted with the city

attorney, who advised that the Land Use Board of Appeals and appellate courts have increasingly scrutinized standards applied to housing to determine whether they are “clear and objective.” Staff will defer to the applicant’s legal counsel and the city attorney to provide more information on these issues at the hearing. However, instead of arguing over and potentially litigating these issues, the applicant and the city have focused on trying to provide a second access to the subdivision. This resulted in the applicant’s revised November 2019 submittal which proposed Gunderson Road and the applicant applying for a UGB expansion earlier this month. With the inclusion of Gunderson Road and subject to a condition of approval, the street pattern will be consistent with the TSP. Therefore, the proposed subdivision meets Approval Criteria 3 of Section 17.100.60(E).

84. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. All public utilities including water, sewer and stormwater are available or will be constructed by the applicant to serve the Bailey Meadows Subdivision. The original submission did not include Gunderson Road. As discussed above, the applicant is now proposing a solution that would provide Gunderson Road and, as conditioned, will be consistent with the TSP. Therefore, the proposed subdivision meets Approval Criteria 4 of Section 17.100.60(E).
85. Section 17.100.60(E)(5) requires all proposed improvements to meet City standards through the completion of conditions as listed within this final order and as detailed within these findings. The detailed review of proposed improvements is contained in this report. Staff has identified a few aspects of the proposed subdivision improvements requiring additional information or modification by the applicant, but conditions of approval can be adopted to bring the proposal into compliance with City standards.
86. Section 17.100.60(E)(6) strives to ensure that a phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops. The applicant is proposing to construct the 100 lot subdivision in three (3) phases. The application includes phase one with 71 lots, phase two with 8 lots, and phase three with 21 lots. The phasing plan is somewhat confusing, and staff has not determined the reasoning for the proposed placement of the phase lines. The applicant’s narrative simply states, “As shown on the Preliminary Subdivision Plat in the Preliminary plans, the subdivision is planned to be completed in three phases and provide necessary public improvements concurrently with each phase. Additionally, the planned offsite extension of Gunderson Road is intended to occur in Phase 1 of the project, though the future minor arterial road is not within the Phase 1 boundary (as the improvements are offsite). The above requirements are satisfied and support the City’s approval of this Subdivision”. The importance of Gunderson Road is well established in this staff report and through public testimony. **If the UGB application is approved, Gunderson Road shall be constructed and accepted by the City prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval.**
87. Conditions of approval regarding phasing can be adopted to bring the proposal into compliance with City standards.

88. The Final Plat shall be recorded as detailed in Section 17.100.60 (I).

89. Section 17.100.70 specifies that all land divisions shall be in conformance with the requirements of the applicable base zoning district. The applicant did not request any variances; however, the submitted plans indicate the applicant would like a variance to Section 17.82.20 to have the front door for the houses along Gunderson Road face the interior local street network instead of Gunderson Road, which is designated as a transit street. During the completeness check, staff requested that the applicant clarify whether or not they wanted to apply for a variance. The applicant said they did not, thus **houses constructed along Gunderson Road will be required to face Gunderson Road**. Based on the updated proposal (Exhibit W), this would include Lots 55-59. The tentative plat shall otherwise be designed to comply with all standards of the City of Sandy Development Code, Transportation System Plan, Facilities Master Plans and Sandy Municipal Code.
90. Section 17.100.100(A) requires the pattern of streets established through land divisions should be connected to provide safe multimodal options, create a logical pattern of circulation, and spread traffic over many streets. The proposed development is moderately conducive to walking and biking while accommodating motor vehicles. The applicant is proposing a knuckle rather than extending Street A to the west property boundary. Staff recommended the applicant extend Street A to the west property boundary. The applicant is proposing to construct a pedestrian walkway instead. The walkway (Tract B) will be located between Lots 10 and 11 and will provide bicycle and pedestrian connectivity to the west in the future. The addition of Gunderson Road will provide additional bicycle options, albeit Highway 211 is not conducive to bicycling at this time.
91. Section 17.100.100(B) contains requirements for preparing transportation impact studies. The submitted Traffic Impact Analysis (Exhibit F) was completed by Lancaster Engineering and is dated June 20, 2019. The traffic analysis is discussed in Section 17.84.50 of this document.
92. Section 17.100.100(C) requires that all streets follow topographic and arrangement specifications. Considering the site's topography, the proposed street layout is acceptable given the topography and residential use of this site, and the topography and use of adjacent properties.
93. Section 17.100.100(D) specifies that street layout shall generally use a rectangular grid pattern. The applicant proposes a rectangular pattern of streets with one knuckle at the intersection of Street A and Avenue I. Future development to the south, east, and west will be required to align with the proposed intersections in order to maintain a rectangular grid pattern and maximize pedestrian, bicycle, and vehicular connectivity. Staff recommended the applicant extend Street A to the west property boundary. The applicant is proposing a pedestrian tract (Tract B) instead, which will improve future bicycle and pedestrian connectivity to the west. Staff is satisfied with this proposed improvement, which will improve the future bicycle and pedestrian connectivity of the area.
94. Section 17.100.100(E) requires that future street plans assure access for future development and promote a logical, connected pattern of streets. The proposed local street plan has been designed to facilitate the traffic needs of this development while ensuring there are no intersection

conflicts with future development. Per the City Engineer (Exhibit Y), **the applicant shall provide a profile design for a minimum of 200 feet for all future street extensions beyond the project boundary to ensure future street grades can be met.**

95. Sections 17.100.100(F) contain specifications for street connections and exemptions for when typical connections are not possible. The proposed design extends Melissa Avenue south into the site. All proposed streets will allow connection with future development to the south and east, with the exception of Street A, which ends in a knuckle. Staff recommended the applicant extend Street A extending to the west property boundary. The applicant is proposing to install a pedestrian tract (Tract B) instead. The applicant submitted a Conceptual Connectivity Plan (Exhibit D) that shows how the proposed streets can connect to the streets to the east in compliance with the Bornstedt Village Plan.
96. Section 17.100.110 specifies street standards and roadway functional classifications. Section 17.100.110(E) contains standards for local street spacing at 8-10 local streets per mile. All proposed streets in the subdivision are local streets, including the extension of the existing Melissa Avenue into the site. The TSP details Gunderson Road, a minor arterial, along the south property boundary. The applicant is proposing to install Gunderson Road as an off-site improvement to intersect with Highway 211.
97. Section 17.100.120(B) requires that residential blocks for local streets not exceed 400 feet in length, unless physical conditions justify larger blocks. The applicant is not proposing any blocks greater than 400 feet. The applicant is proposing a knuckle where Street A and Avenue 1 intersect. Staff recommended the applicant extend Street A to the west property boundary. The applicant is proposing to install a pedestrian tract instead.
98. Section 17.100.120(D) requires blocks over 600 feet in length to provide a pedestrian and bicycle accessway. None of the proposed blocks exceed 600 feet in length.
99. Section 17.100.130 contains specifications for proposed easements. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) details an 8 foot wide public utility easement along all street frontages. The plat shall detail all proposed easements as detailed in Section 17.84.90 above.
100. Section 17.100.180 contains requirements for the creation of new intersections. The proposed intersections are all right angles and meet the required minimum spacing standard of 150 feet as required in Section 17.84.50(C)(2).
101. Section 17.100.210 specifies that the applicant is financially responsible for the installation of a lighting system. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. The applicant will need to install street lights along all street frontages wherever street lighting is determined insufficient. **The locations of the street light fixtures shall be reviewed in detail with construction plans.**
102. Section 17.100.220 contains requirements for lot arrangement, lot dimensions, and other lot specifications. The Single Family Residential (SFR) zoning district requires lots at least 7,500 square feet in area. The proposed lots range in size from 7,500 square feet to 8,659 square feet.

All homes are required to comply with setback standards and maximum building height limitations as required in Chapter 17.34. No lots are proposed to be accessed from a major or minor arterial. All lots are required to comply with clear vision requirements at all intersections.

103. Section 17.100.230 contains specifications for water lines and fire hydrants. The specific details of water facilities will be reviewed with construction plans. The utility plan submitted by the applicant shows a connection to the existing 8-inch water main at the intersection of Melissa Avenue and Rachael Drive and a possible connection to the existing 8-inch water line at the intersection of Arletha Court and Hwy 211. **The applicant shall demonstrate that adequate fire and domestic flow will be available by completing these connections.** Per the City Engineer (Exhibit Y), **all new waterlines shall be a minimum of 8-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.** The applicant's proposed Utility Plan (Exhibit C, Sheet P1-07) depicts new hydrants. **The location of fire hydrants shall be reviewed by the Sandy Fire Department in more detail with construction plans.**
104. Section 17.100.240 specifies requirements for sanitary sewer lines. The specific details of sanitary sewer facilities will be reviewed with construction plans. Per the City Engineer (Exhibit Y), **all new public sanitary sewer lines shall be a minimum of 8-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.** In order to achieve the necessary depth to drain the development site the proposed utility plan shows an 8-inch sanitary sewer line extended north to the existing sewer line in Melissa Avenue approximately 200 feet from the intersection of Rachel Drive and Melissa Avenue.
105. Section 17.100.250 contains specifications for surface drainage and stormwater systems. The applicant proposes a 22,521 square foot public stormwater detention pond (Tract A) to be dedicated to the City of Sandy. Detained and treated discharge from the detention pond is proposed to be discharged to the adjacent property to the west, which is outside of the UGB. Per the Public Works Director (Exhibit O), **the applicant shall demonstrate that the proposed subdivision does not exceed pre-development site runoff discharges to this same point and provide information on the dimensions and slope of the existing drainage way. The detention pond shall meet the requirements of the 2016 City of Portland Stormwater Management Manual (SWMM) for landscaping, Section 2.4.1, and escape route, Section 2.30. All new public storm drains shall be a minimum of 12-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.** The City Engineer (Exhibit Y) states the submitted preliminary stormwater calculations meet the water quality and water quantity criteria as stated in the City of Sandy Municipal Code Chapter 13.18 Standards and the City of Portland current Stormwater Management Manual (SWMM) Standards that were adopted by reference into the Sandy Development Code. Per the City Engineer, **the applicant shall submit a detailed final stormwater report stamped by a licensed professional to the City for review and approval with the final construction plans.**
106. Section 17.100.260 states that all subdivisions shall be required to install underground utilities. **The applicant shall install utilities underground with individual service to each lot.**

107. Section 17.100.270 specifies that sidewalks shall be installed on both sides of a public street. The applicant proposes constructing sidewalks along all public street frontages, with the exception of the Ponder Lane north/south. **As defined in the analysis of Chapter 17.84 of this staff report the applicant shall install sidewalks and planter strips on the west side of Ponder Lane.**
108. Section 17.100.280 requires that when appropriate, bicycle routes shall be extended within the proposed subdivision. The applicant does not propose any specific bicycle routes. Gunderson Road is classified as a minor arterial, which is prescribed to include bicycle lanes in both directions. However, Gunderson Road will not be built to its full profile at this time and bicycle lanes will most likely not be constructed in Gunderson Road in conjunction with development of the Bailey Meadows subdivision.
109. Section 17.100.290 specifies that where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved. As required by Section 17.92.30, the development of the subdivision requires installation of trees along all street frontages. Street trees are discussed in Section 17.92.30 of this document.
110. Section 17.100.300 contains requirements for erosion control for new land divisions. **The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. All erosion control and grading shall comply with Section 15.44 of the Municipal Code and as detailed below. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit. The applicant shall submit confirmation from DEQ if a 1200-C Permit will not be required.**
111. Install all improvements detailed in Section 17.100.310 as required. **The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.**
112. Entry monument signs shall be located entirely outside the public right-of-way and clear vision areas as required by Section 17.74.30. **If entry signs are desired the applicant shall submit a detailed plan with a sign permit.**

17.102 – Urban Forestry

113. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. The subject property contains 23.42 acres and therefore compliance with this chapter is required. The subject property is currently a field, with very few trees. The applicant is not proposing any tree removal, with the exception of four (4) trees in the Melissa Avenue right-of-way and one (1) tree in the Ponder Lane right-of-way. With construction of Gunderson Road as recommended by staff, additional trees will need to be removed from the Gunderson Road right-of-way. Tree removal as required by the city or public utility for the installation or maintenance or repair of roads, utilities, or other structures is exempt from the requirements of Chapter 17.102 per Section

17.102.20(B.1). **The applicant shall not remove any trees 11-inches DBH or greater from the subject property or the property to the south where the off-site Gunderson Road extension will be constructed (if the UGB application is approved) that are located outside of the rights-of-way without applying for a tree removal permit and obtaining approval for tree removal.**

114. Section 17.102.50 contains tree retention and protection requirements. The subject property is 23.42 acres, which requires a minimum of 70 retention trees that are 11-inches or greater DBH and in good health. The applicant inventoried 192 total trees. Per the submitted Tree Preservation & Removal Plan (Exhibit C, Sheets P1-16-19), 19 of the inventoried trees are on the subject property. All of the 19 trees on the subject property are 11-inches or greater DBH; 17 are in good health, and 2 are in fair health. In order to meet the tree retention standard, the applicant cannot remove any of the 19 trees from the subject property. The applicant is proposing to preserve all 19 trees on the subject property. The properties directly north, south, east, and west of the subject site contain many existing trees, some of which are located close to the shared property line and have canopies that extend onto the subject property. The submitted Tree Preservation & Removal Plan (Exhibit C, Sheets P1-16-19) inventoried 173 trees offsite. Of the 173, five (5) trees are proposed to be removed in conjunction with future street construction of Melissa Avenue and Ponder Lane; the remaining 168 are proposed to be preserved. With dedication of Gunderson Road along the south edge of the property along Lots 55-59, additional trees will need to be eventually removed when the street is constructed. This could result in removal of three (3) trees on the subject property (Trees # 15164, 15236, and 15274). This would result in 16 trees being retained on the subject property. The Tree Preservation & Removal Plan details the optimal tree root zone at 1 foot per 1 inch DBH for all trees inventoried, including those on adjacent properties. **The applicant shall install tree protection fencing to protect all 16 trees on the subject property as well as the 154 trees proposed for retention on adjacent properties. The applicant shall retain an arborist on site to monitor any construction activity within the root protection zones of the trees on adjacent properties that have root protection zones that would be impacted by construction of Gunderson Road.** The applicant did not submit a tree inventory and removal plan for the off-site portion of Gunderson Road.

Section 17.102.50(B.1) requires tree protection fencing be placed no less than 10 horizontal feet from the outside edge of the trunk. Per the Pacific Northwest International Society of Arboriculture (ISA), the ISA defines the critical root zone (CRZ) as “an area equal to a 1-foot radius from the base of the tree’s trunk for each 1 inch of the tree’s diameter at 4.5 feet above grade (referred to as diameter at breast height).” Often the drip-line is used to estimate a tree’s CRZ; however, it should be noted that a tree’s roots typically extend well beyond its drip-line. In addition, trees continue to grow, and roots continue to extend. Thus, a proactive approach to tree protection would take into consideration the fact that the tree and its root zone will continue to grow. The submitted Tree Preservation & Removal Plan (Exhibit C, Sheets P1-16-19) details the optimal tree root zone at 1 foot per 1 inch DBH. **The applicant shall install tree protection fencing a minimum distance of 1 foot per 1 inch DBH, as indicated by the project arborist and recommended by the ISA. Tree protection fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade. The tree protection fencing shall be 6 foot tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by**

11 inches) to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated. No construction activity shall occur within the tree protection zone, including, but not limited to, dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures prior to any tree removal, grading, or other construction activity on the site.

OTHER CONSIDERATIONS FOR TREES:

To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of the 16 trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. This document shall include a sketch identifying the required retention trees and a 1 foot per 1 inch DBH radius critical root zone around each tree. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans; plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.

15.30 – Dark Sky

115. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. The applicant will need to install street lights along all street frontages wherever street lighting is determined necessary. **The locations of these fixtures shall be reviewed in detail with construction plans. Full cut-off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers in order to minimize negative impacts on wildlife and human health.**

15.44 – Erosion Control

116. The applicant submitted a Geotechnical Engineering Report (Exhibit I) prepared by GeoPacific Engineering, Inc., dated June 18, 2019. The City Engineer (Exhibit Y) reviewed the Geotechnical Engineering Report and recommends that **the applicant shall retain appropriate professional geotechnical services for observation of construction of earthwork and grading activities. The grading setbacks, drainage, and terracing shall comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report. When the grading is completed, the applicant shall submit a final report by the Geotechnical Engineer to the City stating that adequate inspections and testing have been performed on the lots and all of the work is in compliance with the above noted report and the OSSC. Site grading should not in any way impede, impound or inundate the adjoining properties.**

117. **All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended. The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite.** The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. **All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit. The applicant shall submit confirmation from DEQ if a 1200-C Permit will not be required.**

118. Section 15.44.50 contains requirements for maintenance of a site including re-vegetation of all graded areas. **The applicant's Erosion Control Plan shall be designed in accordance with the standards of Section 15.44.50.**

119. Recent development at both Zion Meadows subdivision and the remodel of the Pioneer Building (former Sandy High School) have sparked unintended rodent issues in the surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed.**

DECISION

Staff recommends the Planning Commission approve the Bailey Meadows subdivision with the conditions as outlined below.

CONDITIONS OF APPROVAL

A. Prior to submitting construction plans, including grading and erosion control permits, the applicant shall update the plan set and associated documents based on the conditions of approval determined by the Planning Commission and shall submit a full set of the updated plans to Planning Division staff for review and approval.

1. Submit a revised Preliminary Plat featuring the following:
 - An eight-foot wide public utility easement (PUE) along the frontage of all proposed lots;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 26-29;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 37-38 and 41-42;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 38-39 and 40-41;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 48-51;
 - A 15-foot private storm drainage easement along the common lot lines of Lots 47-48 and 51-52;
 - A vehicle non-access reserve (VNAR) strip in the following locations:
 - East end of Street A
 - West end of Street B
 - West end of Ponder Lane (east/west portion of right-of-way)
 - West end of Street C
 - West end of Street D

2. Submit a revised Tree Plan featuring the following modifications:

- If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.
 - Detail a minimum of two (2) different tree species per block face for staff review and approval.
3. If the UGB application is approved, the applicant shall submit an analysis of the proposed Gunderson Road alignment at Highway 211 to properly connect with Cascadia Village Drive as identified in the TSP. The proposed alignment shall meet code standards such as tangency, or the applicant shall apply for a design exception. ~~If the UGB application is approved, submit an analysis of the proposed Gunderson Road alignment that confirms that if Gunderson Road intersects with Highway 211 at the location proposed by the applicant, it can still connect to Cascadia Village Drive as identified in the TSP while meeting code standards such as tangency.~~
4. Submit a revised Plan Set featuring the following:
- Revise the Plan Set to detail the front door of the houses on Lots 55-59 facing Gunderson Road.
 - Extend the street improvements on Ponder Lane east/west to the east and west line of the development site and obtain slope easements or construct retaining walls as necessary.
 - Extend the street improvements on Street A to the east property line of the development site and obtain slope easements or construct retaining walls as necessary.
 - Extend the street improvements on Street B to the east and west lines of the development site and obtain slope easements or construct retaining walls as necessary.
 - If the UGB application is approved, extend the street improvements on Avenue 2 to connect with Gunderson Road on the property to the south.
 - Extend the street improvements on Street C to the east and west line of the development site and obtain slope easements or construct retaining walls as necessary.
 - Extend the street improvements on Street D to the east and west line of the development site and obtain slope easements or construct retaining walls as necessary.
5. Revise the plan set to detail all driveways at a maximum of 24 feet wide. Combine driveways for Lots 9 and 10 into a shared driveway or reduce the width of the driveways for Lots 9 and 10 to accommodate street trees and other right-of-way amenities. Submit one of the following two options for staff review and approval:
- Submit a revised plan detailing shared driveways that that do not exceed 24 feet wide with crossover easements; or,
 - Submit a detailed driveway spacing plan that conserves frontage and maximizes area for street trees and on-street parking.
6. Call the PGE Service Coordinators at 503-323-6700 when the developer is ready to start the project.
7. If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.

B. Prior to earthwork, grading, or excavation, the applicant shall complete the following and receive necessary approvals as described:

1. The applicant shall obtain a grading and erosion control permit in conformance with Chapter 15.44. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. *(Submit 2 copies to Planning/Building Department.)*
2. Submit proof of receipt of a Department of Environmental Quality 1200-C permit or submit confirmation from DEQ if a 1200-C Permit will not be required. *(Submit to Planning/Building Department.)*
3. Any existing domestic or irrigation wells on site shall be located, identified, capped, disconnected or abandoned in conformance with OAR 690-220-0030. A copy of the Oregon Water Resources Department (OWRD) abandonment certificate shall be submitted to the City Planning Division. Any on-site sewage disposal system shall be abandoned in conformance with Clackamas County Water Environmental Services (WES) regulations and a copy of the septic tank removal certificate shall be submitted to the City Planning Division.
4. Install tree protection fencing to protect all 16 trees on the subject property as well as the 154 trees proposed for retention on adjacent properties. Retain an arborist on site to monitor any construction activity within the root protection zones of the trees on adjacent properties that have root protection zones that would be impacted by construction of Gunderson Road. Install tree protection fencing a minimum distance of 1 foot per 1 inch DBH, as indicated by the project arborist and recommended by the ISA. Tree protection fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade. The tree protection fencing shall be 6 foot tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated. No construction activity shall occur within the tree protection zone, including, but not limited to, dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures prior to any tree removal, grading, or other construction activity on the site.
5. Request an inspection of erosion control measures and tree protection measures as specified in Section 17.102.50(C). Receive an approval of erosion control measures and tree protection measures prior to construction activities or issuance of the grading and erosion control permit.
6. Submit confirmation from a licensed pest control agent that the site was reviewed to determine if pest eradication is needed.

C. Prior to all construction activities, except grading and/or excavation, the applicant shall submit the following additional information as part of construction plans and complete items during construction as identified below: *(Submit to Public Works unless otherwise noted)*

1. The location of fire hydrants will be reviewed by the Sandy Fire Department in more detail with construction plans. Revise the Parking Analysis if required fire hydrants affect on-street parking spaces.
2. ~~Work with the Fire Marshall to determine if the proposed plan meets Fire Code requirements, other than second access requirements which the Fire Marshall determined to be met. Per ODOT (Exhibit AA), the applicant shall provide turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT or the City, depending on which entity has jurisdiction over the intersection.~~ ~~Work with the Fire Marshal to determine if the proposed plan meets Fire Code. Per ODOT (Exhibit AA), the applicant shall provide emergency vehicle turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT.~~
3. Submit a profile design for a minimum of 200 feet for all future street extensions beyond the project boundary to ensure future street grades can be met.
4. Specify the locations of street lights on all streets being improved within and adjacent to the subdivision. Full cut-off lighting shall be required that does not exceed 4,125 Kelvins.
5. Submit a detailed final stormwater report stamped by a licensed professional to the City for review and approval with the final construction plans.
6. Demonstrate that the proposed subdivision does not exceed pre-development site runoff discharges to this same point and provide information on the dimensions and slope of the existing drainage way. The detention pond shall meet the requirements of the 2016 City of Portland Stormwater Management Manual (SWMM) for landscaping, Section 2.4.1, and escape route, Section 2.30.
7. Submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and the USPS for review and approval prior to installation of mailboxes. Mail delivery facilities shall be provided by the applicant in conformance with Section 17.84.100 and the standards of the USPS.
8. Revise the utility plan to include broadband fiber locations as detailed by the SandyNet Manager.

D. Prior to Final Plat approval, the applicant shall complete the following tasks or provide assurance for their future completion:

1. Submit two paper copies of the tentative final plat for review with the associated plat review fee.
2. When the grading is completed, the applicant shall submit a final report by the Geotechnical Engineer to the City stating that adequate inspections and testing have been performed on all lots (Lots 1-32) and all of the work is in compliance with the above noted report and OSSC.

3. Construct all public improvements including streets and utilities, install street lights, and street signage. Complete street improvements for all streets within the subdivision as defined in this staff report, and for Gunderson Road and Highway 211 per the Development Agreement. The improvements shall include installation of sidewalks and planter strips on the west side of Ponder Lane.
4. Construct sidewalks along Tract A both on Ponder Lane and Street B, prior to final plat approval.
5. Construct the pedestrian tract (Tract B) improvements with pedestrian scale lighting connected to the street light circuit. The Tract B walkway shall be conveyed to the City on the Final Plat. The walkway within the tract shall be constructed of concrete at 8 feet in width with a 7 foot wide area for trees and landscaping. Install bollards at the east end of the tract to restrict vehicles from accessing the tract.
6. Install bollards along the east terminus of Street B, Ponder Lane east/west, Street C, and Street D. Also, install 'no parking' signs along the full length of Ponder Lane north/south at a spacing as determined during construction plan review.
7. Install the required local street improvements north of the property boundary to connect to the existing Melissa Avenue stub.
8. Install a stop sign at the intersection of Melissa Avenue and Rachael Drive for northbound traffic.
9. Install street lights as identified on the construction plans. The locations of street light fixtures shall be reviewed in detail with construction plans.
10. Dedicate the following to the City (by deed using the City's standard form):
 - Tract A and Tract B.
 - If the UGB application is approved, dedicate the right-of-way for Gunderson Road. If the UGB application is not approved, grant the City an easement to permit the eventual dedication of right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City's transportation system plan. ~~Gunderson Road.~~
 - If the UGB application is approved, the stormwater pond for Gunderson Road and Highway 211 (currently noted as Tract C).
11. Record a tree protection covenant specifying protection of the 16 trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. This document shall include a sketch identifying the required retention trees and a 1 foot per 1 inch DBH radius critical root zone around each tree. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans; plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.

12. Pay \$310,890 for the parks fee in lieu of dedication, -or- pay a total of \$341,850 if a portion of the fee is deferred (a minimum of 50 percent (\$170,925) paid prior to final plat approval with the remaining 50 percent (\$170,925) divided between the 100 lots, paid with each building permit). If the applicant dedicates parkland to the south of Bailey Meadows instead of paying the fee in-lieu the applicant and City Manager, on behalf of City Council, shall negotiate the terms of the parkland dedication.
 13. ~~If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring installation within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a two-year maintenance and warranty period. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring installation within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a three-year maintenance and warranty period.~~
 14. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction, or shall aerate the soil at the individual home construction phase. The applicant shall call for an inspection with the City after aerating the soil and before planting the street trees.
 15. Pay plan review, inspection, and permit fees as determined by the Public Works Director.
 16. Pay addressing fees at \$40 for the subdivision plus \$5 per lot, or as otherwise identified in the most updated fee schedule.
 17. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.
 18. Submit a copy of the following once recorded:
 - Mylar version of the Final Plat.
 - Tree protection covenant including a map identifying the location of the retention trees.
 - Deeds identifying dedications to the City.
- E. If the UGB application is approved, Gunderson Road shall be constructed and accepted by the city prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval. ~~Gunderson Road shall be constructed and accepted by the city prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval.~~**

F. All conditions in Section A., B., C., and D. shall be satisfied prior to submittal of building permits. The following list includes conditions related to individual home construction:

1. All homes shall provide building design features in conformance with the standards of Section 17.90.150.
2. All homes shall meet the development standards of Section 17.34.30.
3. All structures shall maintain a minimum 20-foot setback from the Gunderson Road public right-of-way.
4. The front door of the houses on Lots 55-59 shall face Gunderson Road and include a connection directly to Gunderson Road via a pedestrian route per Section 17.82.20.
5. Street trees shall be installed approximately 30 feet on center in conjunction with issuance of building permits. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade. Trees shall be planted and staked per the City of Sandy standard planting detail; trees shall be tied to the stakes with loosely tied twine. Tree ties shall be removed within one year of installation. *However, if the applicant postpones street tree installation per Condition D.13 street trees do not need to be planted with individual home construction.*
6. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction, or shall aerate the soil at the individual home construction phase. The applicant shall call for an inspection with the City after aerating the soil and before planting the street trees.
7. All planter strips shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy.
8. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans. Plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.
9. Development of this subdivision will require payment of system development charges in accordance with applicable City ordinances.

G. General Conditions of Approval:

1. On January 7, the applicant submitted an application to the City to expand the City's UGB in order to: (1) allow the applicant to dedicate right-of-way and construct Gunderson Road from the south boundary of the subject property to Oregon Highway 211; and (2) to dedicate approximately 2.3 acres of parkland within TL 701. If the UGB application is approved and is ultimately deemed acknowledged:
 - a. The applicant shall dedicate right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City's transportation system plan, as shown in Exhibit W

(page 4), subject to the terms of a non-statutory Development Agreement to be entered into between the applicant and the City (the “Development Agreement”).

- b. The applicant shall construct Gunderson Road with a paved width of at least 24 feet to allow for two lanes of travel, as shown in Exhibit W (page 4), subject to the terms of the Development Agreement.

If the UGB application is not approved by either the City or Clackamas County, or an approval is finally reversed on appeal, the Applicant shall be allowed to proceed with an approval of the tentative subdivision application provided that it:

- a. Received final approval of the tentative subdivision application in the event of an appeal;
- b. Prior to final plat approval, pays the City a fee-in-lieu of parkland dedication of \$310,890 (1.29 acres of land to be dedicated x \$241,000) in accordance with SMC Chapter 17.86 and Resolution 2013-14;
- c. Prior to final plat approval, grants the City an easement to permit the eventual dedication of right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City’s transportation system plan; and
- d. All other conditions of approval in this decision are satisfied.

If the UGB application is approved and is appealed, the applicant will intervene in the appeal and exercise good faith and its best efforts in defending the approval.

2. The Final Plat shall be recorded as detailed in Section 17.100.60.
3. Public improvement plans are subject to a separate review and approval process. Preliminary Plat approval does not connote approval of public improvement construction plans, which will be reviewed and approved separately upon submittal of public improvement construction plans.
4. The improvements to Highway 211 shall meet the requirements of ODOT -or- alternatively AASHTO standards if the highway is transferred to the City of Sandy.
5. No building permits will be issued until all public utilities including sanitary sewer and water service are available to serve the development.
6. The City reserves the right to name all streets.
7. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.
8. ~~The applicant shall comply with the parking standards in Chapter 17.98. Garages shall be at least 18 feet in depth to accommodate vehicle parking and the on-street parking spaces shall be at least 22 feet in length. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material. The applicant shall comply with the parking standards in Chapter 17.98. Garages shall be adequate depth to park a vehicle and the on-street parking spaces shall be at least 22 feet in length. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.~~
9. All work within the public right-of-way and within the paved area shall comply with the American Public Works Association (APWA) and City requirements as amended.

10. All ADA ramps shall be designed, inspected by the design engineer, and constructed by the contractor to meet the most current PROWAG requirements.
11. All on-site earthwork activities including any retaining wall construction shall follow the current requirements of the current edition of the Oregon Structural Specialty Code (OSSC). If the proposal includes a retaining wall, the applicant shall submit additional details on the proposed retaining wall for staff review and approval.
12. Trees shall not be removed from the subject property or the property to the south where the off-site Gunderson Road extension will be constructed that are located outside of the rights-of-way without applying for a tree removal permit and obtaining approval for tree removal.
13. All franchise utilities shall be installed underground and in conformance with City standards with individual service to each lot.
14. The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.
15. All public utility installations shall conform to the City's facilities master plans.
16. Site grading shall not in any way impede, impound, or inundate the surface drainage flow from the adjoining properties.
17. The applicant shall retain appropriate professional geotechnical services for observation of construction of earthwork and grading activities. The grading setbacks, drainage, and terracing shall comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report.
18. Water line sizes shall be based upon the Water Facilities Master Plan and shall be sized to accommodate domestic fire protection flows on the site.
19. All public sanitary sewer and waterline mains shall be a minimum of 8 inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.
20. All stormwater drains shall be a minimum of 12 inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.
21. As required by Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing. As required by Section 17.92.140, the developer shall maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.

22. ~~As required by the Planning Commission, retention trees shall be detailed on a recorded tree protection covenant; thus, the retention trees shall be guaranteed or replaced in tree. None of the trees required to be retained may be located on or outside of the property line of the subject property. As required by the Planning Commission, retention trees shall be detailed on a recorded tree protection covenant; thus, the retention trees shall be guaranteed or replaced in perpetuity.~~
23. ~~Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two years following the date of recording of the final plat associated with those improvements. Maintain all unlandscaped and/or revegetated areas for a period of two years following the date of recording of the final plat associated with those improvements.~~
24. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
25. All improvements listed in Section 17.100.300 shall be provided by the applicant including drainage facilities, monumentation, mail facilities, sanitary sewers, storm sewer, sidewalks, street lights, street signs, street trees, streets, traffic signs, underground communication lines including telephone and cable, underground power lines, water lines and fire hydrants.
26. Comply with all standards required by Section 17.84 of the Sandy Development Code. Public and franchise improvements shall be installed or financially guaranteed in accordance with Chapter 17 of the Sandy Municipal Code prior to temporary or final occupancy of structures. Water lines and fire hydrants shall be installed in accordance with City standards. All sanitary sewer lines shall be installed in accordance with City standards.
27. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

Exhibits A - JJJJJJ

Updated February 7, 2020

Bailey Meadows Subdivision

Date: July 2019

Submitted to: City of Sandy
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

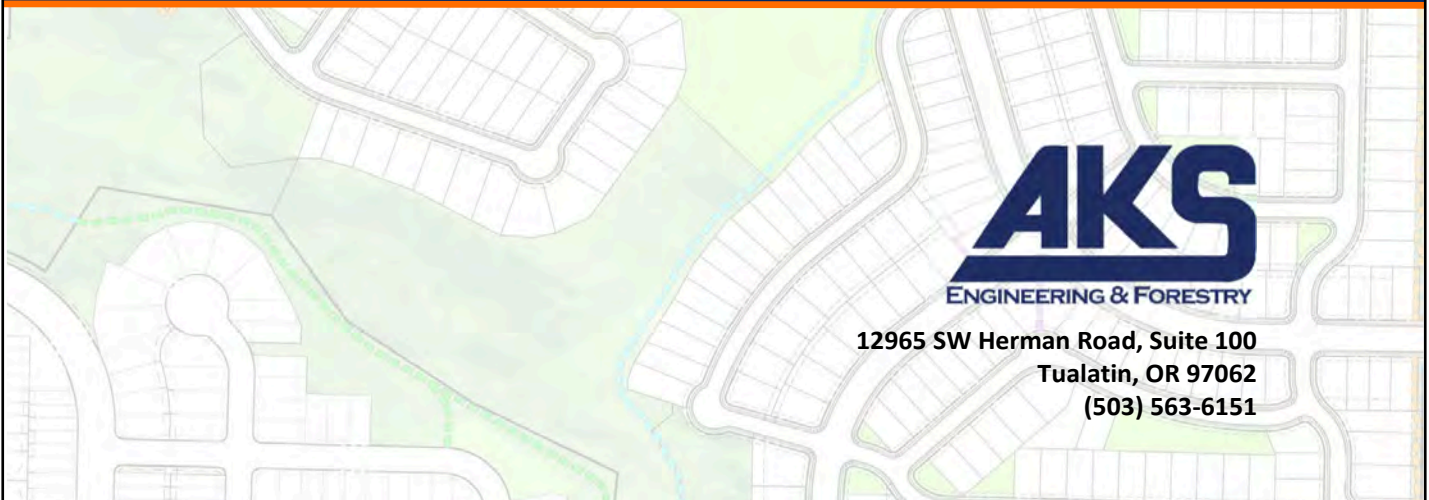


EXHIBIT A



LAND USE APPLICATION FORM

(Please print or type the information below)

Planning Department
 39250 Pioneer Blvd.
 Sandy OR 97055
 503-668-4886

Name of Project Bailey Meadows Subdivision

Location or Address SE Ponder Lane (Current access from Ponder Lane and Hwy 211)

Map & Tax Lot Number T 25 , R 4E , Section 23 ; Tax Lot(s) 800, 801, 802, 803, and 804

Plan Designation LDR Zoning Designation SFR Acres ± 23.42

Request:

| | |
|---|--|
| Please see attached letter for project description. | Applicant's Consultant: AKS Engineering & Forestry, LLC 12965 SW Herman Rd., Suite 100 Tualatin, OR 97062 Contact: Chris Goodell Phone: 503-563-6151 Email: chrsg@aks-eng.com |
|---|--|

I am the (check one) owner lessee of the property listed above and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

| | |
|---|--|
| Applicant Allied Homes & Development | Owner Grant E. & Myrtle J. Sturm |
| Address 12042 SE Sunnyside Rd Ste 706 | Address 647 E Historic Columbia River Hwy |
| City/State/Zip Clackamas, OR 97015 | City/State/Zip Troutdale, OR 97060 |
| Phone Please contact Applicant's consultant | Phone Please contact Applicant's consultant |
| Email Please contact Applicant's consultant | Email Please contact Applicant's consultant |
| Signature <div style="border: 1px solid black; padding: 2px; display: inline-block;"> DocuSigned by: <i>Cody Ergan</i> <small>769397736D25457</small> </div> | Signature <i>Grant E. Sturm Myrtle J. Sturm</i> |

If signed by Agent, owner's written authorization must be attached.

| | | | |
|--|------|----------|--------|
| File No. | Date | Rec. No. | Fee \$ |
| Type of Review (circle one): Type I Type II Type III Type IV | | | |

Bailey Meadows Subdivision

Date: July 2019

Submitted to: City of Sandy
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

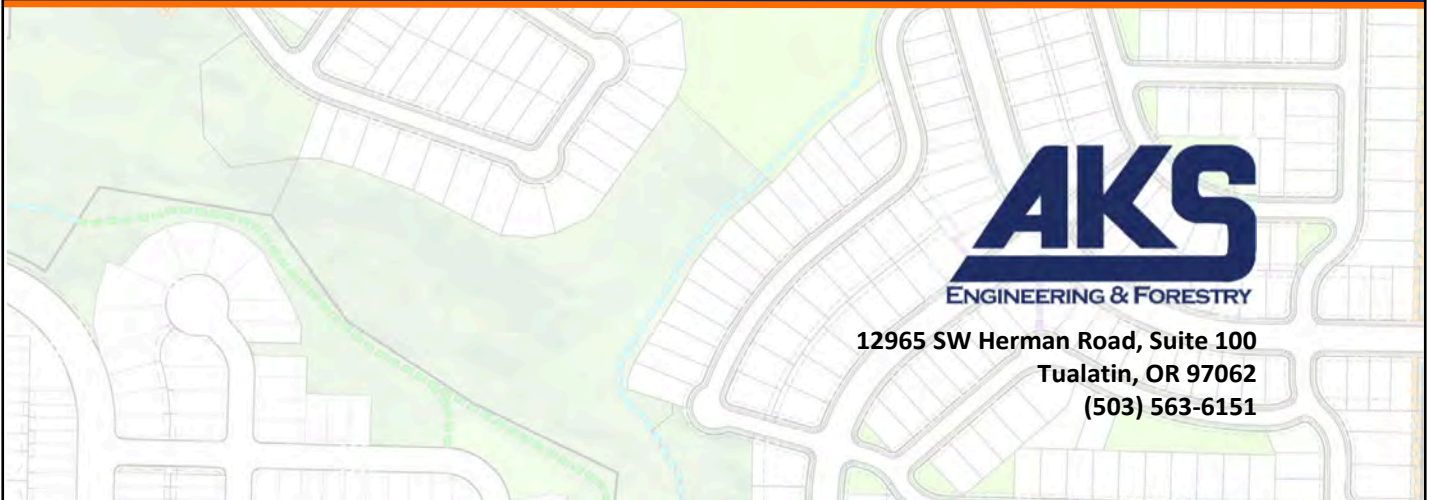


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Exhibits

- Exhibit A:** Preliminary Plans
- Exhibit B:** City of Sandy Land Use Application Forms and Checklists
- Exhibit C:** Property Ownership Information
- Exhibit D:** Clackamas County Assessor’s Map
- Exhibit E:** Public Notification
- Exhibit F:** Traffic Impact Analysis
- Exhibit G:** Preliminary Stormwater Report
- Exhibit H:** Flood & Slope Hazard (FSH) Analysis
- Exhibit I:** Documentation of Plat Name Reservation
- Exhibit J:** Geotechnical Engineering Report

Also Included with This Application

- Cover Letter from Applicant’s Legal Counsel
-

Bailey Meadows Subdivision

| | |
|---|---|
| Submitted to: | City of Sandy Planning Department 39250 Pioneer Boulevard Sandy, OR 97055 |
| Applicant: | Allied Homes and Development 12402 SE Sunnyside Road, Suite 706 Clackamas, OR 97015 |
| Property Owner: | Myrtle J. Sturm and Grant E. Sturm, Trustees of the Sturm Family Trust 647 E Historic Columbia River Highway Troutdale, OR 97060 |
| Applicant's Consultant: | AKS Engineering & Forestry, LLC 12965 SW Herman Road, Suite 100 Tualatin, OR 97062 Contact(s): Chris Goodell, AICP, LEED ^{AP} Email: chrisg@aks-eng.com Phone: (503) 563-6151 |
| Applicant's Legal Counsel: | Schwabe, Williamson & Wyatt Pacwest Center 1211 SW 5th Avenue, Suite 190 Portland, OR 97204 Contact(s): Michael Robinson Email: mrobinson@schwabe.com Phone: (503) 796-3756 |
| Applicant's Transportation Engineer: | Lancaster Engineering 321 SW 4 th Avenue, Suite 400 Portland, OR 97204 Contact(s): Todd Mobley Email: todd@lancasterengineering.com Phone: (503) 248-0313 |
| Applicant's Geotechnical Engineer: | GeoPacific Engineering, Inc. 14835 SW 72 nd Avenue Tigard, OR 97224 Contact(s): Jim Imbrie Email: jimbrie@geopacificeng.com Phone: (503) 598-8445 |
| Clackamas County Assessor's Map: | 24E 23 Tax Lots 800, 801, 802, 803, and 804 |



Site Size:

One subdivision affecting five lots at ±23.42 total acres:

±2.40 acres (Lot 800)

±4.74 acres (Lot 801)

±4.74 acres (Lot 802)

±9.17 acres (Lot 803)

±2.37 acres (Lot 804)

Land Use District:

Single-Family Residential (SFR)



I. Executive Summary

To address the City of Sandy's identified need for urban land for housing under statewide planning goal 10, "housing," the City of Sandy (City) in 2017 expanded its Urban Growth Boundary (UGB) south to include the subject site. In June 2017, the property was annexed to the City of Sandy. The UGB expansion is final and acknowledged by the state.

This application for the Bailey Meadows Subdivision (the "Subdivision") is part of the planned progression of land use planning for the area and involves the creation of "Needed Housing" under ORS 197-303(1) and 197.307(4) on residential land properly zoned for the proposed use within the incorporated limits of the City of Sandy. The Applicant is submitting this application to the City of Sandy for a Single-Family Residential Subdivision on the ±23.42-acre site, designated with Single Family Residential (SFR) zoning. Planned project site features include:

- 100 lots for single-family detached housing
- Interconnected system of sidewalks and local public streets
- On-street parking
- Three planned phases with concurrent infrastructure improvements
- Full range of underground utilities including sanitary sewer, water, and franchise utilities
- Fee-in-lieu payment for parkland dedication
- Fee-in-lieu payment for improvements to SE Ponder Lane

This application package includes the City of Sandy application forms, written materials, and Preliminary Plans necessary for City staff to review and determine compliance with the applicable approval criteria. The evidence is substantial and supports the City's approval of this Subdivision.

This application is a "Needed Housing" application under ORS 197.303(1)(a) as it provides housing within an acknowledged urban growth boundary. ORS 197.307(4) states that a local government may apply only clear and objective standards, conditions, and procedures regulating the creation of Needed Housing, and such standards, conditions, and procedures cannot have the effect, either in themselves or cumulatively, of discouraging Needed Housing through unreasonable cost or delay.

Oregon Courts and the Land Use Board of Appeals (LUBA) have held that an approval standard is not clear and objective if it imposes on an applicant "subjective, value-laden analyses that are designed to balance or mitigate impacts of the development." *Rogue Valley Association of Realtors v. City of Ashland*, 35 Or LUBA 139, 158 (1998) *aff'd*, 158 Or App 1 (1999). ORS 197.831 places the burden on local governments to demonstrate that the standards and conditions placed on Needed Housing applications can be imposed only in a clear and objective manner. While this application addresses all standards and conditions, the Applicant reserves the right to object to the application of standards or conditions that are not clear and objective and does not waive its right to assert that the Needed Housing statutes apply to this application. The exceptions in ORS 197.307(4)(a) and 197.307(5) do not apply to this application. ORS 197.307(7)(a) is controlled by ORS 197.307(4). The City has not taken an exception for Needed Housing under 197.303(3).

II. Site Description and Setting

The subject property is approximately ±23.42 acres and is comprised of five separate tax lots generally located directly south of the Nicolas Glen No. 2 Subdivision. The site is designated "SFR" with no existing structures on the site. The site is primarily used for agricultural purposes with a few trees along the southern border of Tax Lots 800 and 803.

Surrounding Land Uses

North: The site abuts 14 residential lots within the southern portion of the Nicolas Glen No. 2 Subdivision. These properties have a general lot size of ±0.12 acres and are zoned Medium Density Residential (MDR) and are in the City. The planned access for Bailey Meadows Subdivision is via the existing right-of-way street stub terminus at Melissa Avenue, directly north of the project boundary.

East: The property to the east is within both the City's UGB and unincorporated Clackamas County and is zoned Rural Residential Farm Forest 5-Acre (RRFF-5). It is currently improved with a single-family dwelling which accesses off Ponder Lane.

South/West: The properties south and west of the site are undeveloped and located outside of the City's UGB and are zoned Exclusive Farm Use District (EFU) by Clackamas County.

III. Applicable Review Criteria

CITY OF SANDY MUNICIPAL CODE

Title 17 – DEVELOPMENT CODE

CHAPTER 17.18 - PROCESSING APPLICATIONS

17.18.00 PROCEDURES FOR PROCESSING LAND USE APPLICATIONS

An application shall be processed under a Type I, II, III or IV procedure. The differences between the procedures are generally associated with the different nature of the decisions as described in Chapter 17.12.

When an application and proposed development is submitted, the Director shall determine the type of procedure the Code specifies for its processing and the potentially affected agencies.

If a development proposal requires an applicant to file a land use application with the city (e.g. a design review application) and if there is a question as to the appropriate procedure to guide review of the application (e.g. a Type II versus a Type III design review process), the question will be resolved in favor of the lower type number.

If a development proposal requires an applicant to file more than one land use application with the city (e.g. a design review application and a variance) and if the development code provides that the applications are to be reviewed under separate types of procedures (e.g. a Type II design review and a Type III variance):

- the Director will generally elevate all of the required applications to the highest number procedure for review (e.g. the Type II design review application would be reviewed by the Planning Commission along with the Type III variance).

In situations where an applicant has attended a pre-application conference and has reviewed the application with the Director prior to submitting the applications, the Director may exercise his/her discretion to review the Type II application(s) at the staff level and only schedule a public hearing for the Type III portion(s) of the development proposal.

Response: The application requires a Type III Review Procedure, following conclusions of the November 20, 2018 pre-application conference (see response below).



17.18.20 PRE-APPLICATION CONFERENCE

A pre-application conference is required for all Type II, III, and IV applications unless the Director determines a conference is not needed. A request for a pre-application conference shall be made on the form provided by the city and will be scheduled following submittal of required materials and payment of fees. The purpose of the conference is to acquaint the applicant with the substantive and procedural requirements of the Code, provide for an exchange of information regarding applicable elements of the Comprehensive Plan and development requirements, arrange such technical and design assistance which will aid the applicant, and to otherwise identify policies and regulations that create opportunities or pose significant constraints for the proposed development. The Director will provide the applicant with notes from the conference within 10 days of the conference. These notes may include confirmation of the procedures to be used to process the application, a list of materials to be submitted, and the applicable code sections and criteria that may apply to the application. Any opinion expressed by the Director or City staff during a pre-application conference regarding substantive provisions of the City's code is advisory and is subject to change upon official review of the application.

Response: A pre-application conference was held with the City of Sandy on November 20, 2018. An additional meeting with City staff was held on January 29, 2019. This requirement is met.

17.18.30 LAND USE APPLICATION MATERIALS

Unless otherwise specified in this code, an application shall consist of the materials specified in this section, plus any other materials required by this Code.

- A. A completed application form and payment of fees.
- B. List and mailing labels of Affected Property Owners.
- C. An explanation of intent, stating the nature of the proposed development, reasons for the request, pertinent background information, information required by the Development Code and other material that may have a bearing in determining the action to be taken.
- D. Proof that the property affected by the application is in the exclusive ownership of the applicant, that the applicant has the consent of all parties in ownership of the affected property, or the applicant is the contractual owner.
- E. Legal description of the property affected by the application.
- F. Written narrative addressing applicable code chapters and approval criteria.
- G. Vicinity Map showing site in relation to local and collector streets, plus any other significant features in the nearby area.
- F. Site plan of proposed development
- G. Number of Copies to be Submitted:
 - 1. One copy of items A through D listed above;
 - (...)



4. Type III: 15 copies of site plan and other materials required by the Code

The Director may vary the quantity of materials to be submitted as deemed necessary.

Response: The application submittal materials include the items listed above. The list and mailing labels are applicable to property owners within 500 feet of the subject properties. The remainder of the Code Section discusses the processing requirements to be completed by the City. For purposes of brevity, those Sections are not included in this narrative. This requirement is met.

CHAPTER 17.30 - ZONING DISTRICTS

17.30.20 RESIDENTIAL DENSITY CALCULATION PROCEDURE

The number of dwelling units permitted on a parcel of land is calculated after the determination of the net site area and the acreage of any restricted development areas (as defined by Chapter 17.60). Limited density transfers are permitted from restricted development areas to unrestricted areas consistent with the provisions of the Flood and Slope Hazard Area Overlay District, Chapter 17.60.

Calculation of Net Site Area (NSA): Net site area should be calculated in acres based upon a survey of the property boundaries excluding areas dedicated for public use.

- A. Minimum and Maximum Dwelling Units for Sites with No Restricted Areas. The allowable range of housing units on a piece of property is calculated by multiplying the net site area (NSA) in acres by the minimum and maximum number of dwelling units allowed in that zone.

For example: A site (NSA) containing 10 acres in the Single-Family Residential Zoning District requires a minimum of 30 units and allows a maximum of 58 units. (NSA x 3 units/acre = 30 units minimum) (NSA x 5.8 units/acre = 58 units maximum)

Response: The subject site is zoned Single Family Residential (SFR). The planned subdivision includes a total of 100 units on a total net site area of ±18.21 acres resulting in a net residential density of ±5.49 units per acre. This planned density falls within the minimum number of dwelling units required of 3 and the maximum of 5.8 units per acre. The tables below provide the details of the density calculations. Note that the gross site area excludes existing SE Ponder Lane right-of-way. The criteria are met.

| Gross Area (AC) | ROW (AC) | NSA (AC)= GROSS-ROW | | Units Per Acre | Density | Total Density |
|-----------------|----------|---------------------|------------|----------------|---------|---------------|
| 23.42 | 5.21 | 18.21 | MIN | 3 | 54.63 | 55 |
| | | | MAX | 5.8 | 105.62 | 106 |

- B. Minimum and Maximum Dwelling Units for Sites with Restricted Areas

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1. Unrestricted Site Area: To calculate unrestricted site area (USA): subtract all restricted development areas (RDA) as defined by Section 17.60.20(A) from the net site area (NSA), if applicable.

$$\text{NSA} - \text{RDA} = \text{USA}$$

2. Minimum Required Dwelling Units: The minimum number of dwelling units required for the site is calculated using the following formula:

$$\text{USA (in acres)} \times \text{Minimum Density (Units per Acre) of Zoning District} = \text{Minimum Number of Dwelling Units Required.}$$

3. Maximum Allowed Dwelling Units: The maximum number of dwelling units allowed on a site is the lesser of the results of these two formulas:

- a. $\text{NSA (in acres)} \times \text{Maximum Density of Zoning District (units/acre)}$

- b. $\text{USA (in acres)} \times \text{Maximum Density of Zoning District (units/acre)} \times 1.5$ (maximum allowable density transfer based on Chapter 17.60)

For example: suppose a site in a zone with a maximum density of eight (8) units per acre has 6 acres of unrestricted site area (USA= 6) and two acres of restricted development area (RDA=2), for a total net site area of 8 acres (NSA= 8). Then NSA (8) x 8 units/acre = 64 and USA (6) x 8 units/acre x 1.5 = 72, so the maximum permitted number of dwelling units is 64 (the lesser of the two results).

Response: The project site does not contain any restricted areas. See Exhibit H for Flood and Slope Hazard Analysis. The criteria do not apply.

- C. Lot Sizes: Lot sizes shall comply with any minimum lot size standards of the underlying zoning district.

- D. Rounding: A dwelling unit figure is rounded down to the nearest whole number for all total maximum or minimum figures less than four dwelling units. For dwelling unit figures greater than four dwellings units, a partial figure of one-half or greater is rounded up to the next whole number.

For example: A calculation of 3.7 units is rounded down to 3 units. A calculation of 4.2 units is rounded down to 4 units and a calculation of 4.5 units is rounded up to 5 units.

Response: The application involves subdividing the subject site into 100 lots suitable for future single-family detached dwellings, all complying with the minimum lot size of 7,500 square feet. The subdivision also includes one tract for stormwater management infrastructure. Rounding as stated above is demonstrated in the density calculation. The criterion is met.

CHAPTER 17.34 - SINGLE-FAMILY RESIDENTIAL (SFR)

17.34.10 PERMITTED USES

- A. Primary Uses Permitted Outright:



1. Single detached dwelling subject to design standards in Chapter 17.90;

Response: The Applicant plans on building model homes with this subdivision. To the extent this cannot be done, the Applicant will work with the City and build a new single-family home on each of the lots of record prior to plat recordation, similar to a model home scenario.

2. Single detached manufactured dwelling subject to design standards in Chapter 17.90;

17.34.30 DEVELOPMENT STANDARDS

| Type | Standard |
|--|---|
| A. Minimum Lot Area – Single detached dwelling | 7,500 square ft. |
| B. Minimum Average Lot Width – Single detached dwelling | 60 ft. |
| C. Minimum Lot Frontage | 20 ft, except as allowed by Section 17.100.160 |
| D. Minimum Average Lot Depth | No minimum |
| E. Setbacks (Main Building) Front Yard Rear Yard Side Yard (interior) Corner Lot | 10 ft. minimum 20 ft. minimum 7.5 ft. minimum 10 ft. minimum on side abutting the street ¹ |
| F. Setbacks (Garage/Carport) | 22 ft. minimum for front vehicle access 15 ft. minimum if entrance is perpendicular to street (subject to Section 17.90.220) 5 ft. minimum for alley or rear access |

Response: This application proposes lots for the permitted use of “single detached dwelling” listed above. The minimum standards for newly created lots in the SFR district are included in the table above. As planned, each of the lots meets the 20-foot minimum lot frontage to the street and the 60-foot average lot width for a single detached dwelling. The Preliminary Subdivision Plat, included in Exhibit A, demonstrates that future homes can meet the minimum setback requirements at the time of future building permit submittal. As shown, each lot meets the 7,500 square-foot minimum lot size requirement. The criteria are met.

17.34.40 MINIMUM REQUIREMENTS

- A. Must connect to municipal water.
- B. Must connect to municipal sewer if service is currently within 200 feet of the site. Sites more than 200 feet from municipal sewer, may be approved to connect to an alternative disposal system provided all of the following are satisfied:
 1. A county septic permit is secured and a copy is provided to the city;
 2. The property owner executes a waiver of remonstrance to a local improvement district and/or signs a deed restriction agreeing to complete improvements, including but not limited, to curbs, sidewalks, sanitary sewer, water, storm sewer or other improvements which directly benefit the property;

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- 3. The minimum size of the property is one acre or is a pre-existing buildable lot, as determined by the city;
 - 4. Site consists of a buildable parcel(s) created through dividing property in the city, which is less than five acres in size.
 - C. The location of any real improvements to the property must provide for a future street network to be developed.
 - D. Must have frontage or approved access to public streets.

Response: The Preliminary plans include information illustrating how the subdivision is planned to be serviced with municipal water, sanitary sewer, planned street network and improvements, and frontage on public streets. These criteria will be met.

17.34.50 ADDITIONAL REQUIREMENTS

- A. Design review as specified in Chapter 17.90 is required for all uses.

Response: This application involves a subdivision; design review for specific uses will be reviewed at the time of future permit submittal, if necessary. The standard is understood.

- B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.

Response: As illustrated by the Preliminary Plans, each lot is planned with at least 40 feet of street frontage. This criterion does not apply.

- C. Lots with alley access may be up to 10 percent smaller than the minimum lot size of the zone.

Response: Alleys are not included in this project. The criterion does not apply.

- D. Zero Lot Line Dwellings: Prior to building permit approval, the applicant shall submit a recorded easement between the subject property and the abutting lot next to the yard having the zero setback. This easement shall be sufficient to guarantee rights for maintenance purposes of structures and yard, but in no case shall it be less than 5 ft. in width.

Response: Building setback requirements will be reviewed at the time of future building permit submittal. This criterion is understood.

CHAPTER 17.60 - FLOOD & SLOPE HAZARD (FSH) OVERLAY DISTRICT

17.60.10 INTERPRETATION AND MAPPING

The Director has the ultimate responsibility for maintaining the FSH Overlay District on the City of Sandy Zoning Map, determining on-site measuring methods, and otherwise interpreting the provisions of this chapter. Technical terms used in this chapter are defined in Chapter 17.10, Definitions. This chapter does not regulate development on lots or parcels entirely outside the FSH Overlay District.

- A. FSH Overlay District. The only areas subject to the restrictions and prohibitions of the FSH overlay district are those indicated on the City of Sandy Zoning Map on file in the Planning Department and areas of special flood hazard identified by the Federal Insurance

Administration in a scientific and engineering report entitled, "Flood Insurance Study (FIS) for Clackamas County, Oregon and Incorporated Areas," dated January 18, 2019, with accompanying Flood Insurance Rate Maps (FIRMs). This chapter does not regulate lots or parcels entirely outside the FSH Overlay District.

1. The FIS and FIRMs are hereby adopted by reference and declared to be a part of Section 17.60 and are on file at the City of Sandy.

Response: According to the current Zoning Map, the site is located inside the City limits, within the UGB and is unaffected by the FSH Overlay. However, the project site was not included on the City's Goal 5 Inventory to determine whether wetlands, streams, or the FSH Overlay applies to the site because that inventory was created prior to the site's inclusion within the UGB and annexation to the City. A FSH Analysis (Exhibit H) is included in the application materials demonstrating that the FSH Overlay District does not apply to the project site.

B. **Development Approval Required.** No development shall occur within the FSH overlay district without first obtaining City approval under the provisions of this chapter. The Director shall notify the Oregon Division of State Lands whenever any inventoried wetland is proposed for development, in accordance with ORS 227.350. In riverine situations, the Director shall notify adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notification to the administrator.

C. **Interpretation**

All provisions of the FSH overlay code shall be:

1. Considered as minimum requirements;
2. Liberally construed in favor of the governing body; and
3. Deemed neither to limit nor repeal any other powers granted under state statutes.

D. **Applicant Responsibilities.** The applicant for alteration or development within the FSH overlay district shall be responsible for preparing a survey of the entire site, based on site-specific field surveys or Corps of Engineers data that precisely maps and delineates the following areas:

1. The name, location and dimensions of affected streams or rivers, and the tops of their respective banks.
2. Area of Special Flood Hazard boundaries and elevations as determined by the January 18, 2019 FIS for Clackamas County and Incorporated Areas.

Response: According to Federal Emergency Management Area (FEMA) mapping, Special Flood Hazard Areas are not mapped within the project site.

3. The City of Sandy FSH overlay district boundary as depicted on the City of Sandy FSH Map.

Response: The subject site is not located within the City's FSH Overlay District.



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4. The water quality and slope setback area(s) as defined in Section 17.60.30.
 5. The size and location of locally significant wetlands shall be determined based on the City of Sandy Locally Significant Wetland Inventory (2002) unless modified by a wetland delineation approved by the Oregon Division of State Lands and submitted to the City. Wetland delineations that have formal concurrence from the Division of State Lands shall be valid for the period specified in that agency's administrative rules.

Response: The project site is located outside of the City of Sandy's Local Wetland Inventory.

6. Steep slope areas where the slope of the land is 25% or greater within the FSH overlay district boundary.
7. The area enclosed by a continuous line, measured 25 feet horizontally, parallel to and upland from the top of a steep slope area, where the top of the steep slope is within the FSH overlay district boundary.

Response: The FSH Analysis (Exhibit H) concludes that wetlands, waters, or slopes greater than 25% are not located on the subject site.

8. Existing public rights-of-way, structures, roads and utilities.
9. Natural vegetation, including trees or tree clusters and understory within the FSH Overlay District boundary.
10. Existing and proposed contours at 2-foot intervals.

Response: The FSH Analysis (Exhibit H) contains the applicable information as listed above. The criteria are met.

17.60.20 PERMITTED USES AND ACTIVITIES

This chapter lists permitted uses, or uses allowed under prescribed conditions, within the FSH overlay district. Where there are conflicts, this chapter supersedes the use provisions of the underlying district.

Response: The FSH Analysis (Exhibit H) documents that wetlands, waters, or slopes greater than 25% are not located on the subject site. Therefore, the FSH Overlay District does not apply to the project site and thus the criteria of Chapter 17.60 do not apply and have been omitted for brevity.

CHAPTER 17.84 - IMPROVEMENTS REQUIRED WITH DEVELOPMENT

17.84.20 TIMING OF IMPROVEMENTS

- A. All improvements required by the standards in this chapter shall be installed concurrently with development, as follows:
 1. Where a land division is proposed, each proposed lot shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to approval of the final plat.



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2. Where a land division is not proposed, the site shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to temporary or final occupancy of structures.

Response: As shown in the Preliminary Plans in Exhibit A, each lot is to be provided with utility, sanitary sewer, water, and stormwater infrastructure. The criterion is met.

- B. Where specific approval for a phasing plan has been granted for a planned development and/or subdivision, improvements may similarly be phased in accordance with that plan.

Response: As depicted in the Preliminary Plans, improvements are planned to be phased with the approved plans. See Exhibit A for detailed phasing logistics.

17.84.30 PEDESTRIAN AND BICYCLIST REQUIREMENTS

- A. Sidewalks shall be required along both sides of all arterial, collector, and local streets, as follows:

Response: As shown on the Preliminary Plans, sidewalks are planned to be provided on the streets within the subdivision and along the unimproved street stub section of Melissa Avenue.

1. Sidewalks shall be a minimum of 5 ft. wide on local streets. The sidewalks shall be separated from curbs by a tree planting area that provides separation between sidewalk and curb, unless modified in accordance with Subsection 3 below.

Response: As shown on the Preliminary Plans, sidewalks will be a minimum of 5 feet wide on the local street sections interior to the subdivision. See Exhibit A for detailed landscaping plans. The criterion is met.

2. Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 ft. wide.

Response: The project site does not include proposed arterial or collector streets. The criterion does not apply.

3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.

- a) Narrow landscape strips
- b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width

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- c) Eliminate landscape strips
 - d) Narrow on-street improvements by eliminating on-street parking
 - e) Eliminate sidewalks

Response: As shown on the Preliminary Plans, sidewalks are planned adjacent to the new streets within the subdivision. The criteria do not apply.

4. The timing of the installation of sidewalks shall be as follows:

- a) Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.

Response: The project site does not include proposed arterial or collector streets. The criterion does not apply.

- b) Sidewalks along local streets shall be installed in conjunction with development of the site, generally with building permits, except as noted in (c) below.

Response: Sidewalks are planned to be completed in conjunction with frontage improvements as phased with the approved plans. The criterion is met.

- c) Where sidewalks on local streets abut common areas, drainageways, or other publicly owned or semi-publicly owned areas, the sidewalks and planted areas shall be installed with street improvements.

Response: The project site does not abut drainageways, publicly owned areas, or common areas. The criterion does not apply.

B. Safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions, planned developments, commercial developments, industrial areas, residential areas, public transit stops, school transit stops, and neighborhood activity centers such as schools and parks, as follows:

1. For the purposes of this section, “safe and convenient” means pedestrian and bicyclist facilities that: are reasonably free from hazards which would interfere with or discourage travel for short trips; provide a direct route of travel between destinations; and meet the travel needs of pedestrians and bicyclists considering destination and length of trip.

Response: Pedestrian routes as planned are safe, direct, and convenient and don’t deviate unnecessarily from a straight line, involve a significant amount of out-of-direction travel for likely users, or contain hazards. The criteria are met.

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2. To meet the intent of “B” above, right-of-ways connecting cul-de-sacs or passing through unusually long or oddly shaped blocks shall be a minimum of 15 ft. wide with 8 feet of pavement.

Response: The application does not include cul-de-sac improvements or unusual blocks; the criterion is met.

3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.

Response: The application does not involve high volume pedestrian travel. The criterion does not apply.

4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance with the following standards:

- a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.
- b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
- c) Walkways shall be as direct as possible and avoid unnecessary meandering.
- d) Walkway/driveway crossings shall be minimized. Internal parking lot design shall maintain ease of access for pedestrians from abutting streets, pedestrian facilities, and transit stops.

Response: As shown on the Preliminary Plans, pedestrian walkways are intended to connect to the existing and planned pedestrian circulation system and future building entrances. Therefore, the applicable standards above are met.

- e) With the exception of walkway/driveway crossings, walkways shall be separated from vehicle parking or vehicle maneuvering areas by grade, different paving material, painted crosshatching or landscaping. They shall be constructed in accordance with the sidewalk standards adopted by the City. (This provision does not require a separated walkway system to collect drivers and passengers from cars that have parked on site unless an unusual parking lot hazard exists).

Response: The application does not involve common space walkways of this nature. Therefore, the criteria are not applicable.

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- f) Pedestrians amenities such as covered walk-ways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.

Response: The application does not include pedestrian amenities as described above. The criterion is not applicable.

- C. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.

Response: According to the City of Sandy's Transportation System Plan (the "TSP"), there are no existing or planned trails adjacent to the project site which warrant a linkage. Therefore, the standard does not apply. However, this application is not subject to the TSP as explained above.

- D. To provide for orderly development of an effective pedestrian network, pedestrian facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).

Response: As illustrated by the Preliminary Plans, a continuous pedestrian pathway system extending from the Nicolas Glen No. 2 Subdivision throughout the site is planned concurrently with each individual project phase. Sidewalks are planned to be completed prior to occupancy of the adjoining home, as indicated on the Preliminary Plans. Therefore, the standard is met.

- E. To ensure improved access between a development site and an existing developed facility such as a commercial center, school, park, or trail system, the Planning Commission or Director may require off-site pedestrian facility improvements concurrent with development.

Response: Existing adjacent trails, future phases, or public parks that warrant a connection are not included in the project. Therefore, the standard does not apply.

17.84.40 TRANSIT AND SCHOOL BUS TRANSIT REQUIREMENTS

- A. Development sites located along existing or planned transit routes shall, where appropriate, incorporate bus pull-outs and/or shelters into the site design. These improvements shall be installed in accordance with the guidelines and standards of the transit agency. School bus pull-outs and/or shelters may also be required, where appropriate, as a condition of approval for a residential development of greater than 50 dwelling units where a school bus pick-up point is anticipated to serve a large number of children.
- B. New developments at or near existing or planned transit or school bus transit stops shall design development sites to provide safe, convenient access to the transit system, as follows:

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1. Commercial and civic use developments shall provide a prominent entrance oriented towards arterial and collector streets, with front setbacks reduced as much as possible to provide access for pedestrians, bicycles, and transit.
 2. All developments shall provide safe, convenient pedestrian walkways between the buildings and the transit stop, in accordance with the provisions of 17.84.30 B.

Response: The project site is not located along any existing or planned transit or school bus transit stops. The criteria do not apply.

A. Traffic evaluations may be required of all development proposals in accordance with the following:

1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.

Response: The Traffic Impact Analysis (Exhibit F) assesses the traffic in accordance with planned site improvements and accepted traffic engineering practices. The standard is met.

2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.

Response: The Traffic Impact Analysis (Exhibit F) reports conditions which meet the minimum standard established in the Transportation System Plan. The criterion does not apply.

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

1. Arterial streets should generally be spaced in one-mile intervals.
2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.

Response: This application does not include construction of new arterial streets. The criteria do not apply.

C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, "through traffic" means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:

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1. Straight segments of local streets should be kept to less than a quarter mile in length. As practical, local streets should include traffic calming features, and design features such as curves and “T” intersections while maintaining pedestrian connectivity.
 2. Local streets should typically intersect in “T” configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent “T” intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights-of-way.

Response: The Preliminary Plans include information on the local street pattern and intersections internal to the subdivision. The design incorporates curves, “T” intersections, straight segments less than a quarter mile in length, and maintains pedestrian connectivity. The traffic traveling through the area will be of local origin. The criteria are met.

3. Cul-de-sacs should generally not exceed 400 ft. in length nor serve more than 20 dwelling units, except in cases where existing topography, wetlands, or drainage systems or other existing features necessitate a longer cul-de-sac in order to provide adequate access to an area. Cul-de-sacs longer than 400 feet or developments with only one access point may be required to provide an alternative access for emergency vehicle use only, install fire prevention sprinklers, or provide other mitigating measures, determined by the City.

Response: The project site does not include cul-de-sacs. The standard does not apply.

- D. Development sites shall be provided with access from a public street improved to City standards in accordance with the following:
 1. Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.
 2. Half-street improvements are considered the minimum required improvement. Three-quarter-street or full-street improvements shall be required where traffic volumes generated by the development are such that a half-street improvement would cause safety and/or capacity problems. Such a determination shall be made by the City Engineer.
 3. To ensure improved access to a development site consistent with policies on orderly urbanization and extension of public facilities the Planning Commission or Director may require off-site improvements concurrent with development. Off-site improvement requirements upon the site developer shall be reasonably related to the anticipated impacts of the development.
 4. Reimbursement agreements for ¾ street improvements (i.e., curb face to curb face) may be requested by the developer per Chapter 12 of the SMC.

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5. A ½ street improvement includes curb and pavement 2 feet beyond the center line of the right-of-way. A ¾ street improvement includes curbs on both sides of the side and full pavement between curb faces.

Response: The Preliminary Plans show the project site is provided with access extending from Melissa Avenue, an existing public street right-of-way stubbed to the property. Per the Preliminary Plans, a fee-in-lieu of half-street improvements is planned on east SE Ponder Lane. Required frontage improvements on streets applicable to the project site will be completed as necessary. The criterion is met.

- E. As necessary to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies) in accordance with the following:

1. Temporary dead-ends created by this requirement to extend street improvements to the edge of adjacent properties may be installed without turn-arounds, subject to the approval of the Fire Marshal.
2. In order to assure the eventual continuation or completion of the street, reserve strips may be required.

Response: The Preliminary Plans illustrate local street sections extending through the site to the edge of the property boundaries. Temporary dead-ends, as necessary, can be provided in the phase it is associated with, as indicated on the Preliminary Plans. The criteria can be met.

- F. Where required by the Planning Commission or Director, public street improvements may be required through a development site to provide for the logical extension of an existing street network or to connect a site with a nearby neighborhood activity center, such as a school or park. Where this creates a land division incidental to the development, a land partition shall be completed concurrent with the development.

Response: This application does not include an incidental land division as stated above. The standard does not apply.

- G. Except for extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area and be subject to approval of the Director.

Response: Street names which conform to the surrounding area will be subjected to the approval of the Director. The criterion is met.

- H. Location, grades, alignment, and widths for all public streets shall be considered in relation to existing and planned streets, topographical conditions, public convenience and safety, and proposed land use. Where topographical conditions present special circumstances, exceptions to these standards may be granted by the City Engineer provided the safety and capacity of the street network is not adversely affected. The following standards shall apply:

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1. Location of streets in a development shall not preclude development of adjacent properties. Streets shall conform to planned street extensions identified in the Transportation Plan and/or provide for continuation of the existing street network in the surrounding area.
 2. Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.

Response: The planned locations of streets internal to the subdivision provide continuation of the existing street network stemming from the stub at Melissa Avenue, as identified in the Transportation Plan. Location of streets internal to the subdivision do not preclude development of adjacent properties. The grades on the planned local streets are not intended to exceed 15 percent; the project does not include arterial or collector streets. It is understood that if any special circumstances are identified, the standards of this Section will apply and be reviewed for compliance by the City Engineer. The criterion is met.

3. As far as practical, arterial streets and collector streets shall be extended in alignment with existing streets by continuation of the street centerline. When staggered street alignments resulting in “T” intersections are unavoidable, they shall leave a minimum of 150 ft. between the nearest edges of the two rights-of-way.

Response: The project site does not include the extension of arterial or collector streets. The standard does not apply.

4. Centerline radii of curves shall not be less than 500 ft. on arterial streets, 300 ft. on collector streets, and 100 ft. on local streets.

Response: The Preliminary Plans show the centerline radii of curves are not less than 100-foot on internal local streets. The standard is met.

5. Streets shall be designed to intersect at angles as near as practicable to right angles and shall comply with the following:
 - a) The intersection of an arterial or collector street with another arterial or collector street shall have a minimum of 100 ft. of straight (tangent) alignment perpendicular to the intersection.

Response: The project site does not include arterial or collector streets. The criterion does not apply.

- b) The intersection of a local street with another street shall have a minimum of 50 ft. of straight (tangent) alignment perpendicular to the intersection.
- c) Where right angle intersections are not possible, exceptions can be granted by the City Engineer provided that intersections not at right angles have a minimum corner radius of 20 ft. along the right-of-way lines of the acute angle.

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- d) Intersections with arterial streets shall have a minimum curb corner radius of 20 ft. All other intersections shall have a minimum curb corner radius of 10 ft.

Response: The project site does not intersect with existing arterial streets. The criteria do not apply.

- 6. Right-of-way and improvement widths shall be as specified by the Transportation System Plan. Exceptions to those specifications may be approved by the City Engineer to deal with specific unique physical constraints of the site.

Response: As shown on the Preliminary Plans, right-of-way and improvement widths for streets within Bailey Meadows are being designed in accordance with City standards. The criterion is met.

- J. Private streets may be considered within a development site provided all the following conditions are met:

Response: This application includes public, local street infrastructure and thus the criteria for private streets do not apply and has been deleted for brevity.

17.84.60 PUBLIC FACILITY EXTENSIONS

- A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.
- B. Where necessary to serve property as specified in "A" above, required public facility installations shall be constructed concurrent with development.
- C. Off-site public facility extensions necessary to fully serve a development site and adjacent properties shall be constructed concurrent with development.
- D. As necessary to provide for orderly development of adjacent properties, public facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).
- E. All public facility installations required with development shall conform to the City's facilities master plans.

Response: The Preliminary Plans include information detailing the nature of public facility extensions to each lot, and to the edge of properties adjacent to the subdivision, where applicable. Installations are planned to be completed concurrent with the approved phasing of the subdivision and conform to the City's facilities master plans. The criteria are met.

- F. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:
 - 1. Extension of a public facility through the site is not necessary for the future orderly development of adjacent properties;
 - 2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above);

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3. The facilities are designed and constructed in accordance with the Uniform Plumbing Code and other applicable codes, and permits and/or authorization to proceed with construction is issued prior to commencement of work.

Response: The application does not include private facilities as described above. The criterion does not apply.

17.84.70 PUBLIC IMPROVEMENT PROCEDURES

It is in the best interests of the community to ensure public improvements installed in conjunction with development are constructed in accordance with all applicable City policies, standards, procedures, and ordinances. Therefore, prior to commencement of installation of public water, sanitary sewer, storm drainage, broadband (fiber), street, bicycle, or pedestrian improvements for any development site, developers shall contact the City Engineer to receive information regarding adopted procedures governing plan submittal, plan review and approval, permit requirements, inspection and testing requirements, progress of the work, and provision of easements, dedications, and as-built drawings for installation of public improvements. All work shall proceed in accordance with those adopted procedures, and all applicable City policies, standards, and ordinances.

Whenever any work is being done contrary to the provisions of this Code, the Director may order the work stopped by notice in writing served on the persons engaged in performing the work or causing the work to be performed. The work shall stop until authorized by the Director to proceed with the work or with corrective action to remedy substandard work already completed.

Response: Site work is planned to be completed in accordance with the public improvement procedures described above.

17.84.80 FRANCHISE UTILITY INSTALLATIONS

These standards are intended to supplement, not replace or supersede, requirements contained within individual franchise agreements the City has with providers of electrical power, telephone, cable television, and natural gas services (hereinafter referred to as "franchise utilities").

- A. Where a land division is proposed, the developer shall provide franchise utilities to the development site. Each lot created within a subdivision shall have an individual service available or financially guaranteed prior to approval of the final plat.
- B. Where necessary, in the judgment of the Director, to provide for orderly development of adjacent properties, franchise utilities shall be extended through the site to the edge of adjacent property(ies), whether or not the development involves a land division.
- C. The developer shall have the option of choosing whether or not to provide natural gas or cable television service to the development site, providing all of the following conditions exist:
 1. Extension of franchise utilities through the site is not necessary for the future orderly development of adjacent property(ies);



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2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above); and
 3. The development is non-residential.

D. Where a land division is not proposed, the site shall have franchise utilities required by this section provided in accordance with the provisions of 17.84.70 prior to occupancy of structures.

E. All franchise utility distribution facilities installed to serve new development shall be placed underground except as provided below. The following facilities may be installed above-ground:

1. Poles for street lights and traffic signals, pedestals for police and fire system communications and alarms, pad mounted transformers, pedestals, pedestal mounted terminal boxes and meter cabinets, concealed ducts, substations, or facilities used to carry voltage higher than 35,000 volts;
2. Overhead utility distribution lines may be permitted upon approval of the City Engineer when unusual terrain, soil, or other conditions make underground installation impracticable. Location of such overhead utilities shall follow rear or side lot lines wherever feasible.

Response: The Preliminary Plans include information for franchise utility installations. The installation of franchise utilities will be in accordance with the provisions of this Section and arranged with franchise utility providers. The criteria are met.

F. The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.

Response: The Preliminary Plans include information for franchise utility installations. The standard is met.

G. The developer shall be responsible for installation of underground conduit for street lighting along all public streets improved in conjunction with the development in accordance with the following:

1. The developer shall coordinate with the City Engineer to determine the location of future street light poles. The street light plan shall be designed to provide illumination meeting standards set by the City Engineer.
2. The developer shall make arrangements with the serving electric utility for trenching prior to installation of underground conduit for street lighting.

Response: The installation of franchise utilities will be in accordance with the provisions of this Section and arranged with franchise utility providers. The criteria are met.

17.84.90 LAND FOR PUBLIC PURPOSES



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- A. Easements for public sanitary sewer, water, storm drain, pedestrian and bicycle facilities shall be provided whenever these facilities are located outside a public right-of-way in accordance with the following:
1. When located between adjacent lots, easements shall be provided on one side of a lot line.
 2. The minimum easement width for a single utility is 15 ft. The minimum easement width for two adjacent utilities is 20 ft. The easement width shall be centered on the utility to the greatest extent practicable. Wider easements may be required for unusually deep facilities.
- B. Public utility easements with a minimum width of 5 feet shall be provided adjacent to all street rights-of-way for franchise utility installations.

Response: The Preliminary Subdivision Plat in the Preliminary Plans depicts required dedications and easements. The criteria are met.

- C. Where a development site is traversed by a drainageway or water course, a drainage way dedication shall be provided to the City.

Response: The project site does not include water course or drainageway, as reported in the FSH Analysis (Exhibit H). This criterion does not apply.

- D. Where a development is traversed by, or adjacent to, a future trail linkage identified within the Transportation System Plan, dedications of suitable width to accommodate the trail linkage shall be provided. This width shall be determined by the City Engineer, considering the type of trail facility involved.

Response: The project site does not contain adjacent or future trails within the Transportation System Plan. This criterion does not apply.

- E. Where existing rights-of-way and/or easements within or adjacent to development sites are nonexistent or of insufficient width, dedications may be required. The need for and widths of those dedications shall be determined by the City Engineer.

Response: As shown on the Preliminary Plans, right-of-way and improvement widths for streets within Bailey Meadows are being designed in accordance with City standards. Dedications related to existing right-of-way on SE Ponder Lane, east adjacent to the subdivision, are detailed for review by the City Engineer. The criterion is met.

- F. Where easement or dedications are required in conjunction with land divisions, they shall be recorded on the plat. Where a development does not include a land division, easements and/or dedications shall be recorded on standard document forms provided by the City Engineer.

Response: The Preliminary Subdivision Plat in Exhibit A includes details of necessary easements and dedications to be recorded on the plat as required. The criteria are met.

- G. If the City has an interest in acquiring any portion of a proposed subdivision or planned development site for a public purpose, other

than for those purposes listed above, or if the City has been advised of such interest by a school district or other public agency, and there is a reasonable assurance that steps will be taken to acquire the land, the Planning Commission may require those portions of the land be reserved for public acquisition for a period not to exceed 1 year.

Response: Other than for necessary supporting public infrastructure, this application does not include land designated for a public purpose. The criteria do not apply.

H. Environmental assessments for all lands to be dedicated to the public or City may be required to be provided by the developer. An environmental assessment shall include information necessary for the City to evaluate potential liability for environmental hazards, contamination, or required waste cleanups related to the dedicated land. An environmental assessment shall be completed prior to the acceptance of dedicated lands in accordance with the following:

1. The initial environmental assessment shall detail the history of ownership and general use of the land by past owners. Upon review of the information provided by the grantor, as well as any site investigation by the City, the Director will determine if the risks of potential contamination warrant further investigation. When further site investigation is warranted, a Level I Environmental Assessment shall be provided by the grantor.

Response: Other than for necessary supporting public infrastructure, this application does not include land designated for a public purpose. The criteria do not apply.

17.84.100 MAIL DELIVERY FACILITIES

- A. In establishing placement of mail delivery facilities, locations of sidewalks, bikeways, intersections, existing or future driveways, existing or future utilities, right-of-way and street width, and vehicle, bicycle and pedestrian movements shall be considered. The final location of these facilities shall meet the approval of the City Engineer and the Post Office. Where mail delivery facilities are being installed in conjunction with a land division, placement shall be indicated on the plat and meet the approval of the City Engineer and the Post Office prior to final plat approval.
- B. Where mail delivery facilities are proposed to be installed in areas with an existing or future curb-tight sidewalk, a sidewalk transition shall be provided that maintains the required design width of the sidewalk around the mail delivery facility. If the right-of-way width will not accommodate the sidewalk transition, a sidewalk easement shall be provided adjacent to the right-of-way.
- C. Mail delivery facilities and the associated sidewalk transition (if necessary) around these facilities shall conform with the City's standard construction specifications. Actual mailbox units shall conform with the Post Office standards for mail delivery facilities.
- D. Installation of mail delivery facilities is the obligation of the developer. These facilities shall be installed concurrently with the public improvements. Where development of a site does not require public improvements, mail delivery facilities shall be installed concurrently with private site improvements.

Response: In conjunction with the final construction plans, locations for mail delivery facilities will be coordinated and established with the U.S. Post Office.

CHAPTER 17.86 - PARKLAND & OPEN SPACE

Parkland Dedication: New residential subdivisions, planned developments, multi-family or manufactured home park developments shall be required to provide parkland to serve existing and future residents of those developments. Multi-family developments which provide some "congregate" services and/or facilities, such as group transportation, dining halls, emergency monitoring systems, etc., but which have individual dwelling units rather than sleeping quarters only, are considered to be multi-family developments for the purpose of parkland dedication. Licensed adult congregate living facilities, nursing homes, and all other similar facilities which provide their clients with individual beds and sleeping quarters, but in which all other care and services are communal and provided by facility employees, are specifically exempt from parkland dedication and system development fee requirements.

1. The required parkland shall be dedicated as a condition of approval for the following:
 - a. Tentative plat for a subdivision or partition;
2. Calculation of Required Dedication: The required parkland acreage to be dedicated is based on a calculation of the following formula rounded to the nearest 1/100 (0.00) of an acre:

Required parkland dedication (acres) = (proposed units) x (persons/unit) x 0.0043 (per person park land dedication factor)

- a. Population Formula: The following table shall be used to determine the number of persons per unit to be used in calculating required parkland dedication:

| Type of Unit | Total Persons Per Unit |
|---------------------------|------------------------|
| Single-family residential | 3.0 |

Persons per unit, age distribution, and local conditions change with time. The specific formula for the dedication of land will, therefore, be subject to periodic review and amendment.

- b. Per Person Parkland Dedication Factor: The total parkland dedication requirement shall be 0.0043 of an acre per person based on the adopted standard of 4.3 acres of land per one thousand of ultimate population per the Parks Master Plan

1. This standard represents the citywide land-to-population ratio for city parks, and may be adjusted periodically through amendments to the Parks Master Plan.



Response: The criteria above are satisfied by means of a fee in lieu of parkland dedication per the City standard 17.86.40. The remainder of Chapter 17 Section 86, which does not apply to the project, has been omitted for brevity.

17.86.40 CASH IN LIEU OF DEDICATION

At the city’s discretion only, the city may accept payment of a fee in lieu of land dedication. The city may require payment in lieu of land when the park land to be dedicated is less than 3 acres. A payment in lieu of land dedication is separate from Park Systems Development Charges, and is not eligible for a credit of Park Systems Development Charges. The amount of the fee in lieu of land dedication (in dollars per acre) shall be set by City Council Resolution, and it shall be based on the typical market value of developed property (finished lots) in Sandy net of related development costs.

1. The following factors shall be used in the choice of whether to accept land or cash in lieu:

Response: This application is a “Needed Housing” application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore, only objective standards and procedures apply to the application review. The choice between dedication and payment is subjective, as is the procedure to make the recommendation on the choice.

- a. The topography, geology, access to, parcel size, and location of land in the development available for dedication;

Response: This criterion is subjective and cannot be applied to a “Needed Housing” application under ORS 197.307(4).

- b. Potential adverse/beneficial effects on environmentally sensitive areas;

Response: This application does not include any environmentally sensitive areas as reported in the FSH Analysis (Exhibit H). The criterion does not apply.

- c. Compatibility with the Parks Master Plan, Public Facilities element of the Comprehensive Plan, and the City of Sandy Capital Improvements Program in effect at the time of dedication;

Response: This application is a “Limited Land Use Decision” pursuant to ORS 197.195(1) and Plans may be approval criteria only if specific policies are incorporated into the City’s land use regulations. The City’s land use regulation’s approval criteria in SDC 17.100.60 do not incorporate the 1997 Parks Master Plan, nor the above Plans with the specificity required by ORS 197.195(1), so they are not mandatory approval criteria and do not apply to this application.

- d. Availability of previously acquired property; and
- e. The feasibility of dedication.

Response: The above criteria are subjective and cannot be applied to a “Needed Housing” application per ORS 197.307(4).



2. Cash in lieu of parkland dedication shall be paid prior to approval of the final plat or as specified below:
 - a. 50 percent of the payment shall be paid prior to final plat approval, and
 - b. The remaining 50 percent of the payment pro-rated equally among the lots, plus an administrative surcharge as determined by the City Council through a resolution, will constitute a lien against the property payable at the time of sale.

Response: Cash in lieu of parkland dedication will be paid as determined and recorded in the resolution. The table below provides a preliminary cost estimate calculation. The criteria can be met.

| CASH IN LIEU OF DEDICATION | |
|--|-----------|
| Proposed Units | 100 |
| Persons Per Unit | 3 |
| Per Person Parkland Dedication Factor | 0.0043 |
| Required Parkland (Acres) | 1.29 |
| Cash in Lieu Cost Estimate | \$310,890 |

CHAPTER 17.90 - DESIGN STANDARDS

17.90.10 APPLICABILITY

The provisions of this chapter apply to all zones and uses as follows except as specified in Sections 17.90.10(B), (C), (D), (E), and (F) below:

- C. **Residential Dwelling Exception:** Single family dwellings, duplexes, manufactured dwellings on individual lots of record, and manufactured dwellings in parks are exempt from all requirements of this chapter except for Section 17.90.150.

Response: This application involves a planned subdivision of lots suitable for future single-family detached dwellings. The Preliminary Dimensioned Subdivision Plan with Setbacks, included in Exhibit A, demonstrates that future homes can meet the minimum setback requirements of the Single-Family Residential zone. The residential design standards, which apply to the street-facing facades of all new single-family dwellings, will be assessed at time of future building permit submittal. The remainder of Section 17.90.150 has been omitted for brevity.

CHAPTER 17.92 - LANDSCAPING & SCREENING GENERAL STANDARDS - ALL ZONES

17.92.30 REQUIRED TREE PLANTINGS

Planting of trees is required for all parking lots with 4 or more parking spaces, public street frontages, and along private drives more than 150 feet long. Trees shall be planted outside the street right-of-way except where there is a designated planting strip or City adopted street tree plan.

The City maintains a list of appropriate trees for street tree and parking lot planting situations. Selection of species should be made from the city-approved list. Alternate selections may be approved by the Director following written request. The type of tree used shall determine frequency of trees in planting areas. Trees in parking areas shall be dispersed throughout the lot to provide a canopy for shade and visual relief.

| Area/Type of Planting | Canopy | Spacing |
|-----------------------|--------|------------------|
| Street Tree | Medium | 30 ft. on center |
| Street Tree | Large | 50 ft. on center |

Trees may not be planted:

- Within 5 ft. of permanent hard surface paving or walkways, unless specific species, special
- planting techniques and specifications approved by the Director are used.
- Unless approved otherwise by the City Engineer:
- Within 10 ft. of fire hydrants and utility poles
- Within 20 ft. of street light standards
- Within 5 ft. from an existing curb face
- Within 10 ft. of a public sanitary sewer, storm drainage or water line
- Where the Director determines the trees may be a hazard to the public interest or general welfare.
- Trees shall be pruned to provide a minimum clearance of 8 ft. above sidewalks and 12 ft. above street and roadway surfaces.

Response: As shown on the Preliminary Street Tree and Stormwater Screening Planting Plan (included in Exhibit A), required street trees and planting strips are generally planned to be completed prior to occupancy of the adjoining lot. Street trees and planting strips that are located along the stormwater facility and at the site access are planned to be completed with the subdivision infrastructure as shown on the Preliminary Plans. Landscaping will be provided in accordance with the above criteria. Therefore, this standard is met.

17.92.40 IRRIGATION

Landscaping shall be irrigated, either with a manual or automatic system, to sustain viable plant life.

Response: This standard is understood. No additional response is necessary.

17.92.60 REVEGETATION IN UNLANDSCAPED OR NATURAL LANDSCAPED AREAS

- A. Areas where natural vegetation has been removed or damaged through grading or construction activity in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements shall be replanted.

- B. Plant material shall be watered at intervals sufficient to assure survival and growth.
- C. The use of native plant materials or plants acclimatized to the Pacific Northwest is encouraged to reduce irrigation and maintenance demands.

Response: This standard is understood. No additional response is necessary.

17.98.20 OFF-STREET PARKING REQUIREMENTS

- A. Off Street Parking Requirements. Off street parking shall conform to the following standards:
 1. All square footage measurements are gross square feet of total floor area.
 2. 18 lineal inches of bench shall be considered 1 seat.
 3. Except as otherwise specified, parking for employees shall be provided based on 1 space per 2 employees for the largest shift in addition to required parking specified in Sections A6-A9 below.
 4. Where less than 5 parking spaces are required, then only one bicycle space shall be required except as otherwise modified in Sections 5-9 below.
 5. In addition to requirements for residential off street parking, new dwellings shall meet the on-street parking requirements in Section 17.98.200.

| Residential Uses | Number of Parking Spaces | Number of Bicycle Spaces |
|------------------------|--------------------------|--------------------------|
| Single Family Detached | 2 per dwelling | 0 |

Response: This application is for a residential subdivision suitable for single-family detached homes. As shown on the Preliminary Parking Plan in Exhibit A, future driveways provide for two off-street parking spaces per dwelling. Bicycle parking is not required or provided. As applicable, the criteria above are met.

17.98.200 RESIDENTIAL ON-STREET PARKING REQUIREMENTS

- A. Residential On-Street Parking Requirements. Residential on-street parking shall conform to the following standards:
 1. In addition to required off-street parking, all new residential planned developments, subdivisions and partitions shall provide one (1) on-street parking space within 200 feet of each dwelling except as provided in Section 17.98.200(A)(6) below.

Response: As shown on the Preliminary Parking Plan in Exhibit A, in addition to required off-street parking, the 100-lot subdivision is planned to provide 122 on-street parking spaces. The criterion is met.

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2. The location of residential on-street parking shall be reviewed for compliance with this section through submittal of a Residential Parking Analysis Plan as required in Section 17.98.10(M).

Response: The Preliminary Plans (Exhibit A) include a Preliminary Parking Plan sheet. The submittal requirements are met.

3. Residential on-street parking shall not obstruct required clear vision areas and shall not violate any local or state laws.
4. Parallel residential on-street parking spaces shall be 22 feet minimum in length.
5. Residential on-street parking shall be measured along the curb from the outside edge of a driveway wing or curb cut. Parking spaces must be set back a minimum of 15 feet from an intersection and may not be located within 10 feet of a fire hydrant.

Response: As shown on the Preliminary Parking Plan in Exhibit A, on-street parking is planned to not obstruct clear vision areas. Parallel on-street parking spaces meet the minimum length and setback requirements as detailed above. The criteria are met.

6. Portions of residential on-street parking required by this section may be provided in parking courts that are interspersed throughout a development when the following standards are met:
 - a. No more than eight (8) parking spaces shall be provided in a parking court;
 - b. Parking spaces within a parking court shall be nine (9) feet wide and 18 feet in depth;
 - c. Notwithstanding Section 17.98.70, vehicles parked in a parking court are permitted to back onto the public right-of-way from the parking court;
 - d. A parking court shall be located within 200 feet of the dwellings requiring parking in accordance with the requirements of Section 17.98.10(M);
 - e. No more than two (2) parking courts shall be provided within a block, with only one (1) parking court provided along a block face;
 - f. A parking court shall be paved in compliance with the standards of this chapter and the latest adopted grading and drainage standards; 17.98 - 13 Revised by Ordinance No. 2013-04 (effective 07/03/13)
 - g. If a parking court is adjacent to a public right-of-way, it shall be publicly owned and maintained;
 - h. If a parking court is adjacent to a private drive, it shall be privately owned and maintained. For each parking court there shall be a legal recorded document which includes:
 - i. A legal description of the parking court;

- ii. Ownership of the parking court;
 - iii. Use rights; and
 - iv. A maintenance agreement and the allocation and/or method of determining liability for maintenance of the parking court;
- i. A parking court shall be used solely for the parking of operable passenger vehicles.

Response: This application does not include parking courts. The criteria listed above are not applicable.

CHAPTER 17.100 - LAND DIVISION

17.100.20 LAND DIVISION CLASSIFICATION - TYPE I, II OR III PROCEDURES

E. Type III Land Division (Major Partition or Subdivision). A major partition or subdivision shall be a Type III procedure if unsatisfactory street conditions exist or the resulting parcels/lots do not comply with the standards of the zoning district and this chapter. The Director shall determine if unsatisfactory street conditions exist based on one of the following criteria:

1. The land division does not link streets that are stubbed to the boundaries of the property.

Response: This application links to and includes the continuation of the existing Melissa Avenue right-of-way street stub, north of the project site as shown on the Preliminary Plans in Exhibit A. Therefore, this criterion does not apply, and future street conditions will be satisfactory.

2. An existing street or a new proposed street will be extended beyond the boundaries of the land division to complete a street system or provide access to adjacent property.

Response: As shown on the Preliminary Plans, planned streets are not extended beyond the boundaries of the subdivision. Therefore, this criterion does not apply, and future street conditions will be satisfactory.

3. The proposed street layout is inconsistent with a street pattern adopted as part of the Comprehensive Plan or officially adopted City street plan.

Response: The Preliminary Plans include information illustrating how the infrastructure is planned to be consistent with City standards. Therefore, the criterion will be met, and future street conditions will be satisfactory.

17.100.60 SUBDIVISIONS

Approval of a subdivision is required for a land division of 4 or more parcels in a calendar year.

A two-step procedure is required for subdivision approval: (1) tentative plat review and approval; and (2) final plat review and approval.



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- A. Preapplication Conference. The applicant for a subdivision shall participate in a preapplication conference with city staff to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services. The preapplication conference provides the opportunity to discuss the conceptual development of the property in advance of formal submission of the tentative plan in order to save the applicant unnecessary delay and cost.

Response: A pre-application conference was held on November 20, 2018.

- B. Application Requirements for a Tentative Plat. Subdivision applications shall be made on forms provided by the planning department and shall be accompanied by:
1. 20 copies of the tentative plat;
 2. Required fee and technical service deposit;
 3. 20 copies of all other supplementary material as may be required to indicate the general program and objectives of the subdivision;
 4. Preliminary title search;
 5. List of affected property owners.

Response: Exhibit B contains the documents listed above. These submittal requirements are met.

- B. Format. The Tentative Plat shall be drawn on a sheet 18 x 24 inches in size and at a scale of one inch equals one hundred feet unless an alternative format is approved by the Director at the preapplication conference. The application shall include one copy of a scaled drawing of the proposed subdivision, on a sheet 8 1/2 x 11, suitable for reproduction.

Response: Exhibit A contains the Preliminary Subdivision Plat. This submittal requirement is met.

- D. Data Requirements for Tentative Plat.
1. Scale of drawing, north arrow, and date.
 2. Location of the subdivision by section, township and range, and a legal description sufficient to define the location and boundaries of the proposed tract.
 3. A vicinity map, showing adjacent property boundaries and how proposed streets may be extended to connect to existing streets.
 4. Names, addresses, and telephone numbers of the owner(s) of the property, the engineer or surveyor, and the date of the survey.
 5. Streets: location, names, paved widths, alleys, and right-of-way (existing and proposed) on and within 400 feet of the boundaries of the subdivision tract.
 6. Easements: location, widths, purpose of all easements (existing and proposed) on or serving the tract.

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7. Utilities: location of storm drainage, sanitary sewers and water lines (existing and proposed) on and abutting the tract. If utilities are not on or abutting the tract, indicate the direction and distance to the nearest locations.
 8. Ground elevations shown by contour lines at two-foot vertical intervals for ground slopes of less than 10 percent and at ten-foot vertical intervals for ground slopes exceeding 10 percent. Ground elevation shall be related to an established benchmark or other datum approved by the Director.
 9. Natural features such as marshes, rock outcroppings, watercourses on and abutting the property, location of wooded areas.
 10. Approximate location of areas subject to periodic inundation or storm sewer overflow, location of any floodplain or flood hazard district.
 11. Location, width, and direction of flow of all water courses.
 12. Identification of the top of bank and boundary of mandatory setback for any stream or water course.
 13. Identification of any associated wetland and boundary of mandatory setback.
 14. Identification of any wetland and boundary of mandatory setback.
 15. Location of at least one temporary bench mark within the tract boundaries.
 16. Existing uses of the property, including location and present use of all existing structures to remain on the property after platting.
 17. Lots and Blocks: approximate dimensions of all lots, minimum lot sizes, and proposed lot and block numbers.
 18. Existing zoning and proposed land use.
 19. Designation of land intended to be dedicated or reserved for public use, with the purpose, conditions, or limitations of such reservations clearly indicated.
 20. Proposed development phases, if applicable.
 21. Any other information determined necessary by the Director at the preapplication conference, such as a soil report or other engineering study, traffic analysis, floodplain or wetland delineation, etc.

Response: The Preliminary Plans and other documentation include the information listed above, as applicable. Therefore, these submittal requirements are met.

- E. Approval Criteria. The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.12 and the following approval criteria:



-
1. The proposed subdivision is consistent with the density, setback and dimensional standards of the base zoning district, unless modified by a Planned Development approval.

Response: As shown on the Preliminary Subdivision Plat in Exhibit A and findings provided in the written document, the planned subdivision is consistent with the density, setback, and dimensional standards of the SFR zoning district. The project is not modified by Planned Development standards of approval. The criterion is met.

3. The proposed subdivision is consistent with the design standards set forth in this chapter.

Response: This subdivision application is consistent with the design standards set forth in SD 17.100.70 and in conformance with the applicable SFR zoning district. Therefore, the criterion is met.

4. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy.

Response: As shown on the Preliminary Plans, the intended local street pattern internal to the subdivision is connected and consistent with the Comprehensive Plan. Access from the existing street stub, Melissa Avenue, provides a continuous network through and to the boundaries of the subdivision. Additionally, this standard may not be applied under ORS 197.307(4) because the phrase “connected and consistent” is subjective. Additionally, this standard may not be applied under ORS 197.307(4) because the phrase “City standards” is subjective. Additionally, this standard may not be applied under ORS 197.307(4) because the words “objective” and “necessary” are subjective.

5. Adequate public facilities are available or can be provided to serve the proposed subdivision.

Response: As shown in the Preliminary Plans, public facilities as available will be provided to serve the subdivision, including but not limited to stormwater management, sanitary sewer, municipal water, and franchise utilities. Infrastructure is planned to be completed concurrent with the build out of the associated phase. The criterion is met.

6. All proposed improvements meet City standards.

Response: Sandy Development Code requirements have been reviewed with the intent that all planned improvements meet applicable City standards.

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

Response: As shown on the Preliminary Subdivision Plat in the Preliminary Plans, the subdivision is planned to be completed in three phases and provide necessary public improvements concurrently with each phase. The above requirements are satisfied and support the City’s approval of this Subdivision.

F. Conditions. The Director or Planning Commission may require dedication of land and easements and may specify such conditions or modifications of the tentative plat as deemed necessary.

Response: It is understood the Preliminary Subdivision Plat may have conditions or modifications required as necessary. The Applicant reserves the right to object to the application of standards or conditions other than those that are clear and objective and does not waive its right to assert that the needed housing statutes apply to this application.

G. Improvements. A detailed list of required improvements for the subdivisions shall be set forth in the approval and conditions for the tentative plat.

Response: This criterion is understood. No additional response is necessary.

H. Tentative Plat Expiration Date. The final plat shall be delivered to the Director for approval within one year following approval of the tentative plat, and shall incorporate any modification or condition required by approval of the tentative plat. The Director may, upon written request of the subdivider, grant an extension of the tentative plat approval for up to one additional year.

Response: This criterion is understood. No additional response is necessary.

17.100.70 LAND DIVISION DESIGN STANDARDS

All land divisions shall be in conformance with the requirements of the applicable base zoning district and this chapter, as well as with other applicable provisions of this Code. Modifications to these requirements may be accomplished through a Planned Development. The design standards in this section shall be used in conjunction with street design standards included in the City of Sandy Transportation System Plan and standards and construction specifications for public improvements as set forth in adopted Public Facilities Plans and the Sandy Municipal Code.

Response: This application contains the Preliminary Plans, reports, analysis, calculations, and applicable narrative information to validate conformance with the requirements of the Sandy Development Code. The land division design standards of City Code are satisfied.

17.100.80 CHARACTER OF THE LAND

Land which the Director or the Planning Commission finds to be unsuitable for development due to flooding, improper drainage, steep slopes, rock formations, adverse earth formations or topography, utility easements, or other features which will reasonably be harmful to the safety, health, and general welfare of the present or future inhabitants of the partition or subdivision and the surrounding areas, shall not be developed unless adequate methods are formulated by the subdivider and approved by the Director or the Planning Commission to solve the problems created by the unsuitable land conditions.

Response: As detailed in the Flood and Slope Hazard Analysis (Exhibit H) the project site does not exhibit or contain unsuitable land conditions. This criterion does not apply.

17.100.90 ACCESS CONTROL GUIDELINES AND COORDINATION



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- A. Notice and coordination with ODOT required. The city will coordinate and notify ODOT regarding all proposals for new or modified public and private accesses on to Highways 26 and 211.
 - B. It is the city policy to, over time, reduce noncompliance with the Oregon Highway Plan Access Management Policy guidelines.
 - C. Reduction of compliance with the cited State standards means that all reasonable alternatives to reduce the number of accesses and avoid new non-complying accesses will be explored during the development review. The methods to be explored include, but are not limited to: closure, relocation, and consolidation of access; right-in/right-out driveways; crossover easements; and use of local streets, alleys, and frontage roads.

Response: The above criterion applies to City processes for noticing and coordinating with ODOT, as applicable. This standard is not applicable as the project does not access Highway 26 or 211 and does not require direct action of the Applicant. The criteria do not apply.

17.100.100 STREETS GENERALLY

No subdivision or partition shall be approved unless the development has frontage or approved access to an existing public street. In addition, all streets shall be graded and improved in conformance with the City's construction standards, approved by the City Engineer, in accordance with the construction plans.

- A. **Street Connectivity Principle.** The pattern of streets established through land divisions should be connected to: (a) provide safe and convenient options for cars, bikes and pedestrians; (b) create a logical, recognizable pattern of circulation; and (c) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

Response: The Preliminary Plans illustrate the street network internal to the subdivision and establish safe, logical circulation throughout the site. The Street Connectivity Principle is met.

- B. **Transportation Impact Studies.** Transportation impact studies may be required by the city engineer to assist the city to evaluate the impact of development proposals, determine reasonable and prudent transportation facility improvements and justify modifications to the design standards. Such studies will be prepared in accordance with the following:
 - 1. A proposal established with the scope of the transportation impact study shall be coordinated with, and agreed to, by the city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. A professional civil or traffic engineer registered in the State of Oregon shall prepare such studies.
 - 2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.



Response: The Traffic Impact Analysis prepared by a registered professional traffic engineer (Exhibit F) is included in the application materials. The scope of the analysis was confirmed with the City's traffic engineer consultant. The requirements are met.

- C. **Topography and Arrangement.** All streets shall be properly related to special traffic generators such as industries, business districts, schools, and shopping centers and to the pattern of existing and proposed land uses.
- D. **Street Spacing.** Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.

Response: The Preliminary Plans (Exhibit A) include information which meets the criteria above. The streets are arranged in accordance with existing residential activity and a rectangular grid pattern is generally used. The criteria are met.

- E. **Future Street Plan.** Future street plans are conceptual plans, street extensions and connections on acreage adjacent to land divisions. They assure access for future development and promote a logical, connected pattern of streets. It is in the interest of the city to promote a logical, connected pattern of streets. All applications for land divisions shall provide a future street plan that shows the pattern of existing and proposed future streets within the boundaries of the proposed land divisions, proposed connections to abutting properties, and extension of streets to adjacent parcels within a 400 foot radius of the study area where development may practically occur.

Response: The Preliminary Plans (Exhibit A) include a Conceptual Future Street Plan which meets the criteria above.

- F. **Connections.** Except as permitted under Exemptions, all streets, alleys and pedestrian walkways shall connect to other streets within the development and to existing and planned streets outside the development and to undeveloped properties which have no future street plan. Streets shall terminate at other streets or at parks, schools or other public land within a neighborhood.

Where practicable, local roads shall align and connect with other roads when crossing collectors and arterials.

Proposed streets or street extensions shall be located to provide direct access to existing or planned transit stops, and existing or planned neighborhood activity centers, such as schools, shopping areas and parks.

Response: The Preliminary Plans show local street and pedestrian walkway (sidewalk) connections internal to the subdivision. The local streets do not cross any collector or arterial roads and there are no exemptions necessary for the intended street network.

- G. **Exemptions.**
 - 1. A future street plan is not required for partitions of residentially zoned land when none of the parcels may be redivided under existing minimum density standards.



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2. Standards for street connections do not apply to freeways and other highways with full access control.
 3. When street connection standards are inconsistent with an adopted street spacing standard for arterials or collectors, a right turn in/right turn out only design including median control may be approved. Where compliance with the standards would result in unacceptable sight distances, an accessway may be approved in place of a street connection.

Response: This application does not seek street design exemptions. The criteria do not apply.

17.100.110 STREET STANDARDS AND CLASSIFICATION

Street standards are illustrated in the figures included at the end of this chapter. Functional definitions of each street type are described in the Transportation System Plan as summarized below.

- A. Major arterials are designed to carry high volumes of through traffic, mixed with some unavoidable local traffic, through or around the city. Major arterials should generally be spaced at 1-mile intervals.
- B. Minor arterials are designed to collect and distribute traffic from major and minor arterials to neighborhood collectors and local streets, or directly to traffic destinations. Minor arterials should generally be spaced at 1-mile intervals.
- C. Residential minor arterials are a hybrid between minor arterial and collector type streets that allow for moderate to high traffic volumes on streets where over 90% of the fronting lots are residential.
- D. Collector streets are designed to collect and distribute traffic from higher type arterial streets to local streets or directly to traffic destinations. Collector streets should generally be spaced at 1/2-mile intervals.

Response: The project site does not include major or minor arterials, residential minor arterials, or collector streets. These standards do not apply.

- E. Local streets are designed to provide direct access to abutting property and connect to collector streets. A general spacing of 8-10 local streets per mile is recommended.

Response: The subdivision is accessed via Melissa Avenue, a local street section to the north of the property boundary, and a continuous network of local streets allow transportation throughout the site.

- F. Cul-de-sacs and dead end streets are discouraged. If deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length.
- G. Public access lanes are designed to provide primary access to a limited number of dwellings when the construction of a local street is unnecessary.
- H. Alleys are designed to provide access to multiple dwellings in areas where lot frontages are narrow and driveway spacing requirements cannot be met.



Response: The project site does not include cul-de-sacs, public access lanes, or alleys. These standards do not apply.

17.100.120 BLOCKS AND ACCESSWAYS

- A. **Blocks.** Blocks shall have sufficient width to provide for two tiers of lots at appropriate depths. However, exceptions to the block width shall be allowed for blocks that are adjacent to arterial streets or natural features.
- B. **Residential Blocks.** Blocks fronting local streets shall not exceed 400 feet in length, unless topographic, natural resource, or other similar physical conditions justify longer blocks. Blocks may exceed 400 feet if approved as part of a Planned Development, Specific Area Plan, adjustment or variance.

Response: As shown on the Preliminary Plans, the residential blocks provide two tiers of lots. Blocks front local streets and do not exceed 400 feet in length. There is no minimum average lot depth in the criteria of 17.34.30 Design Standards for newly created lots and the Preliminary Subdivision Plan with Setbacks demonstrates that future homes can meet the minimum setback requirements at the time of future building permit submittal. The standards are met.

- C. **Commercial Blocks.** Blocks located in commercial districts shall not exceed 400 feet in length.

Response: This application does not involve commercial districts; the criteria does not apply.

- D. **Pedestrian and Bicycle Access Way Requirements.** In any block in a residential or commercial district over 600 feet in length, a pedestrian and bicycle accessway with a minimum improved surface of 10 feet within a 15-foot right-of-way or tract shall be provided through the middle of the block. To enhance public convenience and mobility, such accessways may be required to connect to cul-de-sacs, or between streets and other public or semipublic lands or through greenway systems.

Response: As shown on the Preliminary Plans, this application does not include any blocks greater than 600 feet in length. The standard does not apply.

17.100.130 EASEMENTS

A minimum eight (8) foot public utility easement shall be required along property lines abutting a right-of-way for all lots within a partition or subdivision. Where a partition or subdivision is traversed by a watercourse, drainage way, channel or stream, the land division shall provide a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse, and such further width as determined needed for water quality and quantity protection.

Response: As shown on the Preliminary Subdivision Plat, easements and dedications required along property lines abutting a right-of-way will be provided as required. The criterion is met.

17.100.140 PUBLIC ALLEYS



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- A. Public alleys shall have a minimum width of 20 feet. Structural section and surfacing shall conform to standards set by the City Engineer.
 - B. Existing alleys may remain unimproved until redevelopment occurs. When development occurs, each abutting lot shall be responsible for completion of improvements to that portion of the alley abutting the property.
 - C. Parking within the alley right-of-way is prohibited except as provided in Section 17.100.140(D) below.
 - D. An alley with a minimum width of 28 feet may permit parallel parking on one side of the alley only.

Response: The application does not include public alleys. The criteria do not apply.

17.100.180 INTERSECTIONS

- A. Intersections. Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two new streets at an angle of less than 75 degrees shall not be acceptable. No more than two streets shall intersect at any one point unless specifically approved by the City Engineer. The city engineer may require left turn lanes, signals, special crosswalks, curb extensions and other intersection design elements justified by a traffic study or necessary to comply with the Development Code.
- B. Curve Radius. All local and neighborhood collector streets shall have a minimum curve radius (at intersections of rights-of-way) of 20 feet, unless otherwise approved by the City Engineer. When a local or neighborhood collector enters on to a collector or arterial street, the curve radius shall be a minimum of 30 feet, unless otherwise approved by the City Engineer

Response: The Preliminary Plans include information illustrating how the local street system internal to the subdivision meets the design requirements. No more than two streets intersect at any one point and internal streets meet the minimum curve radius at intersections of rights-of-way, as applicable. The criteria are met.

17.100.190 STREET SIGNS

The subdivider shall pay the cost of street signs prior to the issuance of a Certificate of Substantial Completion. The City shall install all street signs and upon completion will bill the developer for costs associated with installation. In addition, the subdivider may be required to pay for any traffic safety devices related to the development. The City Engineer shall specify the type and location of the street signs and/or traffic safety devices.

Response: This statement is understood. No additional response is necessary.

17.100.200 STREET SURFACING

Public streets, including alleys, within the development shall be improved in accordance with the requirements of the City or the standards of the Oregon State Highway Department. An overlay of asphalt concrete, or material approved by the City Engineer, shall be placed on all streets within the development. Where required, speed humps shall be constructed in conformance with the City's standards and specifications.

Response: The statement is understood. No additional response is necessary.

17.100.210 STREET LIGHTING

A complete lighting system (including, but not limited to: conduits, wiring, bases, poles, arms, and fixtures) shall be the financial responsibility of the subdivider on all cul-de-sacs, local streets, and neighborhood collector streets. The subdivider will be responsible for providing the arterial street lighting system in those cases where the subdivider is required to improve an arterial street. Standards and specifications for street lighting shall be coordinated with the utility and any lighting district, as appropriate.

Response: Conceptual locations for street lighting are indicated in the Preliminary Plans. PGE will be contacted, and final lighting design elements will be confirmed during the final design process, as appropriate. The criterion is met.

17.100.220 LOT DESIGN

A. The lot arrangement shall be such that there will be no foreseeable difficulties, for reason of topography or other conditions, in securing building permits to build on all lots in compliance with the Development Code.

Response: The Preliminary Subdivision Plat with Setbacks, included in Exhibit A, demonstrates that all lots in the subdivision can accommodate future homes which meet the minimum setback requirements at the time of future building permit submittal. As shown, each lot meets the 7,500 square-foot minimum lot size requirement. The criteria are met.

B. The lot dimensions shall comply with the minimum standards of the Development Code. When lots are more than double the minimum lot size required for the zoning district, the subdivider may be required to arrange such lots to allow further subdivision and the opening of future streets to serve such potential lots.

Response: As shown on the Preliminary Plans, lot dimensions comply with the minimum dimensions and standards of the Development Code. Lots are not larger than twice the minimum lot size. The criterion is met.

C. The lot or parcel width at the front building line shall meet the requirements of the Development Code and shall abut a public street other than an alley for a width of at least 20 feet. A street frontage of not less than 15 feet is acceptable in the case of a flag lot division resulting from the division of an unusually deep land parcel which is of a size to warrant division into not more than two parcels.

Response: As shown on the Preliminary Plans, each lot complies with the minimum dimensions and standards of the Development Code and have proper frontage on a public street. The criterion is met.

D. Double frontage lots shall be avoided except where necessary to provide separation of residential developments from arterial streets or to overcome specific disadvantages of topography or orientation.

Response: As shown on the Preliminary Plans, the subdivision does not include double-frontage lots. The criteria do not apply.

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- E. Lots shall avoid deriving access from major or minor arterials. When driveway access from major or minor arterials may be necessary for several adjoining lots, the Director or the Planning Commission may require that such lots be served by a common access drive in order to limit possible traffic hazards on such streets. Where possible, driveways should be designed and arranged to avoid requiring vehicles to back into traffic on minor or major arterials.

Response: As shown on the Preliminary Plans, the lot arrangement demonstrates compliance with the requirements of the Development Code. The project site does not contain or connect to major or minor arterial streets. The above criterion is met.

17.100.230 WATER FACILITIES

Water lines and fire hydrants serving the subdivision or partition, and connecting the development to City mains, shall be installed to provide adequate water pressure to serve present and future consumer demand. The materials, sizes, and locations of water mains, valves, service laterals, meter boxes and other required appurtenances shall be in accordance with the standards of the Fire District, the City, and the State.

If the city requires the subdivider to install water lines in excess of eight inches, the city may participate in the oversizing costs. Any oversizing agreements shall be approved by the city manager based upon council policy and dependent on budget constraints. If required water mains will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement for the proportionate share of the cost.

Response: As shown on the Preliminary Plans, water infrastructure including conveyance mains, lines, and fire hydrants are designed in accordance with applicable standards. This criterion is met.

17.100.240 SANITARY SEWERS

Sanitary sewers shall be installed to serve the subdivision and to connect the subdivision to existing mains. Design of sanitary sewers shall take into account the capacity and grade to allow for desirable extension beyond the subdivision.

If required sewer facilities will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement by nonparticipating landowners for the proportionate share of the cost of construction.

Response: The Preliminary Plans include information illustrating how the project is planned to be serviced with sanitary sewer. This infrastructure is planned in accordance with the standards of the applicable jurisdictions; therefore, the criterion is met.

17.100.250 SURFACE DRAINAGE AND STORM SEWER SYSTEM

- A. Drainage facilities shall be provided within the subdivision and to connect with off-site drainage ways or storm sewers. Capacity, grade and materials shall be by a design approved by the city engineer. Design of drainage within the subdivision shall take into account the location, capacity and grade necessary to maintain unrestricted flow



from areas draining through the subdivision and to allow extension of the system to serve such areas.

- B. In addition to normal drainage design and construction, provisions shall be taken to handle any drainage from preexisting subsurface drain tile. It shall be the design engineer's duty to investigate the location of drain tile and its relation to public improvements and building construction.
- C. The roof and site drainage from each lot shall be discharged to either curb face outlets (if minor quantity), to a public storm drain or to a natural acceptable drainage way if adjacent to the lot.

Response: The Preliminary Plans (Exhibit A) and Preliminary Stormwater Report (Exhibit G) include information illustrating how stormwater runoff is planned to be managed. The criteria are met.

17.100.260 UNDERGROUND UTILITIES

All subdivisions or major partitions shall be required to install underground utilities (including, but not limited to, electrical and telephone wiring). The utilities shall be installed pursuant to the requirements of the utility company.

Response: The Preliminary Plans include information illustrating how the project is planned to be provided with underground utilities. This infrastructure is planned in accordance with the standards of the applicable jurisdictions; therefore, the criterion is met.

17.100.270 SIDEWALKS

Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision.

Response: The Preliminary Plans show compliance with the local street typical sections in City Code. The standard is met.

17.100.280 BICYCLE ROUTES

If appropriate to the extension of a system of bicycle routes, existing or planned, the Director or the Planning Commission may require the installation of bicycle lanes within streets. Separate bicycle access ways may be required to reduce walking or cycling distance when no feasible street connection is available.

Response: The project site does not include any existing or planned bicycle routes. The criterion does not apply.

17.100.290 STREET TREES

Where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved by the Director. The street tree plan shall provide street trees approximately every 30' on center for all lots.

Response: As shown in the Preliminary Plans in Exhibit A, the appropriate number of trees are provided on the Street Tree Plan. The criterion is satisfied.

17.100.300 EROSION CONTROL



Grass seed planting shall take place prior to September 30th on all lots upon which a dwelling has not been started but the ground cover has been disturbed. The seeds shall be of an annual rye grass variety and shall be sown at not less than four pounds to each 1000 square feet of land area.

Response: The requirement is understood. No additional response is necessary.

17.100.310 REQUIRED IMPROVEMENTS

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

- A. Drainage facilities
- B. Lot, street and perimeter monumentation
- C. Mailbox delivery units
- D. Sanitary sewers
- E. Sidewalks
- F. Street lights
- G. Street name signs
- H. Street trees
- I. Streets
- J. Traffic signs
- K. Underground communication lines, including broadband (fiber), telephone, and cable. Franchise agreements will dictate whether telephone and cable lines are required.
- L. Underground power lines
- M. Water distribution lines and fire hydrants

Response: The above listed improvements are planned to be included in the project design as required. The criteria are met.

CHAPTER 17.102 - URBAN FORESTRY

17.102.20 APPLICABILITY

This chapter applies only to properties within the Sandy Urban Growth Boundary that are greater than one acre including contiguous parcels under the same ownership.

- A. General: No person shall cut, harvest, or remove trees 11 inches DBH or greater without first obtaining a permit and demonstrating compliance with this chapter.
 - 1. As a condition of permit issuance, the applicant shall agree to implement required provisions of this chapter and to allow all inspections to be conducted.
 - 2. Tree removal is subject to the provisions of Chapter 15.44, Erosion Control, Chapter 17.56, Hillside Development, and Chapter 17.60 Flood and Slope Hazard.



Response: As detailed in the Preliminary Plans, the application includes tree removal subject to the exception criteria below. Thus, the application is demonstrating compliance with this chapter. Tree removal is planned to comply with erosion control provisions of Chapter 15.44. As documented in the FSH Analysis (Exhibit H), the provisions of Chapters 17.56 and 17.60 are not relevant to the site and do not apply. The applicable criteria are understood.

B. **Exceptions:** The following tree removals are exempt from the requirements of this chapter.

1. Tree removal as required by the city or public utility for the installation or maintenance or repair of roads, utilities, or other structures.

Response: As detailed in the Preliminary Plans, the application includes tree removal for the installation of roads and utilities, including four off-site trees located in the existing public right-of-way for Melissa Avenue. Such tree removal is exempt from the requirements of this chapter as stated above. As shown on the Preliminary Plans, a tree in the existing public right-of-way could potentially be retained upon acceptance of fee-in-lieu for improvements to east SE Ponder Lane.

2. Tree removal to prevent an imminent threat to public health or safety, or prevent imminent threat to public or private property, or prevent an imminent threat of serious environmental degradation. In these circumstances, a Type I tree removal permit shall be applied for within seven days following the date of tree removal.

Response: The application does not involve tree removal subject to the exception criteria above.

IV. Conclusion

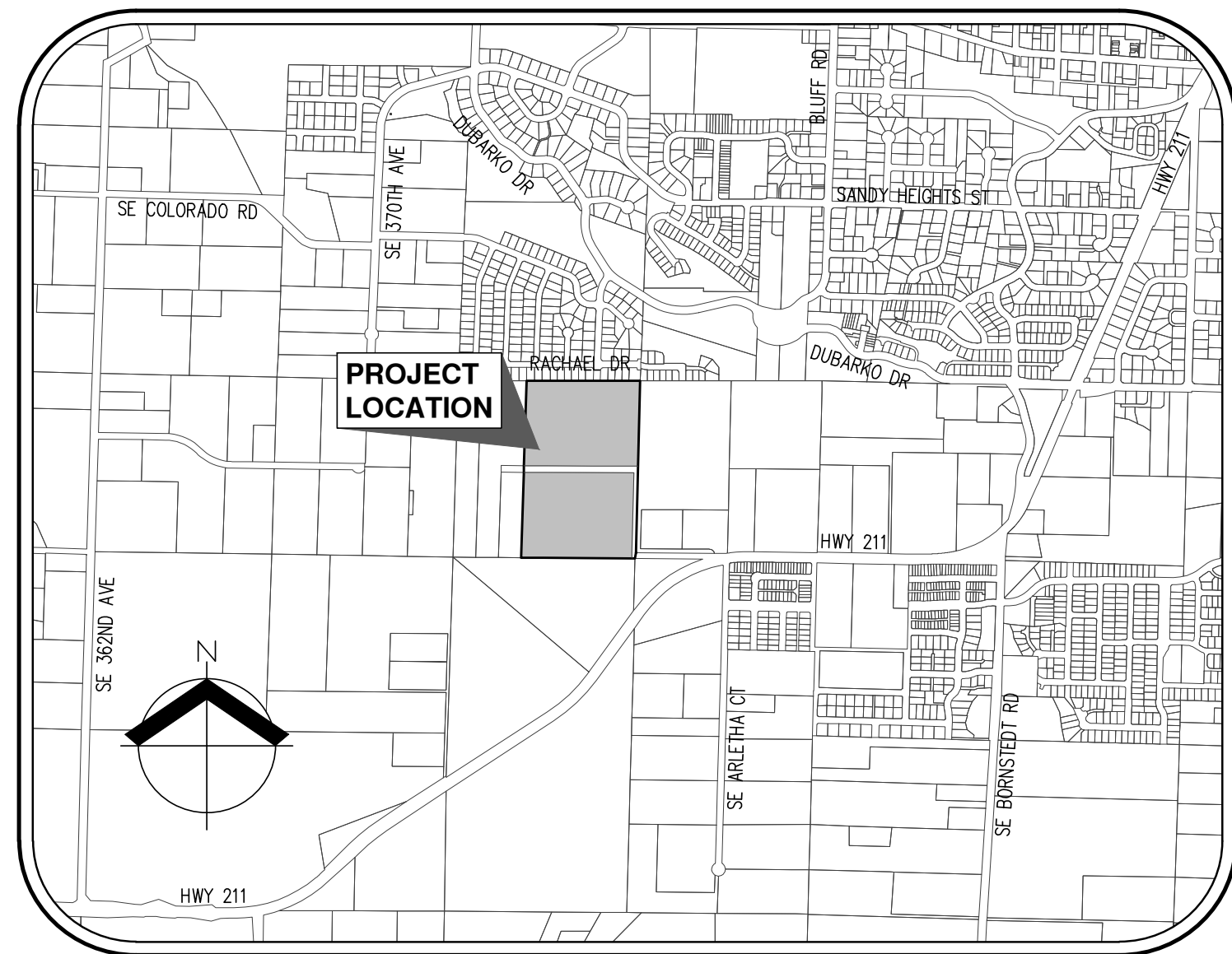
The required findings have been made and this written narrative and accompanying documentation demonstrate that the application is consistent with the applicable provisions of the City of Sandy Development Code. The evidence in the record is substantial and supports approval of the application.



BAILEY MEADOWS

PRELIMINARY SUBDIVISION PLANS

EXHIBIT C



VICINITY MAP
SCALE: 1" = 1000'



SITE MAP
SCALE: 1" = 200'

APPLICANT:

ALLIED HOMES AND DEVELOPMENT
12402 SE SUNNYSIDE ROAD SUITE 706
CLACKAMAS, OR 97015

PLANNING / ENGINEERING / SURVEYING TEAM:

AKS ENGINEERING & FORESTRY, LLC
CONTACT: MONTY HURLEY / CHRIS GOODELL
12965 SW HERMAN ROAD, SUITE 100
TUALATIN, OR 97062
PH: 503-563-6151

PROJECT LOCATION:

NORTHWEST OF THE INTERSECTION OF OREGON STATE HIGHWAY 211 AND SE PONDER LANE SANDY, OREGON

PROPERTY DESCRIPTION:

TAX LOTS 800, 801, 802, 803, & 804 CLACKAMAS COUNTY ASSESSOR'S MAP NUMBER 2 4E 23, SECTION 23, TOWNSHIP 2 SOUTH, RANGE 4 EAST, WILLAMETTE MERIDIAN, CITY OF SANDY, CLACKAMAS COUNTY, OREGON.

EXISTING LAND USE:

AGRICULTURE

PROJECT PURPOSE:

RESIDENTIAL SUBDIVISION FOR FUTURE SINGLE-FAMILY RESIDENTIAL HOMES.

VERTICAL DATUM:

ELEVATIONS ARE BASED ON NGS BENCHMARK NO. RD0188. LOCATED IN CONCRETE WALL 1-FOOT ABOVE SIDEWALK NEAR THE SOUTHWEST CORNER OF THE BUILDING AT 39131 PIONEER BOULEVARD, SANDY OREGON. ELEVATION = 990.05 FEET (NAVD88)

PROPERTIES:

| TAX LOT | MAP | AREA |
|---------|---------|-----------------|
| 800 | 2 4E 23 | 2.40 AC |
| 801 | 2 4E 23 | 4.74 AC |
| 802 | 2 4E 23 | 4.74 AC |
| 803 | 2 4E 23 | 9.17 AC |
| 804 | 2 4E 23 | 2.37 AC |
| | | TOTAL: 23.42 AC |

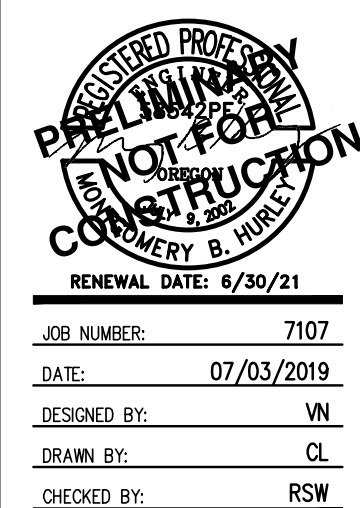
| | EXISTING | PROPOSED | EXISTING | PROPOSED |
|------------------------------------|----------|----------|----------|----------|
| DECIDUOUS TREE | | | | |
| CONIFEROUS TREE | | | | |
| FIRE HYDRANT | | | | |
| WATER BLOWOFF | | | | |
| WATER METER | | | | |
| WATER VALVE | | | | |
| DOUBLE CHECK VALVE | | | | |
| AIR RELEASE VALVE | | | | |
| SANITARY SEWER CLEAN OUT | | | | |
| SANITARY SEWER MANHOLE | | | | |
| SIGN | | | | |
| STREET LIGHT | | | | |
| MAILBOX | | | | |
| LEGEND | | | | |
| STORM DRAIN CLEAN OUT | | | | |
| | | | | |
| STORM DRAIN CATCH BASIN | | | | |
| | | | | |
| STORM DRAIN AREA DRAIN | | | | |
| | | | | |
| STORM DRAIN MANHOLE | | | | |
| | | | | |
| GAS METER | | | | |
| | | | | |
| GAS VALVE | | | | |
| | | | | |
| GUY WIRE ANCHOR | | | | |
| | | | | |
| UTILITY POLE | | | | |
| | | | | |
| POWER VAULT | | | | |
| | | | | |
| POWER JUNCTION BOX | | | | |
| | | | | |
| POWER PEDESTAL | | | | |
| | | | | |
| COMMUNICATIONS VAULT | | | | |
| | | | | |
| COMMUNICATIONS JUNCTION BOX | | | | |
| | | | | |
| COMMUNICATIONS RISER | | | | |
| | | | | |
| EXISTING | | | | |
| RIGHT-OF-WAY LINE | | | | |
| BOUNDARY LINE | | | | |
| PROPERTY LINE | | | | |
| CENTERLINE | | | | |
| DITCH | | | | |
| CURB | | | | |
| EDGE OF PAVEMENT | | | | |
| EASEMENT | | | | |
| FENCE LINE | | | | |
| GRAVEL EDGE | | | | |
| POWER LINE | | | | |
| OVERHEAD WIRE | | | | |
| COMMUNICATIONS LINE | | | | |
| FIBER OPTIC LINE | | | | |
| GAS LINE | | | | |
| STORM DRAIN LINE | | | | |
| SANITARY SEWER LINE | | | | |
| WATER LINE | | | | |

SHEET INDEX

- P1-01 COVER SHEET WITH SITE & VICINITY MAPS & LEGEND
- P1-02 PRELIMINARY EXISTING CONDITIONS PLAN
- P1-03 PRELIMINARY EXISTING CONDITIONS PLAN
- P1-04 PRELIMINARY SUBDIVISION PLAT WITH FUTURE BUILDING SETBACKS
- P1-05 PRELIMINARY GRADING & EROSION & SEDIMENT CONTROL PLAN
- P1-06 PRELIMINARY GRADING & EROSION & SEDIMENT CONTROL PLAN
- P1-07 PRELIMINARY COMPOSITE UTILITY PLAN
- P1-08 PRELIMINARY COMPOSITE UTILITY PLAN
- P1-09 PRELIMINARY STREET PLAN
- P1-10 PRELIMINARY STREET PLAN
- P1-11 PRELIMINARY STREET CROSS SECTIONS & PROFILES
- P1-12 PRELIMINARY STREET PROFILES
- P1-13 PRELIMINARY STREET PROFILES
- P1-14 PRELIMINARY STREET PROFILES
- P1-15 CONCEPTUAL FUTURE STREET PLAN
- P1-16 PRELIMINARY TREE PRESERVATION & REMOVAL PLAN & ARBORIST REPORT
- P1-17 PRELIMINARY TREE PRESERVATION & REMOVAL PLAN & ARBORIST REPORT
- P1-18 PRELIMINARY TREE PRESERVATION & REMOVAL TABLE & ARBORIST REPORT
- P1-19 PRELIMINARY TREE PRESERVATION & REMOVAL TABLE & ARBORIST REPORT
- P1-20 PRELIMINARY DEMOLITION PLAN
- P1-21 PRELIMINARY DEMOLITION PLAN
- P1-22 PRELIMINARY STREET TREE AND STORMWATER SCREENING PLANTING PLAN
- P1-23 PRELIMINARY LANDSCAPE NOTES AND DETAILS
- P1-24 PRELIMINARY PARKING PLAN
- P1-25 PRELIMINARY EMERGENCY VEHICLE ACCESS PLAN
- P1-26 PRELIMINARY EMERGENCY VEHICLE ACCESS PLAN



COVER SHEET WITH SITE & VICINITY MAPS & LEGEND
BAILEY MEADOWS
SANDY, OREGON



P1-01

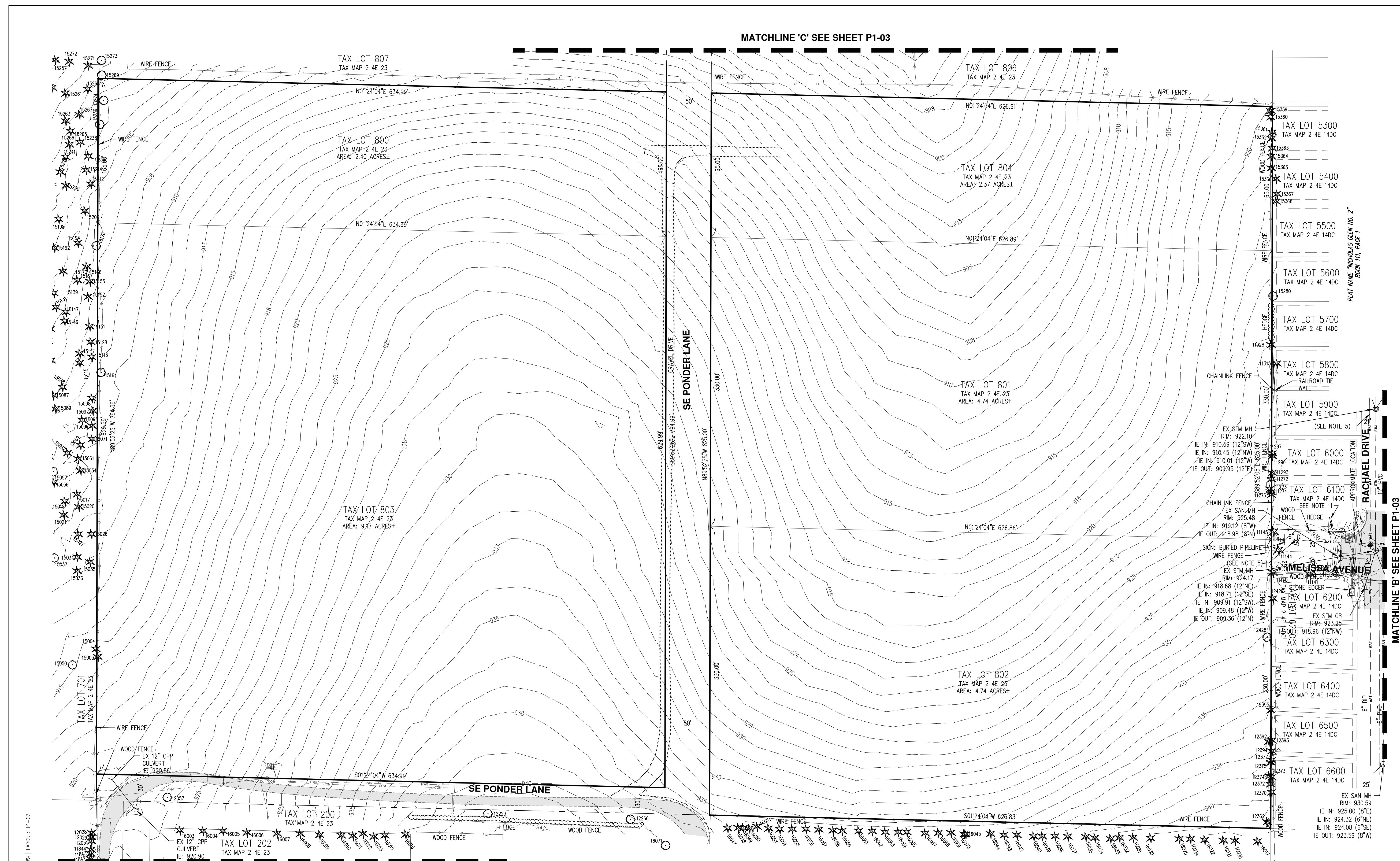
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**PRELIMINARY EXISTING
 CONDITIONS PLAN
 BAILEY MEADOWS
 SANDY, OREGON**

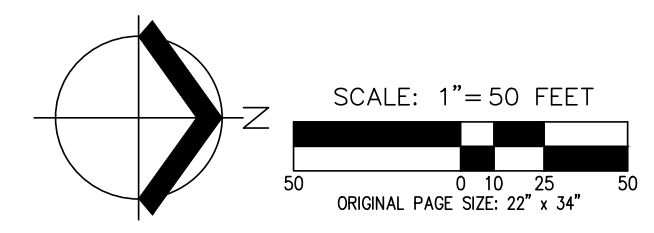
REGISTERED PROFESSIONAL LAND SURVEYOR
PRELIMINARY
 NOT FOR CONSTRUCTION
 D. RETTIG
 80124LS
 RENEWS: 12/31/20

JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: AJ
 DRAWN BY:
 CHECKED BY: BRH, MTB

P1-02



AKS DRAWING FILE: 7107 EXCOND.DWG | LAYOUT: P1-02



MATCHLINE 'A' SEE SHEET P1-03

NOTES:

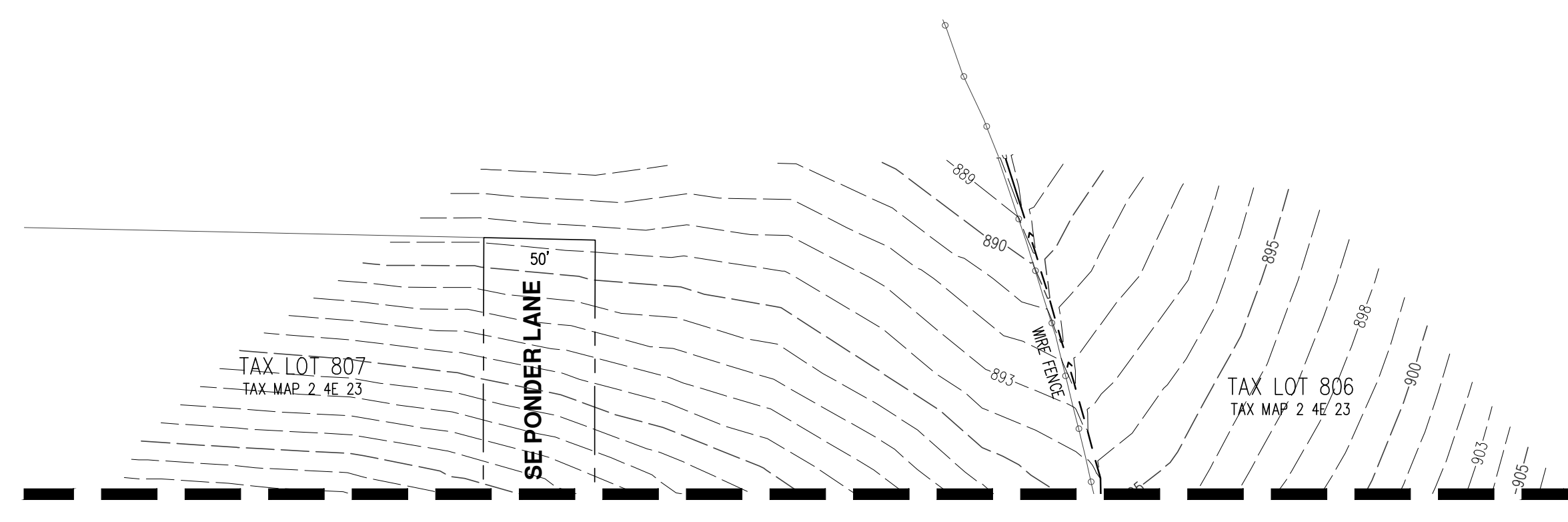
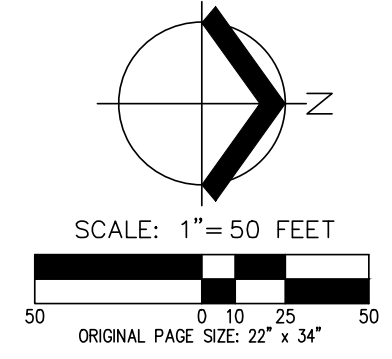
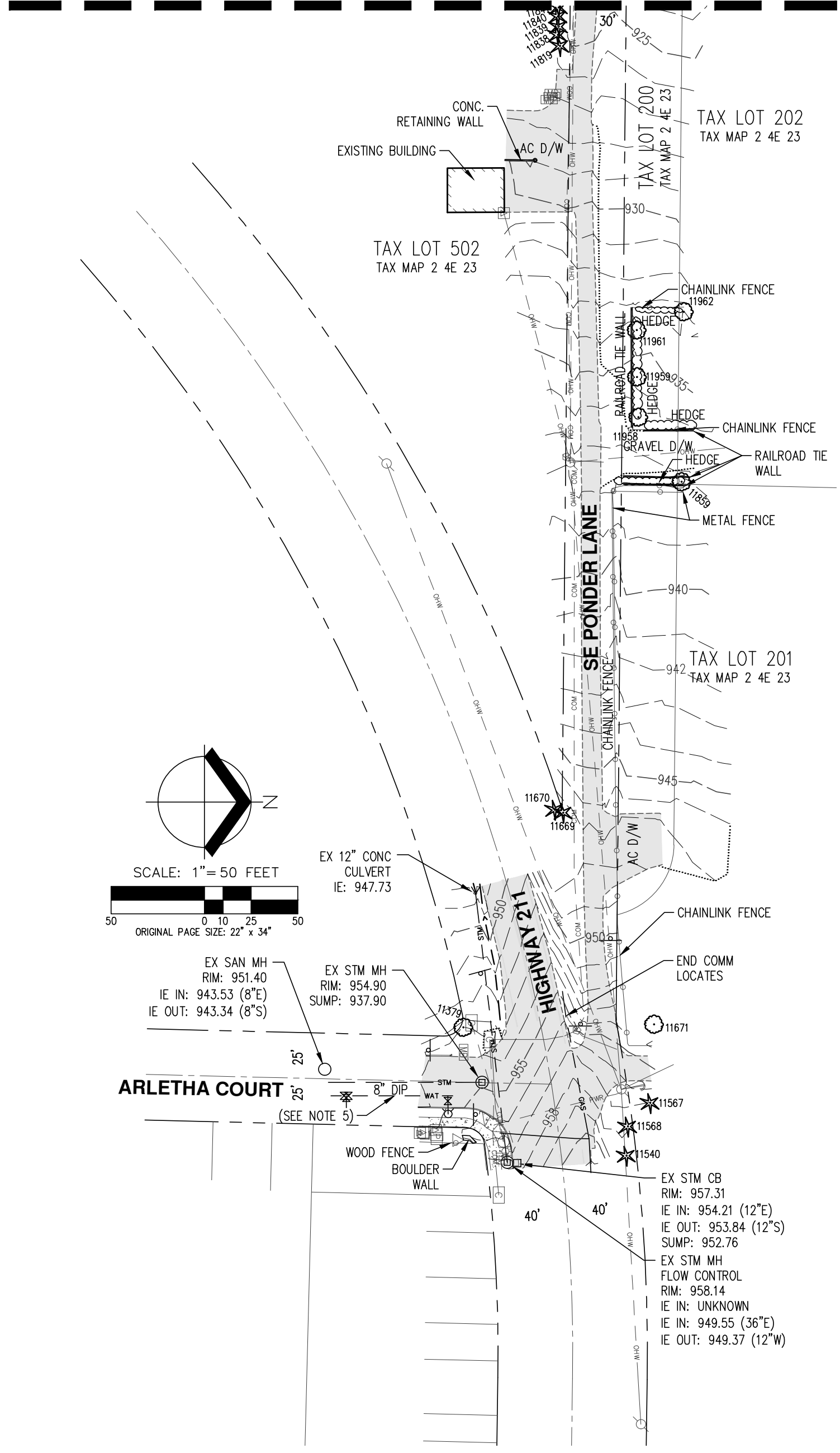
- UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 19105127, 19105129, 19105131, 19005117, & 19100525. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL UTILITIES AND EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
- FIELD WORK WAS CONDUCTED APRIL 29, JUNE 3 & 7, 2019.
- VERTICAL DATUM: ELEVATIONS ARE BASED ON NGS BENCHMARK NO. R00188, ELEVATION 990.05 FEET (NAVD88). LOCATED IN CONCRETE WALL 1' ABOVE SIDEWALK NEAR THE SOUTHWEST CORNER OF THE BUILDING AT 39131 PIONEER BOULEVARD, SANDY OREGON.
- THIS IS NOT A BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY. BOUNDARIES MAY BE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION.
- WATER LINE LOCATES WERE REQUESTED THROUGH OREGON UTILITY NOTIFICATION CENTER, BUT WERE NOT PROVIDED BY THE CITY. WATER LINES SHOWN ARE PER AS-BUILT DRAWINGS AND ARE APPROXIMATE ONLY. PLEASE CONTACT SURVEYOR FOR ANY QUESTIONS REGARDING ACCURACY.
- BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
- CONTOUR INTERVAL IS 1 FOOT.
- TREES WITH DIAMETER OF 11" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
- THE PLATTED LOTS PER THE SUBDIVISION OF "NICOLAS GLEN NO. 2" (BOOK 111, PAGE 1), ARE SUBJECT TO A 5 FOOT WIDE PUBLIC UTILITY EASEMENT ON ALL FRONT, SIDE AND REAR LOT LINES.
- WATER LINE ADDED PER PLANS ENTITLED "STREET AND UTILITY IMPROVEMENTS FOR NICOLAS GLEN PHASE 2", SHEET 18, DATED 6-25-97.
- SANITARY SEWER LATERALS ARE SHOWN PER PLANS ENTITLED "NICOLAS GLEN PHASE 2 SANITARY SEWER PLAN", SHEET 10 OF 21, DATED 6-25-97.

FLAT NAME: "NICOLAS GLEN NO. 2"
 BOOK 111, PAGE 1

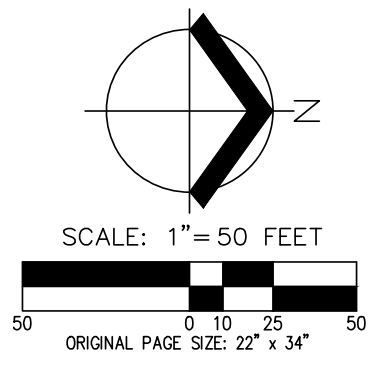
MATCHLINE 'B' SEE SHEET P1-03

MATCHLINE 'C' SEE SHEET P1-03

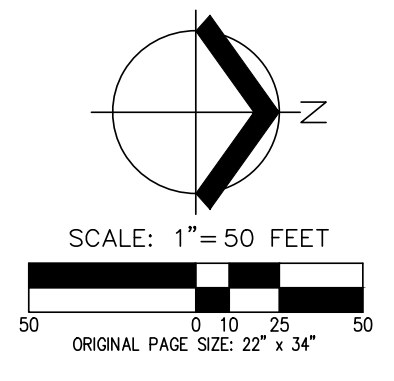
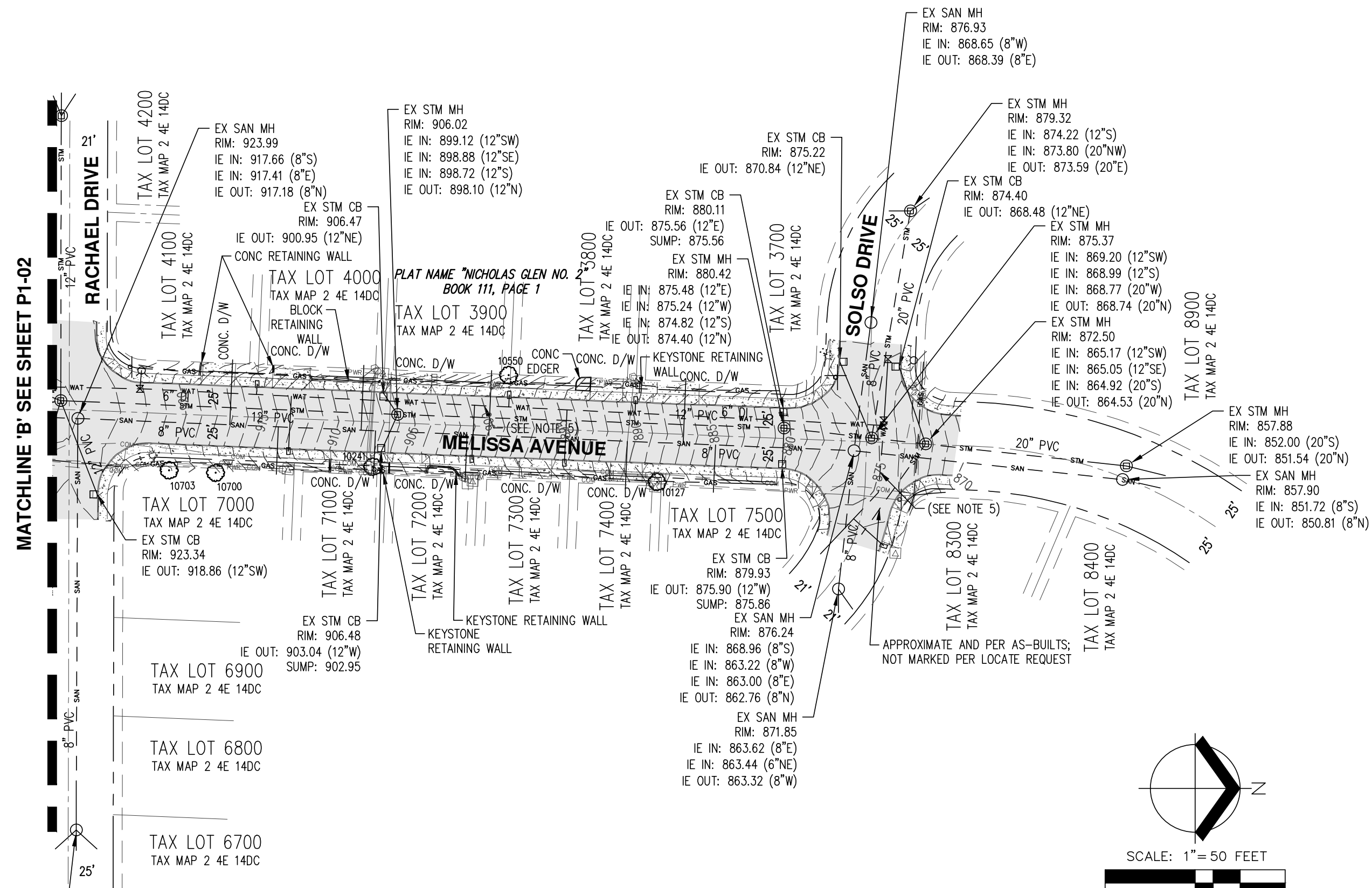
MATCHLINE 'A' SEE SHEET P1-02



MATCHLINE 'C' SEE SHEET P1-02



- NOTES:**
- UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 19105127, 19105129, 19105131, 19005117, & 19105125. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL UTILITIES AND EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
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 - VERTICAL DATUM: ELEVATIONS ARE BASED ON NGS BENCHMARK NO. RD0188, ELEVATION 990.05 FEET (NAVD88). LOCATED IN CONCRETE WALL 1' ABOVE SIDEWALK NEAR THE SOUTHWEST CORNER OF THE BUILDING AT 39131 PIONEER BOULEVARD, SANDY OREGON.
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 - BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
 - CONTOUR INTERVAL IS 1 FOOT.
 - TREES WITH DIAMETER OF 11" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
 - THE PLATTED LOTS PER THE SUBDIVISION OF "NICOLAS GLEN NO. 2" (BOOK 111, PAGE 1), ARE SUBJECT TO A 5 FOOT WIDE PUBLIC UTILITY EASEMENT ON ALL FRONT, SIDE AND REAR LOT LINES.
 - WATER LINE ADDED PER PLANS ENTITLED "STREET AND UTILITY IMPROVEMENTS FOR NICOLAS GLEN PHASE 2", SHEET 18, DATED 6-25-97.
 - SANITARY SEWER LATERALS ARE SHOWN PER PLANS ENTITLED "NICOLAS GLEN PHASE 2 SANITARY SEWER PLAN", SHEET 10 OF 21, DATED 6-25-97.



**PRELIMINARY EXISTING
CONDITIONS PLAN
BAILEY MEADOWS
SANDY, OREGON**



JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY:
DRAWN BY: AJ
CHECKED BY: BRH, MTB

P1-03

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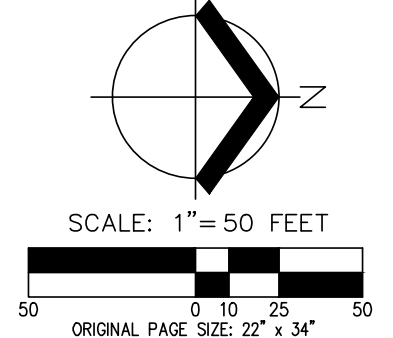
AKS DRAWING FILE: 7107 DDM SUBDIV PLANNING | LAYOUT: P1-04

EASEMENT LEGEND

- PUE PUBLIC UTILITY EASEMENT
- TPAE TEMPORARY PUBLIC ACCESS EASEMENT (CONCEPTUAL LOCATION)
- PSSE PUBLIC SANITARY SEWER EASEMENT
- PSDE PUBLIC STORM DRAINAGE EASEMENT

SETBACK LEGEND

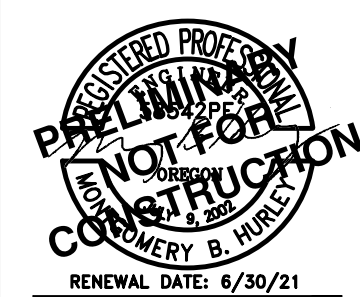
- A. FRONT YARD: 10 FT
- B. FRONT GARAGE: 22 FT
- C. REAR YARD: 20 FT
- D. SIDE YARD: 7.5 FT
- E. STREET SIDE YARD: 10 FT



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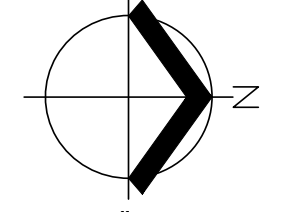


**PRELIMINARY SUBDIVISION PLAT
 WITH FUTURE BUILDING SETBACKS
 BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: WN
 DRAWN BY: CL
 CHECKED BY: RSW

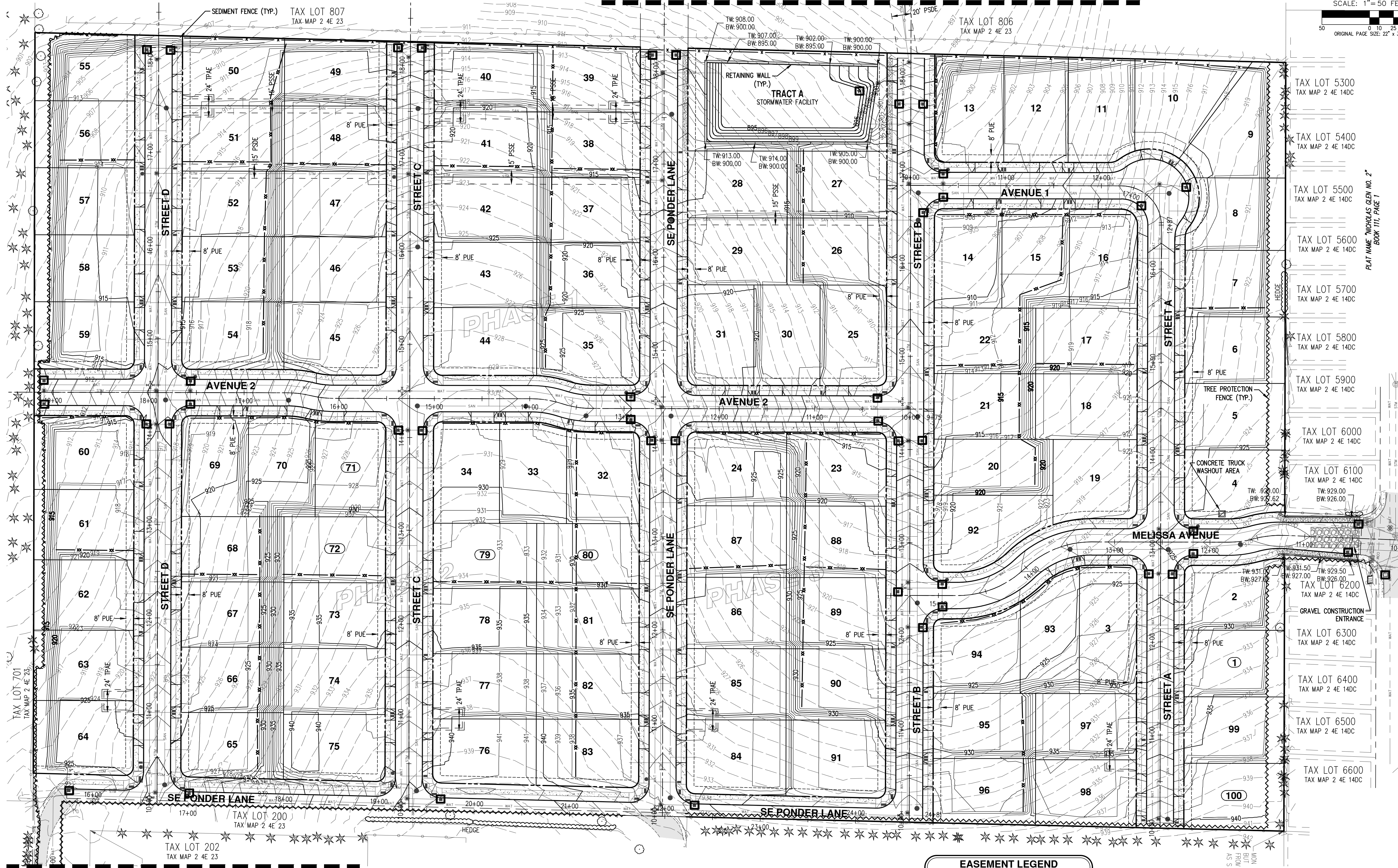
P1-04



SCALE: 1" = 50 FEET
ORIGINAL PAGE SIZE: 22" x 34"

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MATCH LINE "C" SEE SHEET P1-06



MATCH LINE "A" SEE SHEET P1-06

MATCH LINE "B" SEE SHEET P1-06

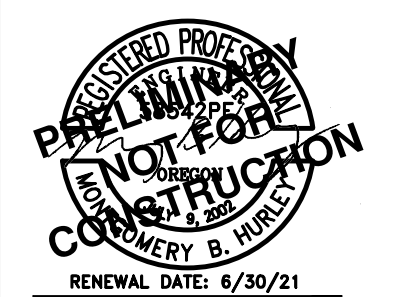
PLAT NAME: "WOODS GEN. NO. 2"
BOOK 111, PAGE 1

- TAX LOT 5300 TAX MAP 2 4E 14DC
- TAX LOT 5400 TAX MAP 2 4E 14DC
- TAX LOT 5500 TAX MAP 2 4E 14DC
- TAX LOT 5600 TAX MAP 2 4E 14DC
- TAX LOT 5700 TAX MAP 2 4E 14DC
- TAX LOT 5800 TAX MAP 2 4E 14DC
- TAX LOT 5900 TAX MAP 2 4E 14DC
- TAX LOT 6000 TAX MAP 2 4E 14DC
- TAX LOT 6100 TAX MAP 2 4E 14DC
TW: 929.00
BW: 926.00
- TAX LOT 6200 TAX MAP 2 4E 14DC
TW: 931.50
BW: 927.00
- TAX LOT 6300 TAX MAP 2 4E 14DC
- TAX LOT 6400 TAX MAP 2 4E 14DC
- TAX LOT 6500 TAX MAP 2 4E 14DC
- TAX LOT 6600 TAX MAP 2 4E 14DC

EASEMENT LEGEND

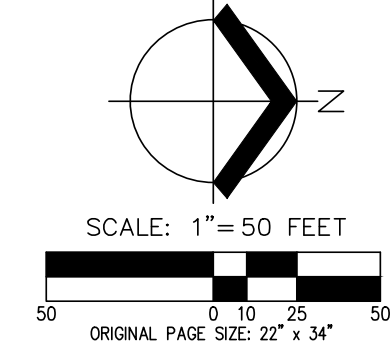
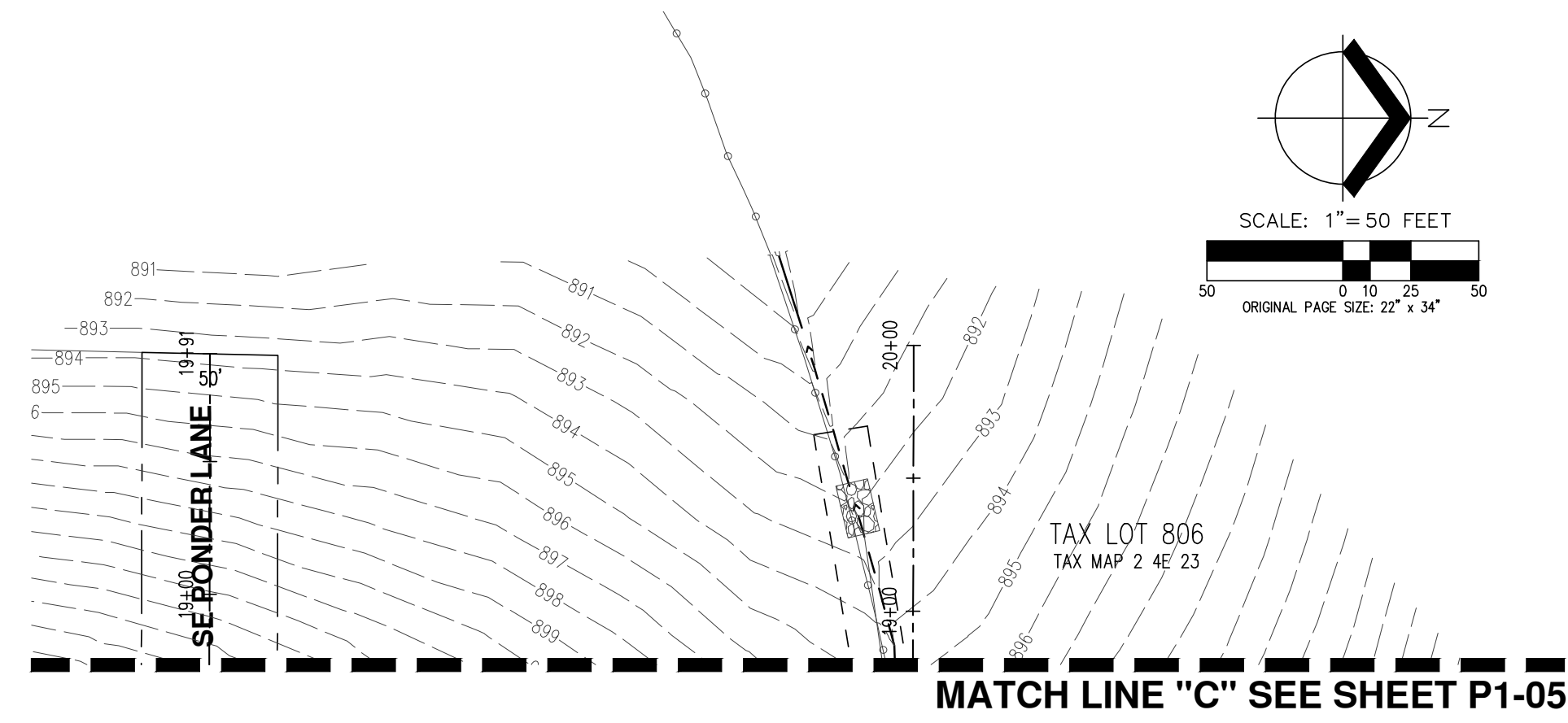
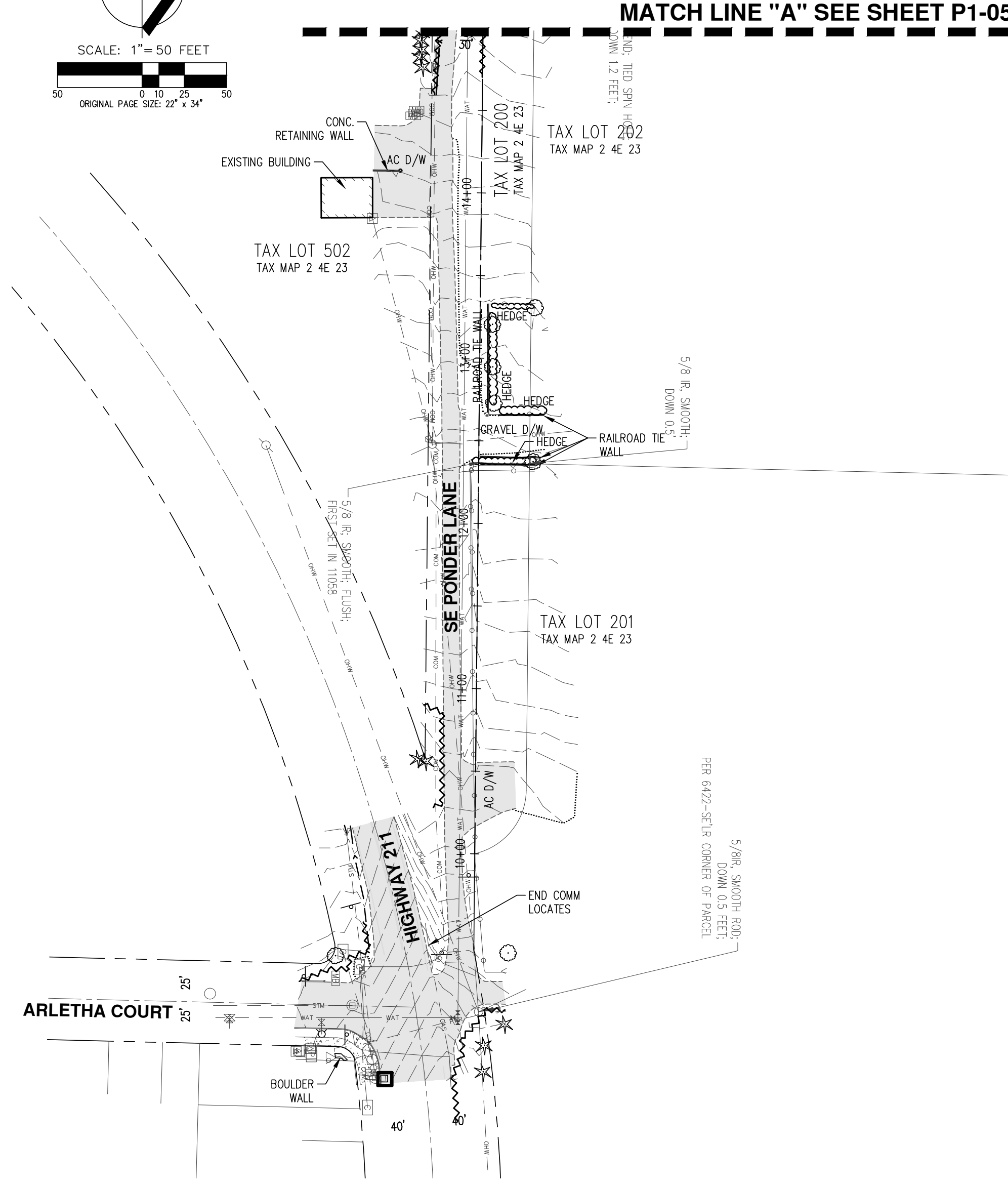
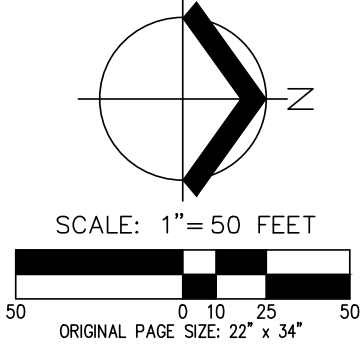
| | |
|------|---|
| PUE | PUBLIC UTILITY EASEMENT |
| TPAE | TEMPORARY PUBLIC ACCESS EASEMENT (CONCEPTUAL LOCATION) |
| PSSE | PUBLIC SANITARY SEWER EASEMENT |
| PSDE | PUBLIC STORM DRAINAGE EASEMENT |

PRELIMINARY GRADING & EROSION & SEDIMENT CONTROL PLAN BAILEY MEADOWS SANDY, OREGON

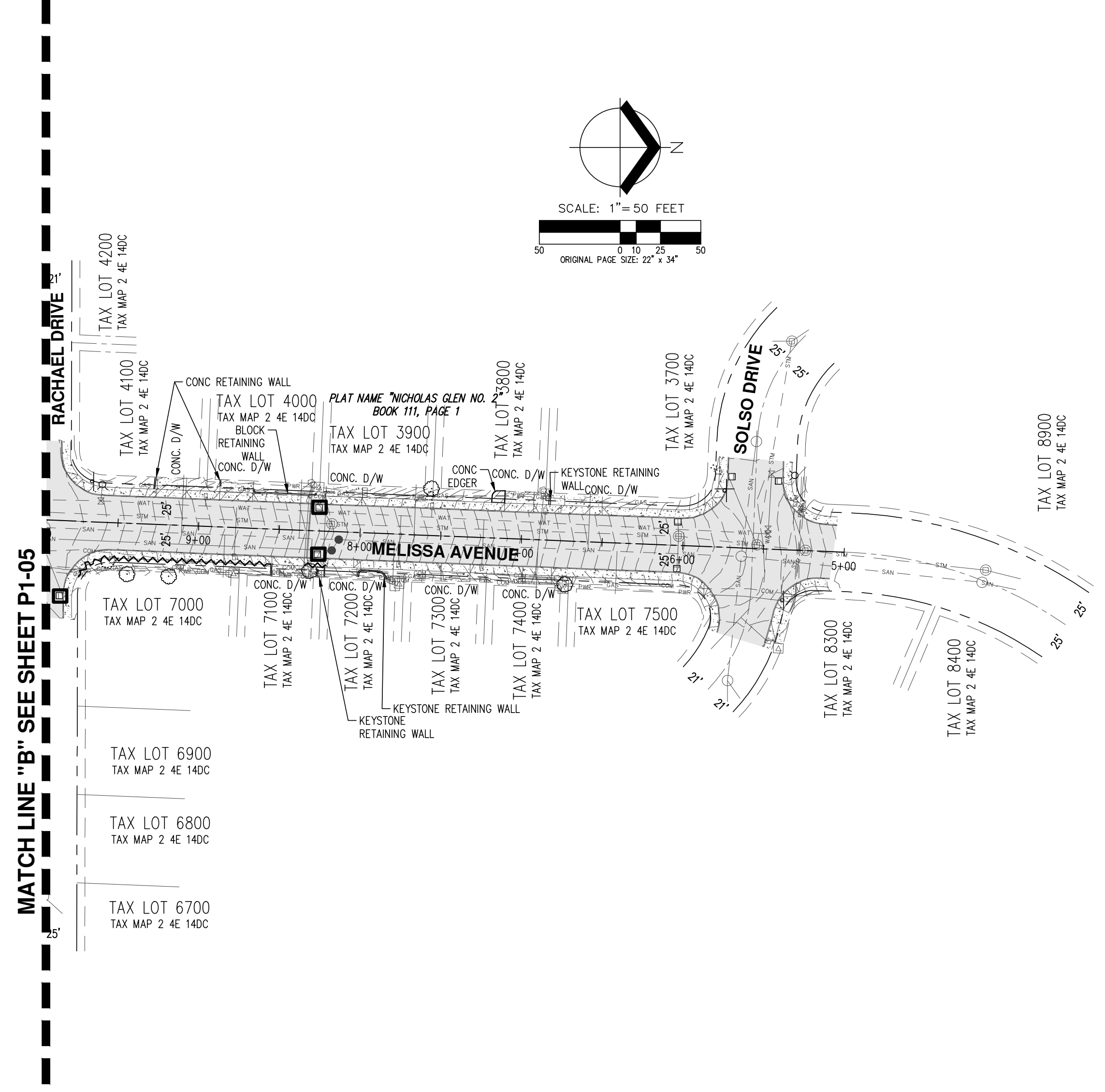
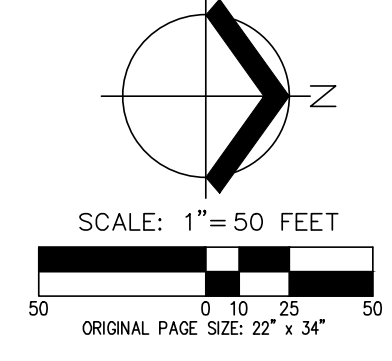


RENEWAL DATE: 6/30/21
JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY: VN
DRAWN BY: CL
CHECKED BY: RSW

P1-05



| LEGEND | |
|--|----------|
| EXISTING GROUND CONTOUR (1 FT) | --- --- |
| EXISTING GROUND CONTOUR (5 FT) | --- --- |
| FINISHED GRADE CONTOUR (1 FT) | --- --- |
| FINISHED GRADE CONTOUR (5 FT) | --- --- |
| SEDIMENT FENCE (TO BE INSTALLED PRIOR TO GRADING) | ---x--- |
| SEDIMENT FENCE (TO BE INSTALLED AFTER GRADING) | ---x--- |
| AREA DRAIN PROTECTION (TYP) PER CATCH BASIN INSERT BAG DETAIL | [Symbol] |
| CURB INLET PROTECTION (TYP) PER COMBINATION DETAIL | [Symbol] |
| DITCH INLET PROTECTION (TYP) PER DITCH INLET PROTECTION DETAIL | [Symbol] |
| CHECK DAM BIOFILTER BAG | [Symbol] |
| CONCRETE WASHOUT AREA | [Symbol] |
| DRAINAGE FLOW DIRECTION | [Arrow] |
| GRAVEL CONSTRUCTION ENTRANCE | [Symbol] |
| GRADING LIMITS | --- --- |
| TREE PROTECTION/CONSTRUCTION FENCE | --- --- |

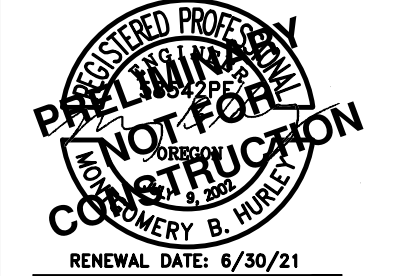


AKS DRAWING FILE: 7107 ESC PLANNING | LAYOUT: P1-06

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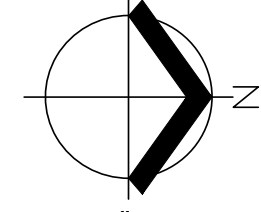
ENGINEERING - SURVEYING - NATURAL RESOURCES
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**PRELIMINARY GRADING & EROSION
 & SEDIMENT CONTROL PLAN
 BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
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 DRAWN BY: CL
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P1-06



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MATCH LINE "C" SEE SHEET P1-08

TAX LOT 807
TAX MAP 2 4E 23

TAX LOT 806
TAX MAP 2 4E 23

TAX LOT 5300
TAX MAP 2 4E 14DC

TAX LOT 5400
TAX MAP 2 4E 14DC

TAX LOT 5500
TAX MAP 2 4E 14DC

TAX LOT 5600
TAX MAP 2 4E 14DC

TAX LOT 5700
TAX MAP 2 4E 14DC

TAX LOT 5800
TAX MAP 2 4E 14DC

TAX LOT 5900
TAX MAP 2 4E 14DC

TAX LOT 6000
TAX MAP 2 4E 14DC

TAX LOT 6100
TAX MAP 2 4E 14DC

TAX LOT 6200
TAX MAP 2 4E 14DC

TAX LOT 6300
TAX MAP 2 4E 14DC

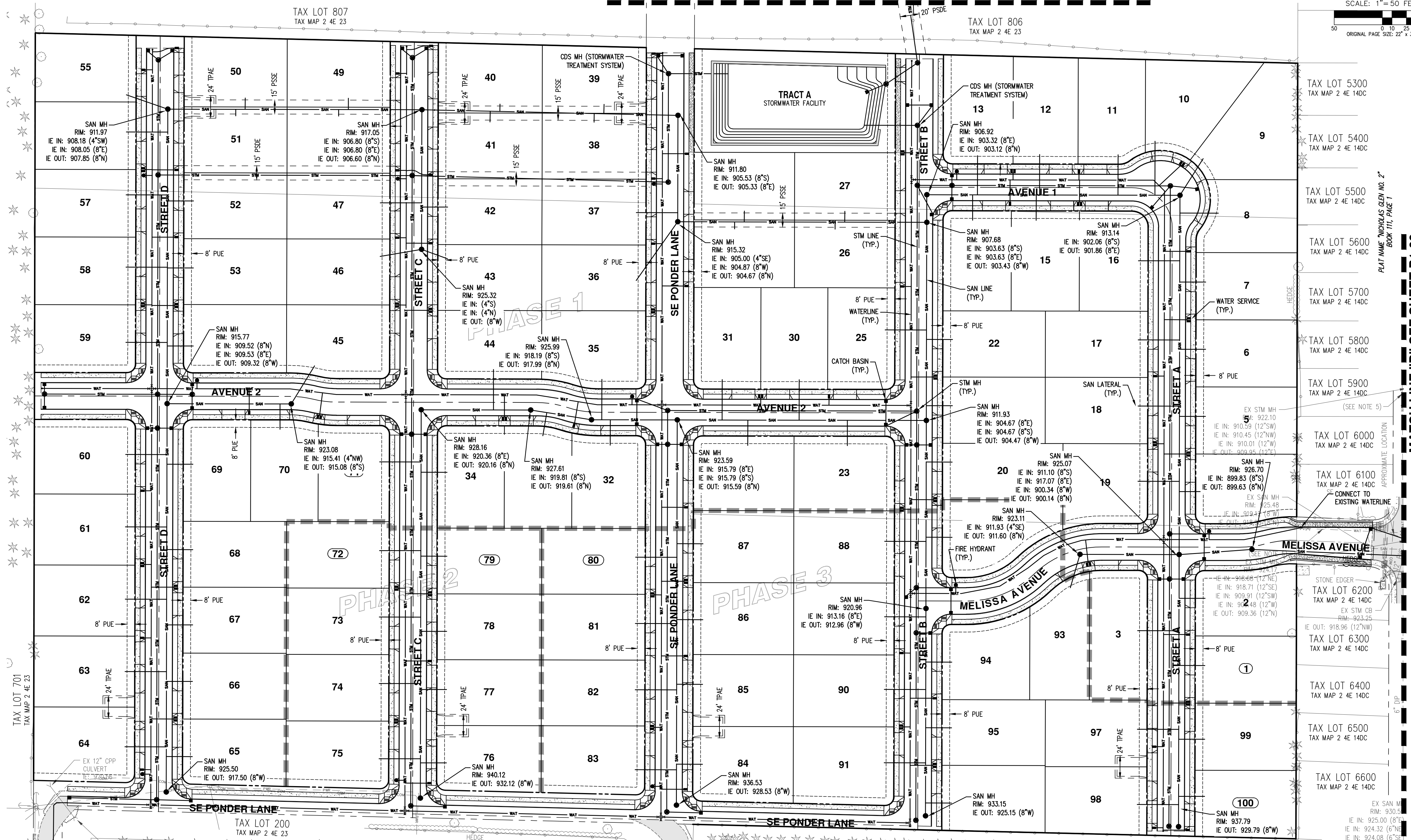
TAX LOT 6400
TAX MAP 2 4E 14DC

TAX LOT 6500
TAX MAP 2 4E 14DC

TAX LOT 6600
TAX MAP 2 4E 14DC

PLAT NAME: "MORIAS GLEN NO. 2"
BOOK 111, PAGE 1

MATCH LINE "B" SEE SHEET P1-08



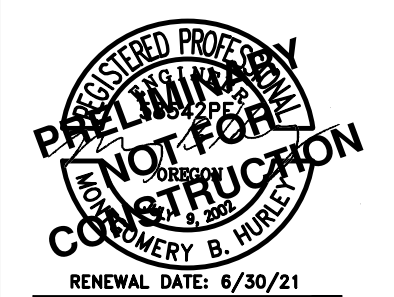
EASEMENT LEGEND

| | |
|------|--|
| PUE | PUBLIC UTILITY EASEMENT |
| TPAE | TEMPORARY PUBLIC ACCESS EASEMENT (CONCEPTUAL LOCATION) |
| PSSE | PUBLIC SANITARY SEWER EASEMENT |
| PSDE | PUBLIC STORM DRAINAGE EASEMENT |

NOTE:
CURB WEEPHOLES SHALL BE INSTALLED ON LOTS WITHOUT STORM DRAIN LATERALS.

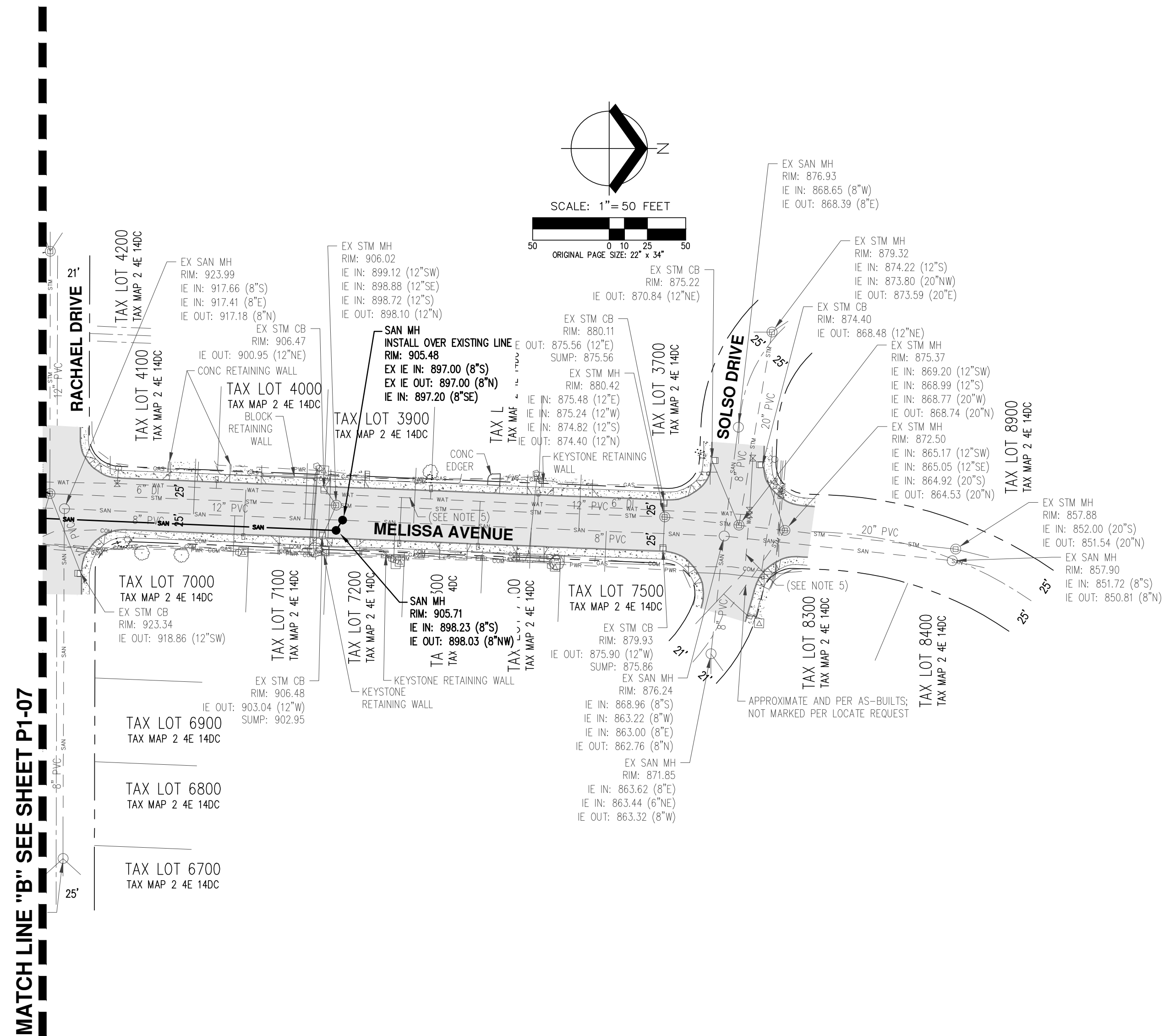
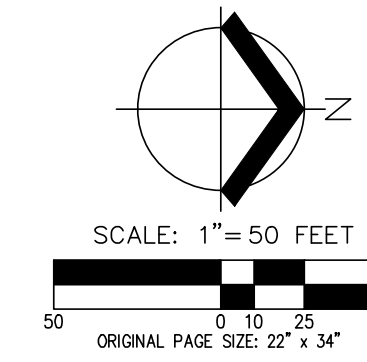
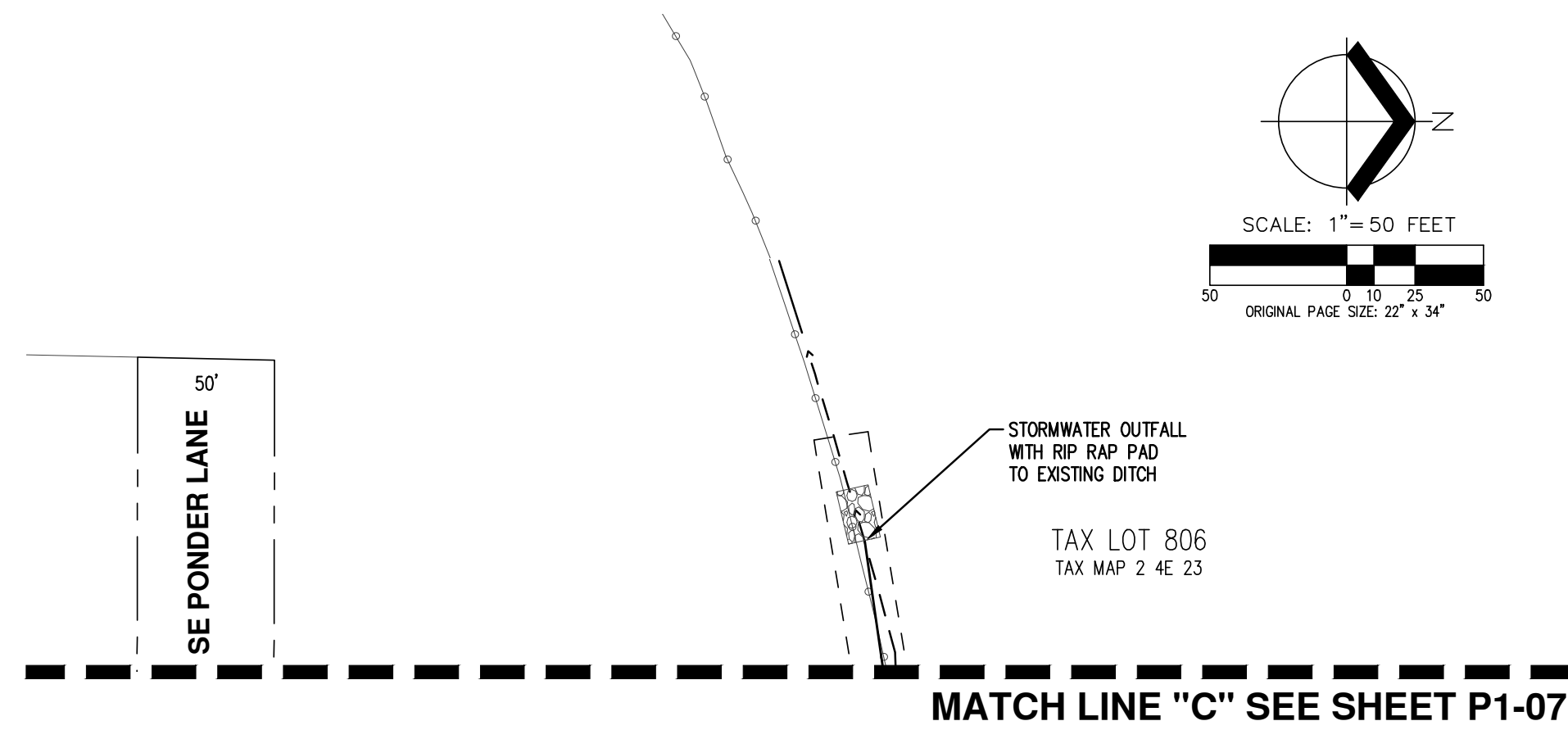
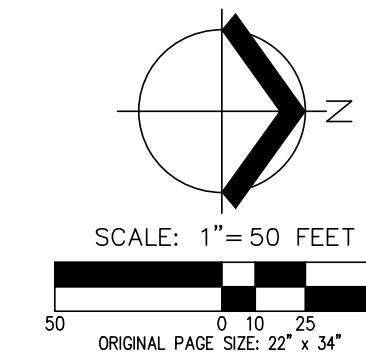
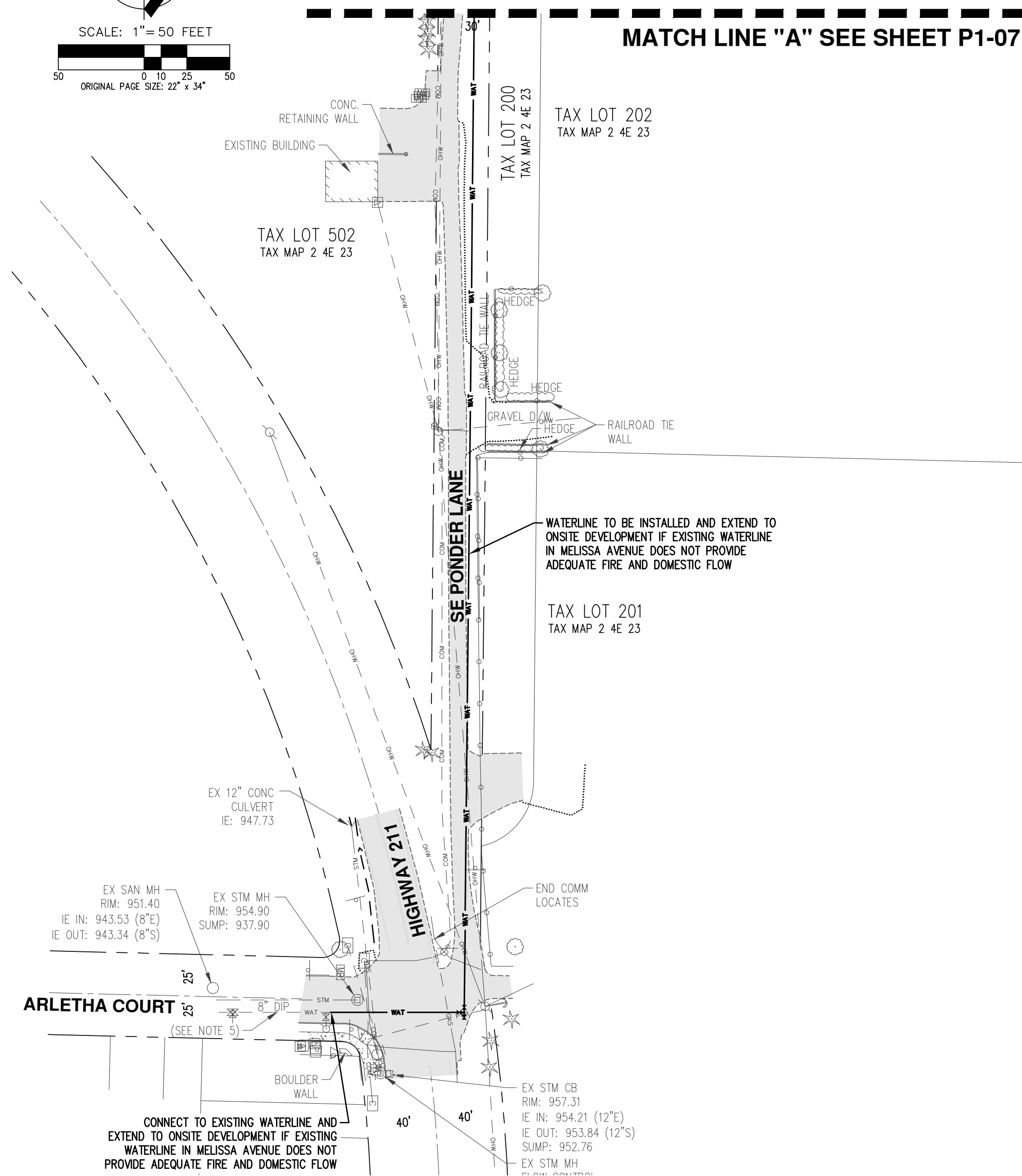
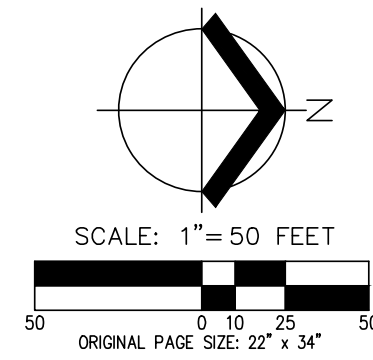
MATCH LINE "A" SEE SHEET P1-08

**PRELIMINARY COMPOSITE
UTILITY PLAN
BAILEY MEADOWS
SANDY, OREGON**



RENEWAL DATE: 6/30/21
JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY: VN
DRAWN BY: CL
CHECKED BY: RSW

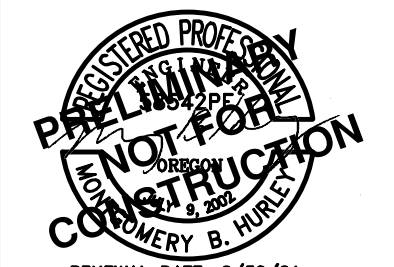
P1-07



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FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

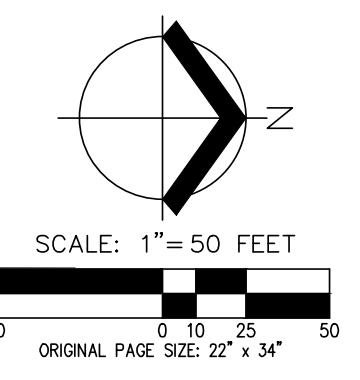
**PRELIMINARY COMPOSITE
UTILITY PLAN
BAILEY MEADOWS
SANDY, OREGON**



RENEWAL DATE: 6/30/21
JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY: VN
DRAWN BY: CL
CHECKED BY: RSW

P1-08

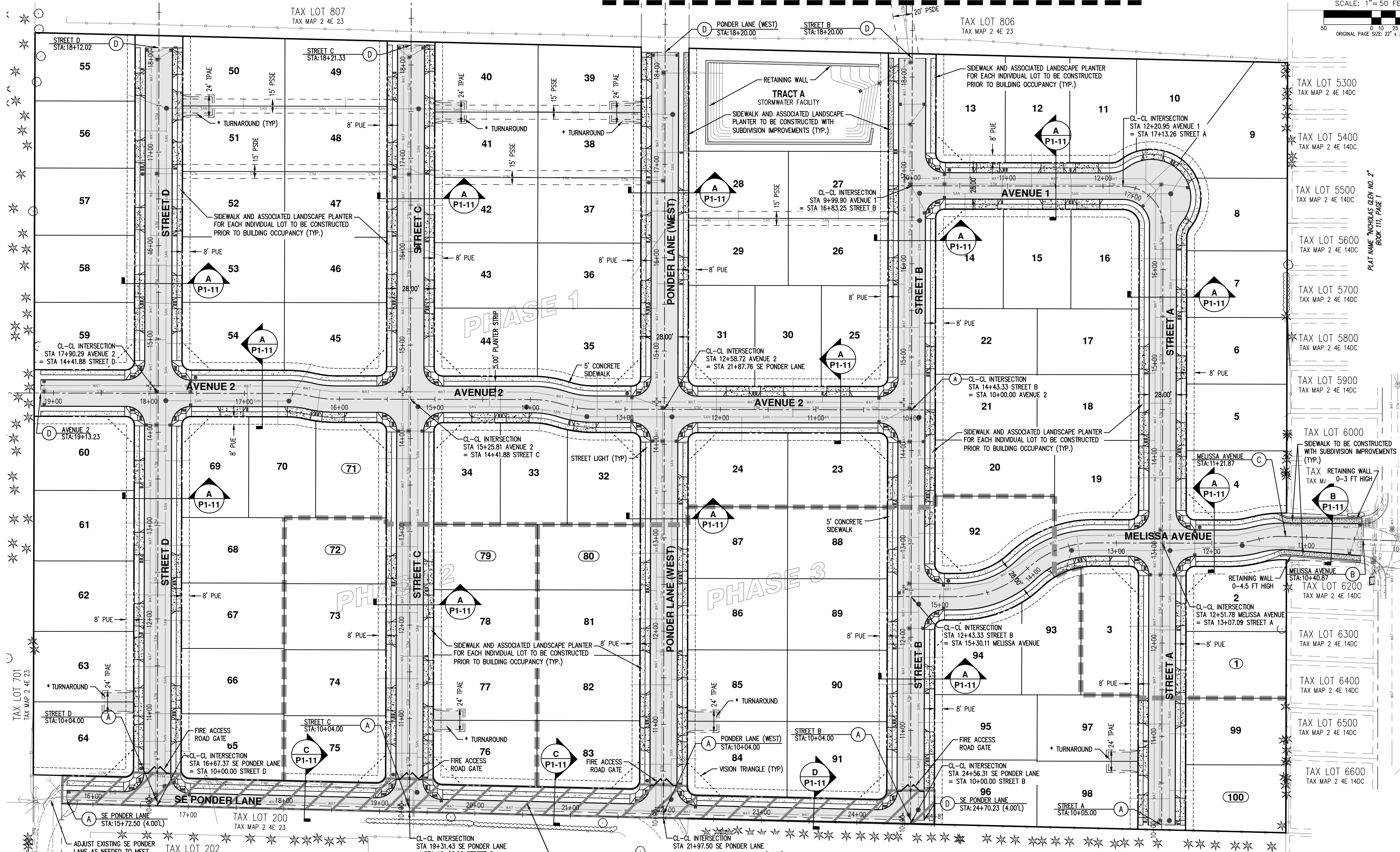
- # KEYED NOTES**
- A. BEGIN STREET IMPROVEMENTS
 - B. BEGIN IMPROVEMENTS / BEGIN TAPER
 - C. END TAPER
 - D. END IMPROVEMENTS



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ENGINEERING - SURVEYING - NATURAL RESOURCES
 FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

MATCH LINE C SEE SHEET P1-10



MATCH LINE B SEE SHEET P1-10

MATCH LINE A SEE SHEET P1-10

FEE-IN-LIEU OF STREET IMPROVEMENTS

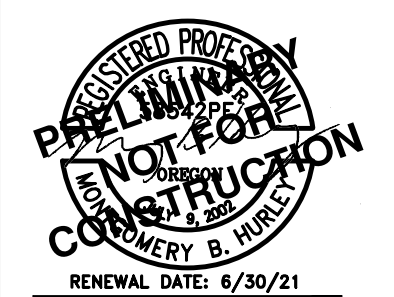
EASEMENT LEGEND

| | |
|-------|--|
| PUE | PUBLIC UTILITY EASEMENT |
| TP/AE | TEMPORARY PUBLIC ACCESS EASEMENT (CONCEPTUAL LOCATION) |
| PSSE | PUBLIC SANITARY SEWER EASEMENT |
| PSDE | PUBLIC STORM DRAINAGE EASEMENT |

* TEMPORARY EMERGENCY VEHICLE AND FRANCHISE WASTE HAULER TURNAROUND. LOCATIONS SHOWN ARE CONCEPTUAL AND TO BE DETERMINED DURING THE FINAL CONSTRUCTION PLAN REVIEW PROCESS.

PRELIMINARY STREET PLAN

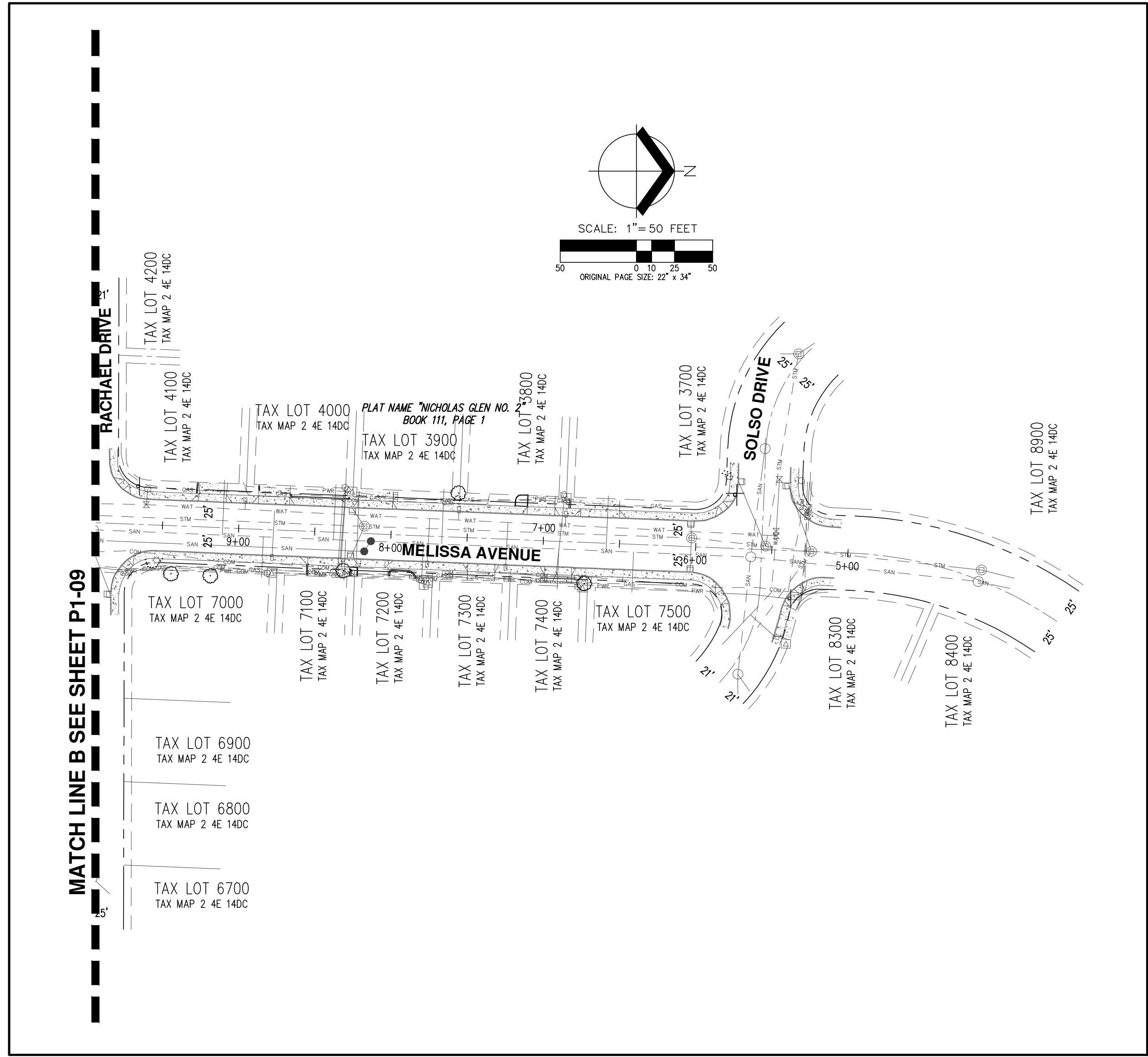
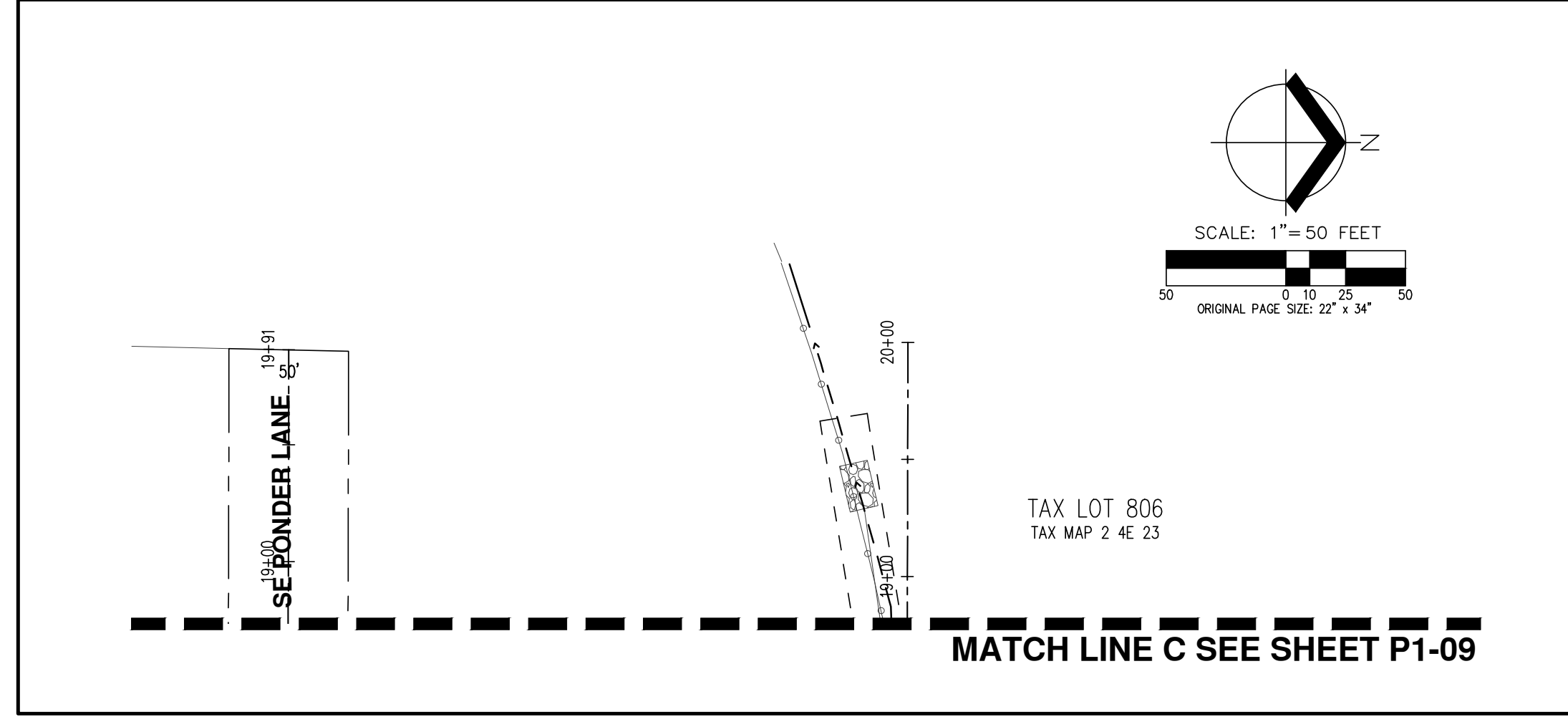
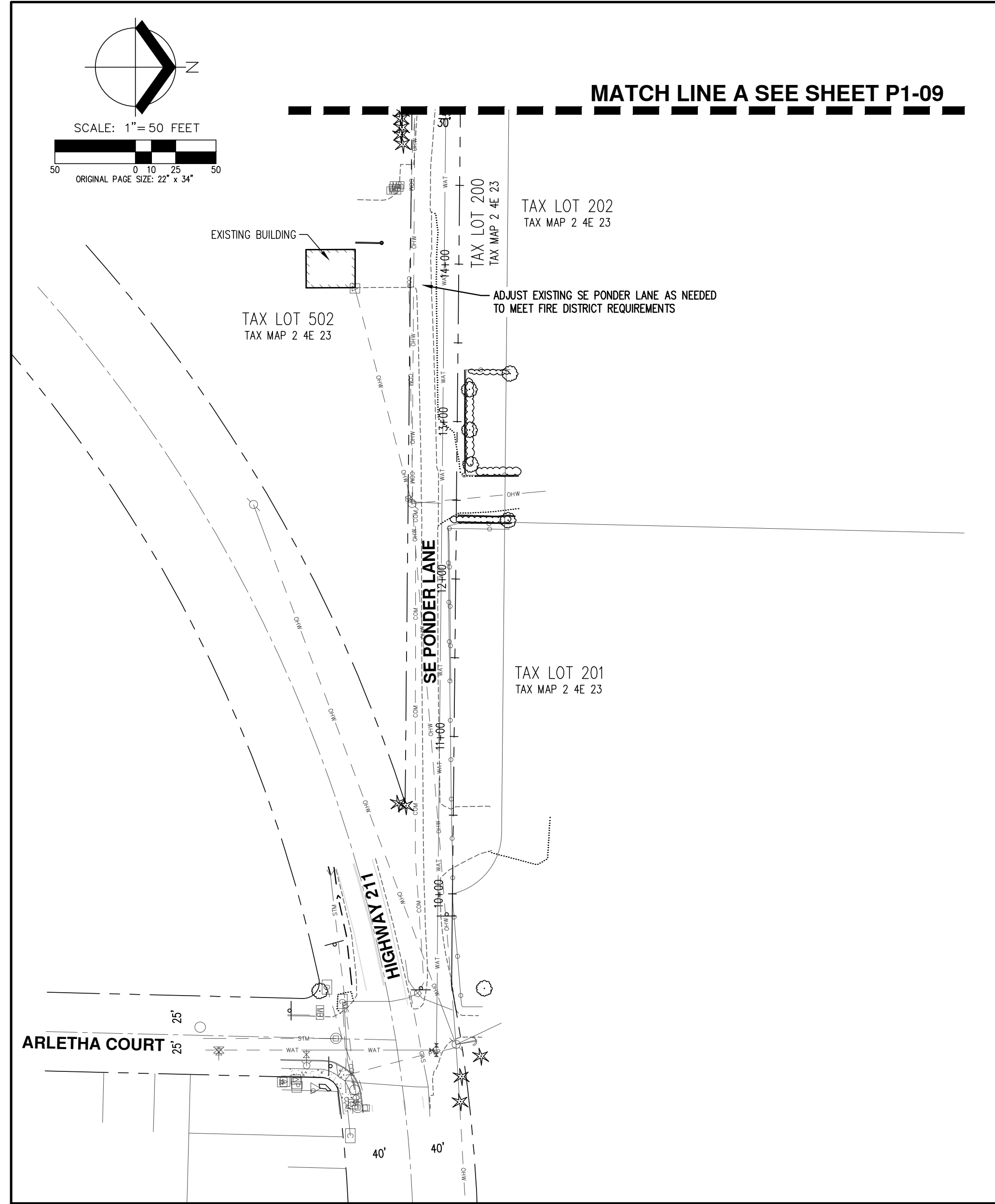
BAILEY MEADOWS SANDY, OREGON



REVISION DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
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 DRAWN BY: CL
 CHECKED BY: RSW

P1-09

AKS DRAWING FILE: 7107 STR PLANNING | LAYOUT: P1-10



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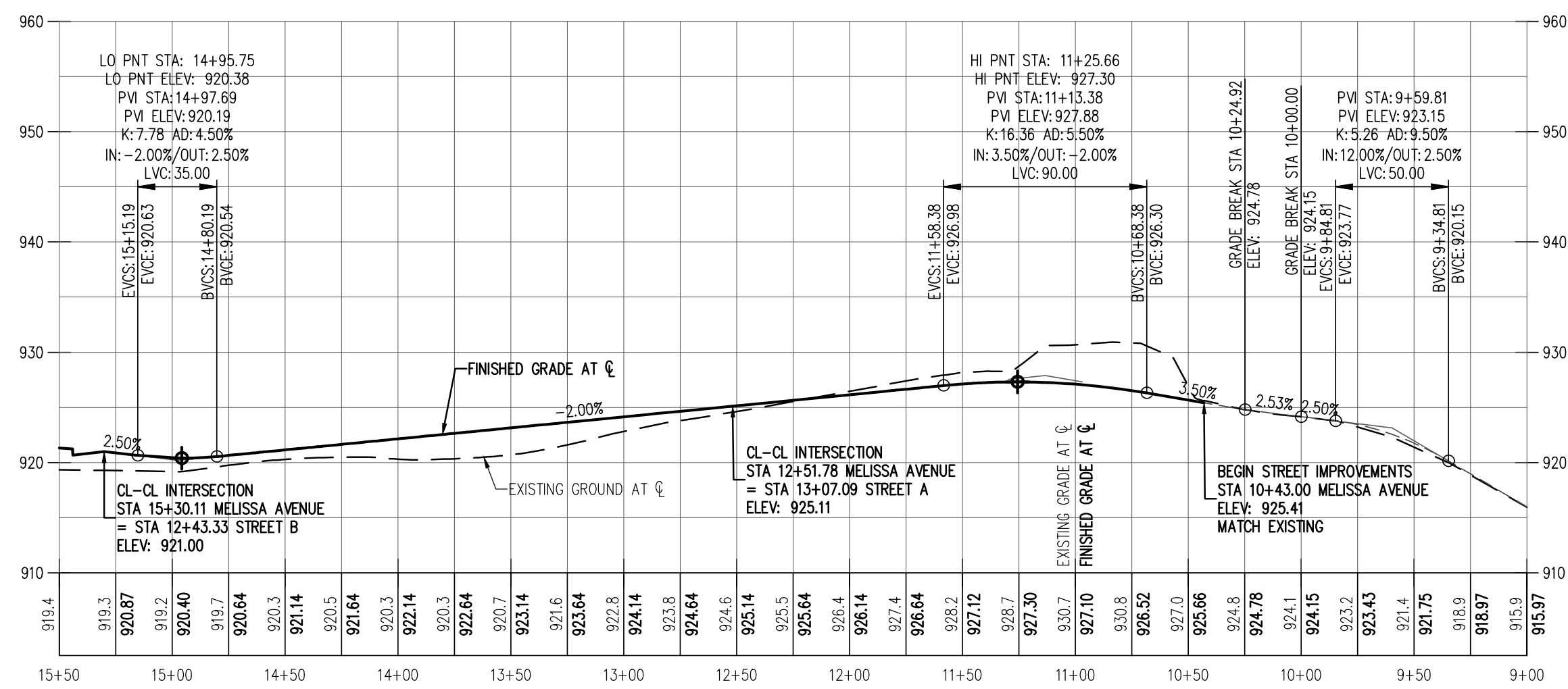
ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

PRELIMINARY STREET PLAN
BAILEY MEADOWS
SANDY, OREGON

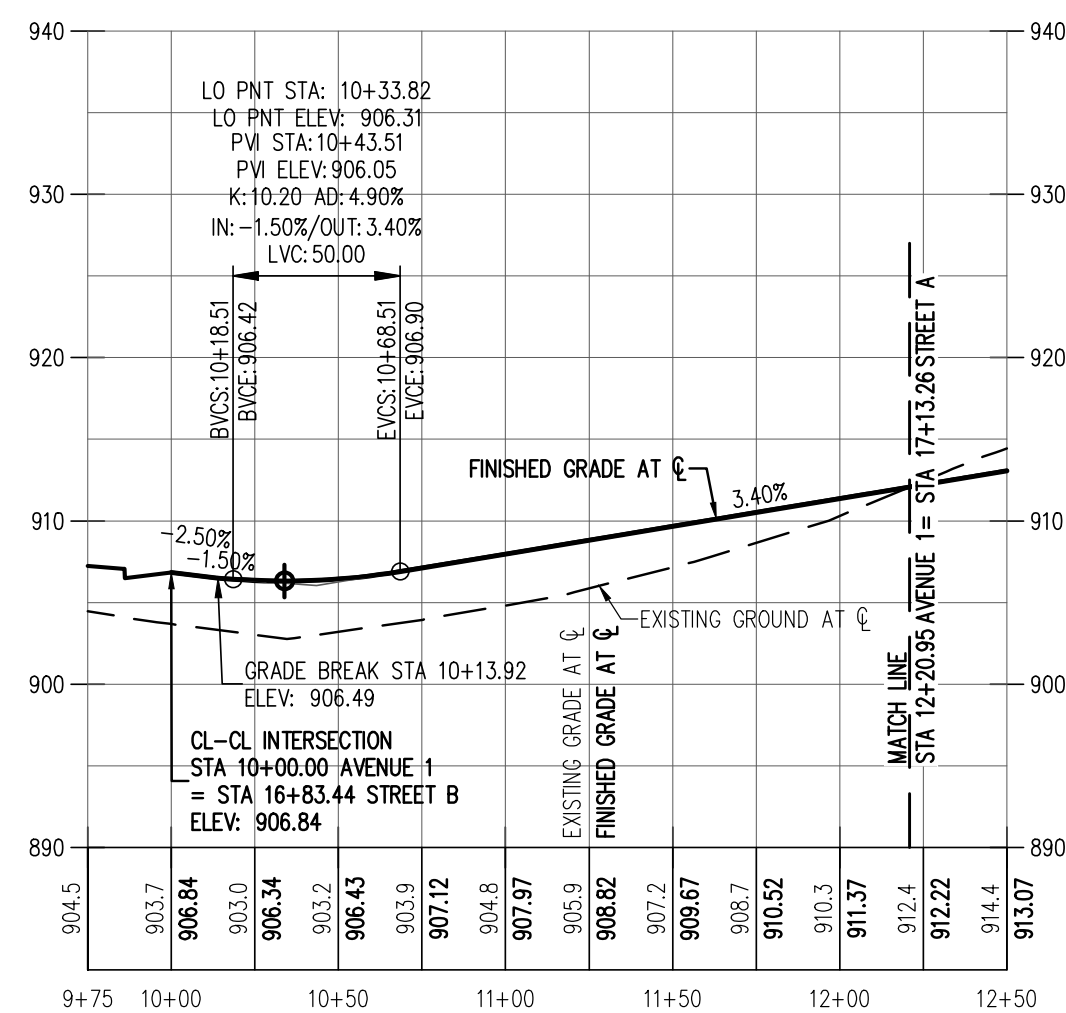
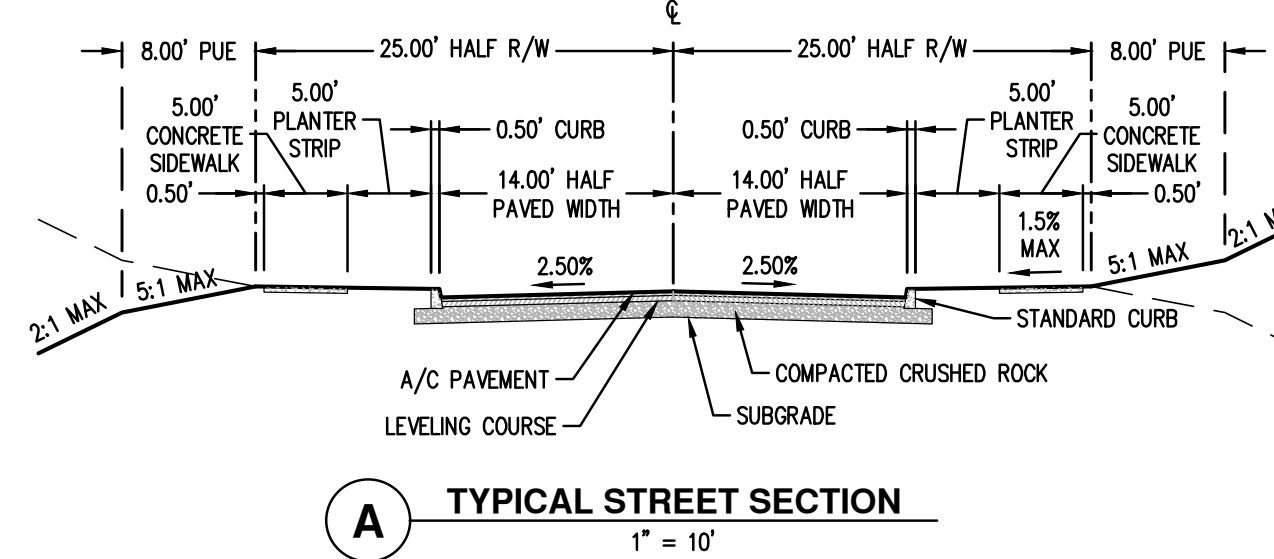
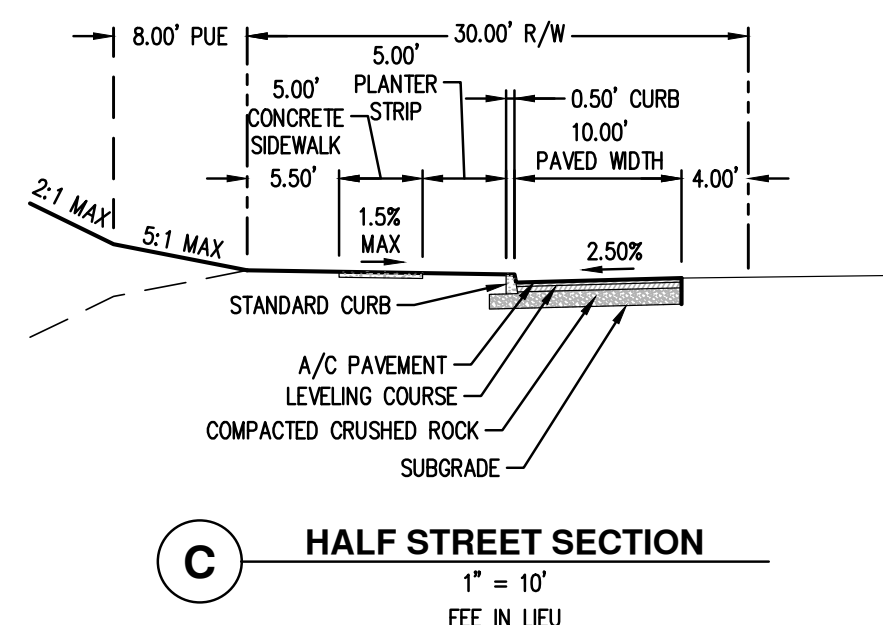
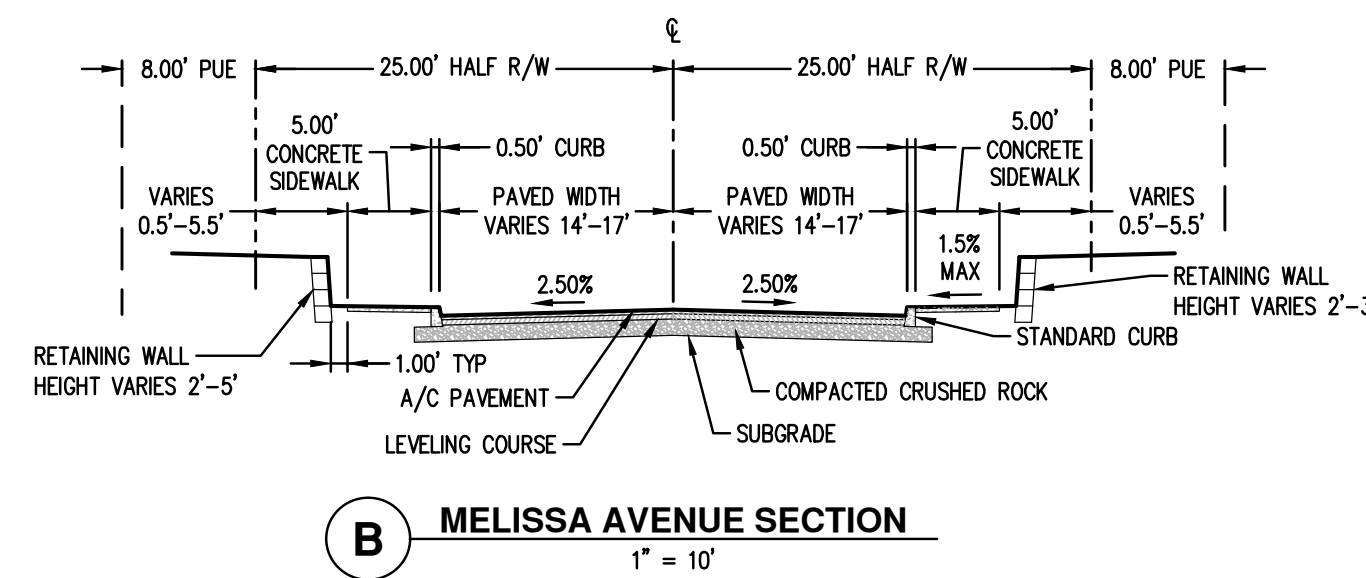
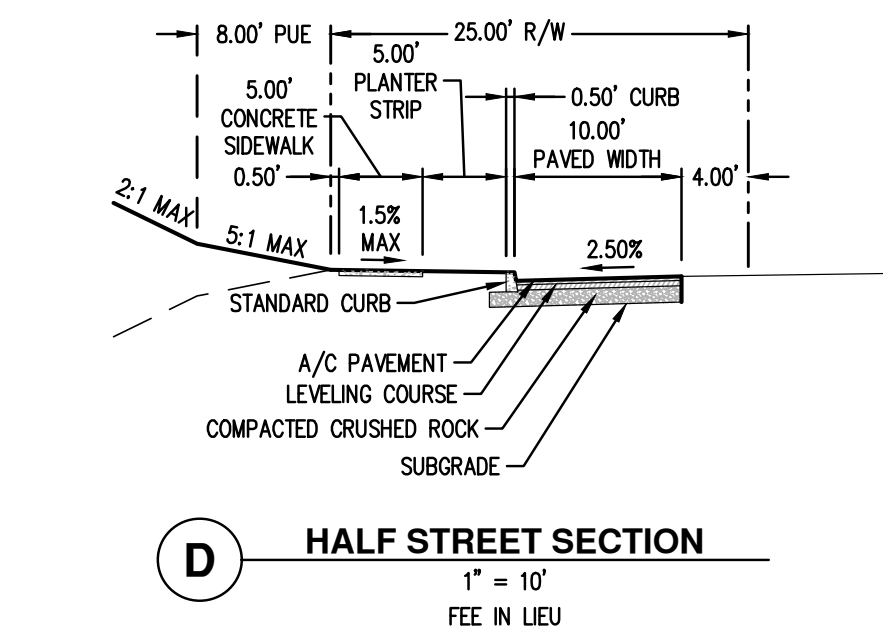
REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY PLAN
NOT FOR CONSTRUCTION
COURTNEY B. TERRY
RENEWAL DATE: 6/30/21

JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY: VN
DRAWN BY: CL
CHECKED BY: RSW

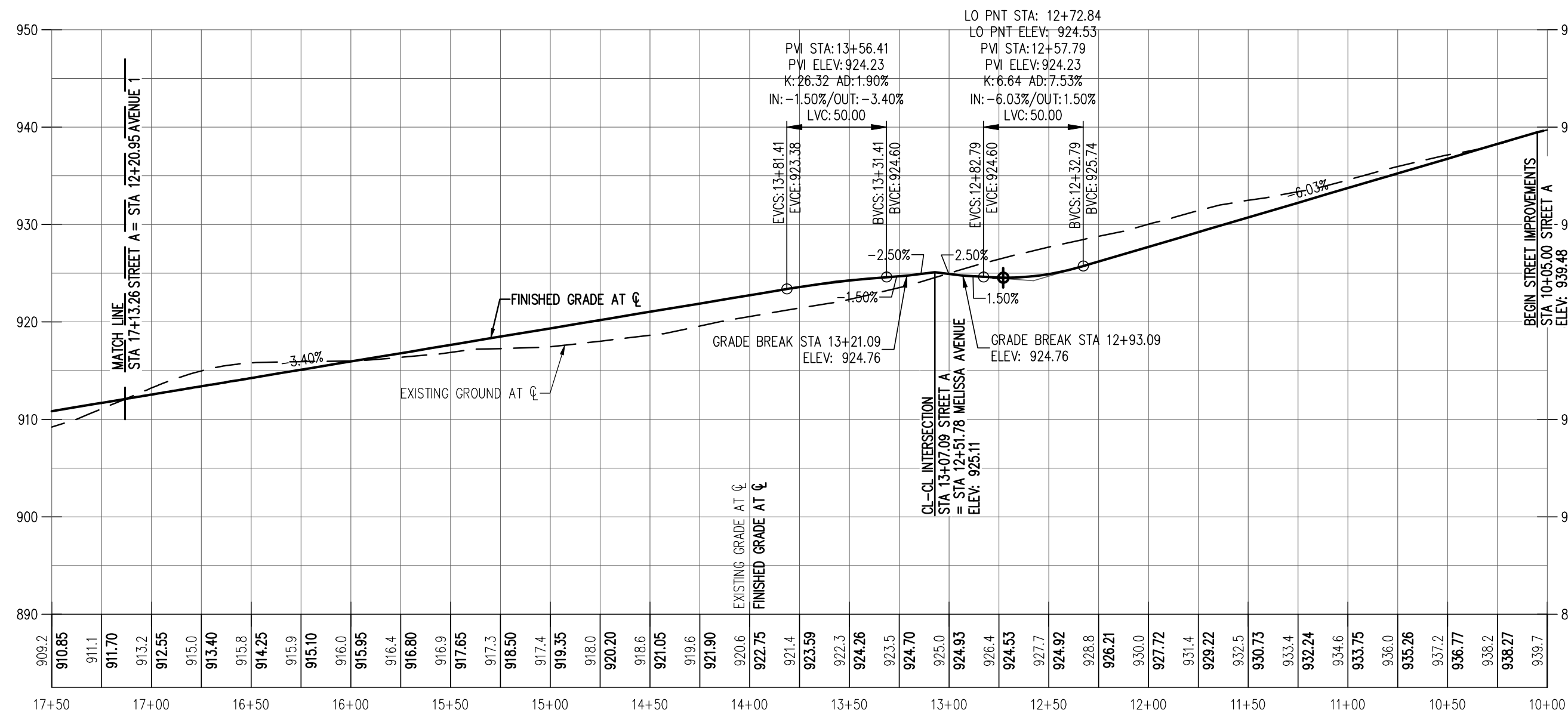
P1-10



MELISSA AVENUE PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



AVENUE 1 PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



STREET A PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'

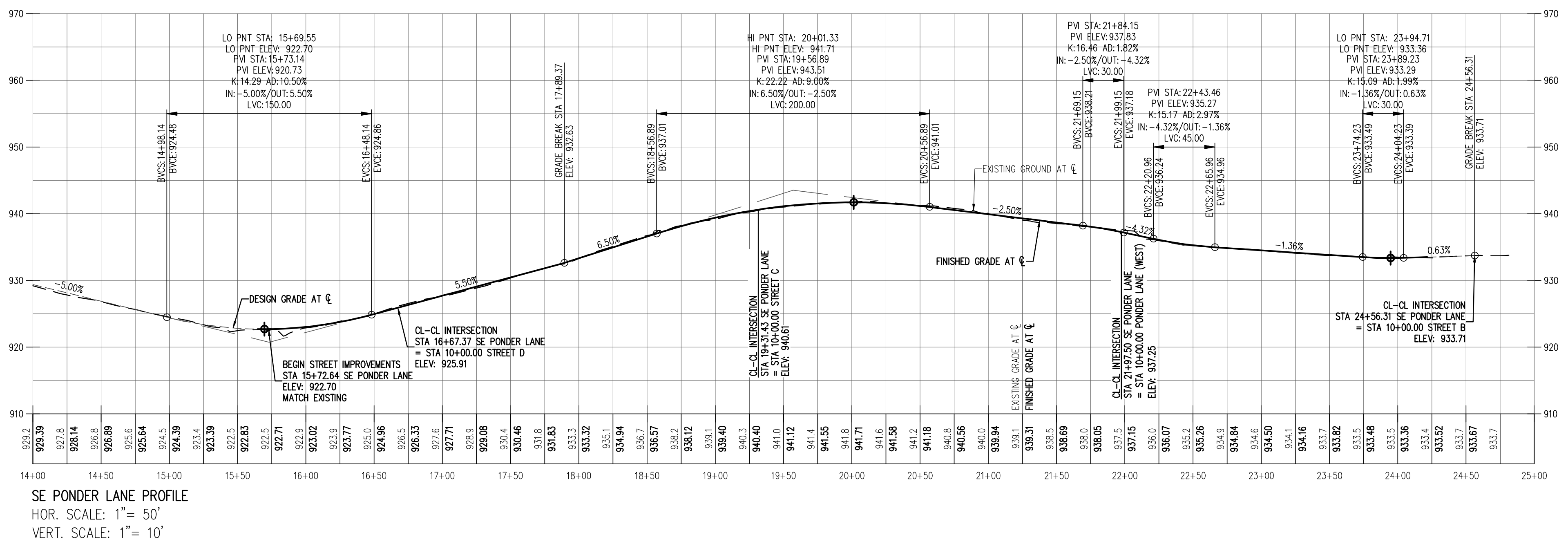
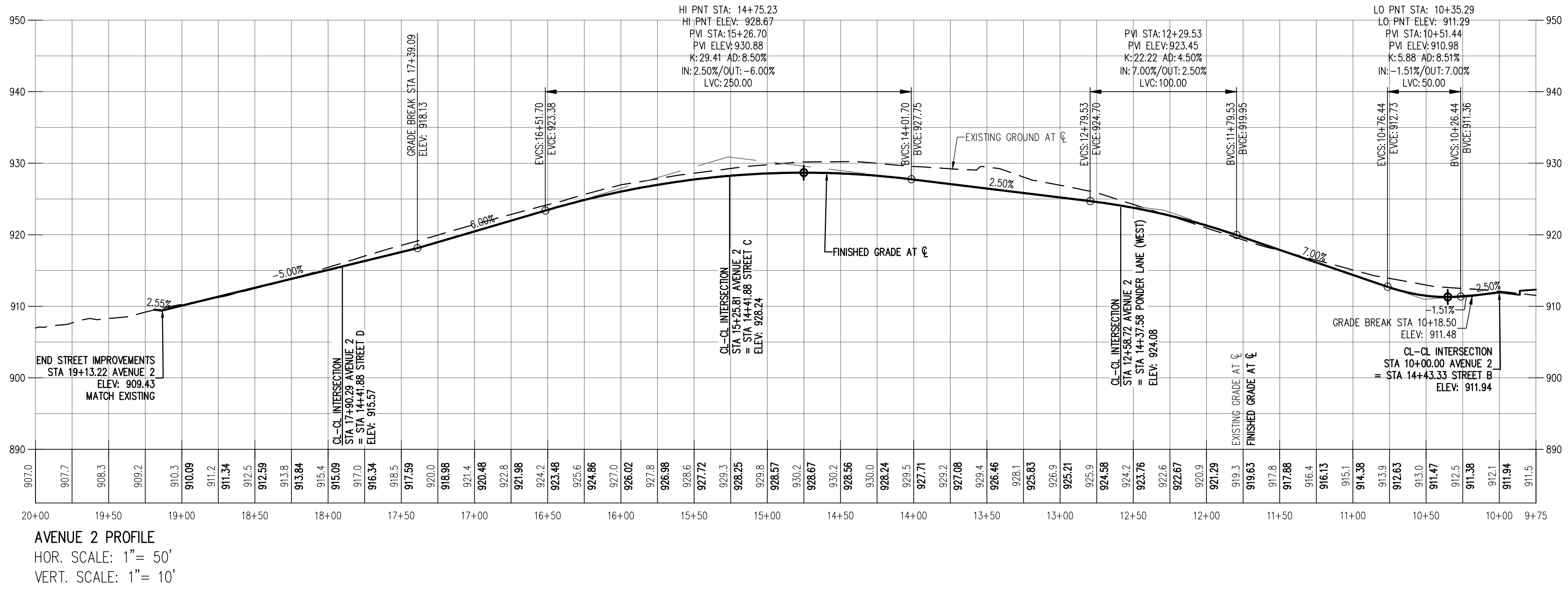
AKS DRAWING FILE: 7107 STR PROFILES.DWG | LAYOUT: P1-11

**PRELIMINARY STREET CROSS
 SECTIONS & PROFILES
 BAILEY MEADOWS
 SANDY, OREGON**

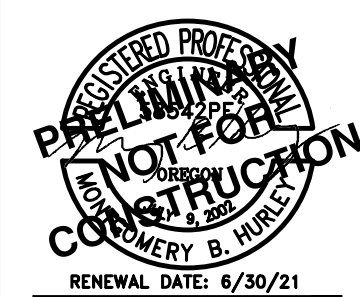
REGISTERED PROFESSIONAL
PRELIMINARY
 NOT FOR
 CONSTRUCTION
 COMERY B. THURMAN
 RENEWAL DATE: 6/30/21

JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

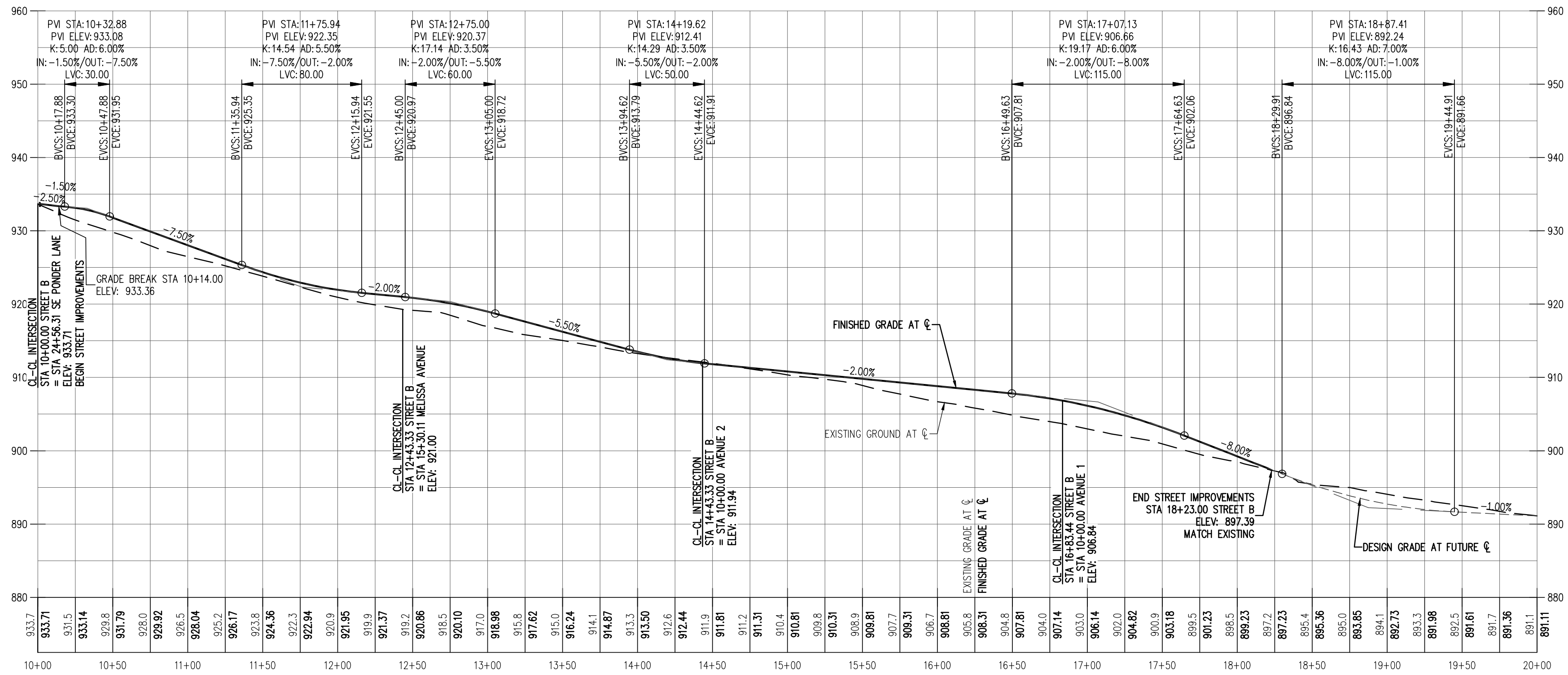
AKS DRAWING FILE: 7107 STR PROFILES.DWG | LAYOUT: P1-12



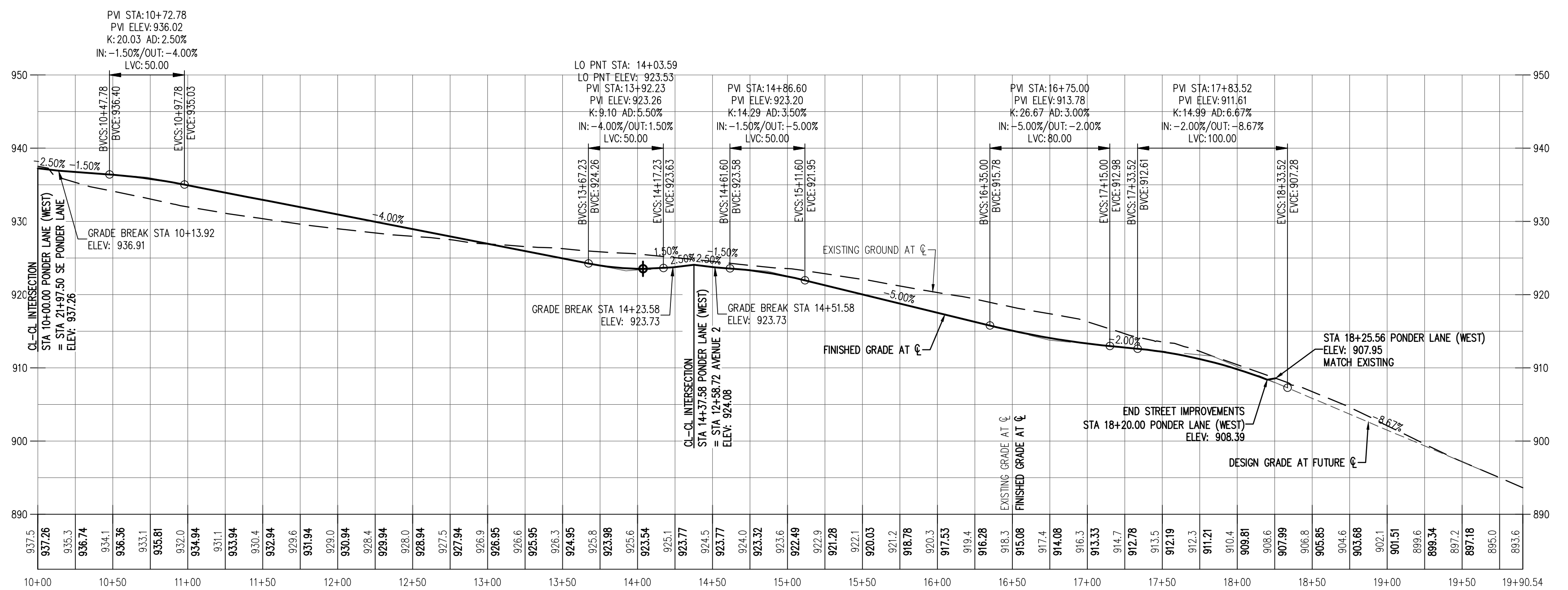
PRELIMINARY STREET PROFILES
BAILEY MEADOWS
SANDY, OREGON



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: VN
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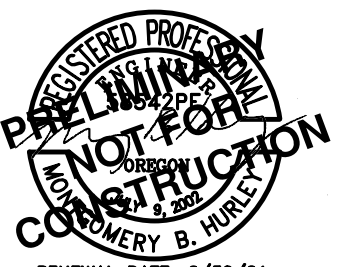
STREET B PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



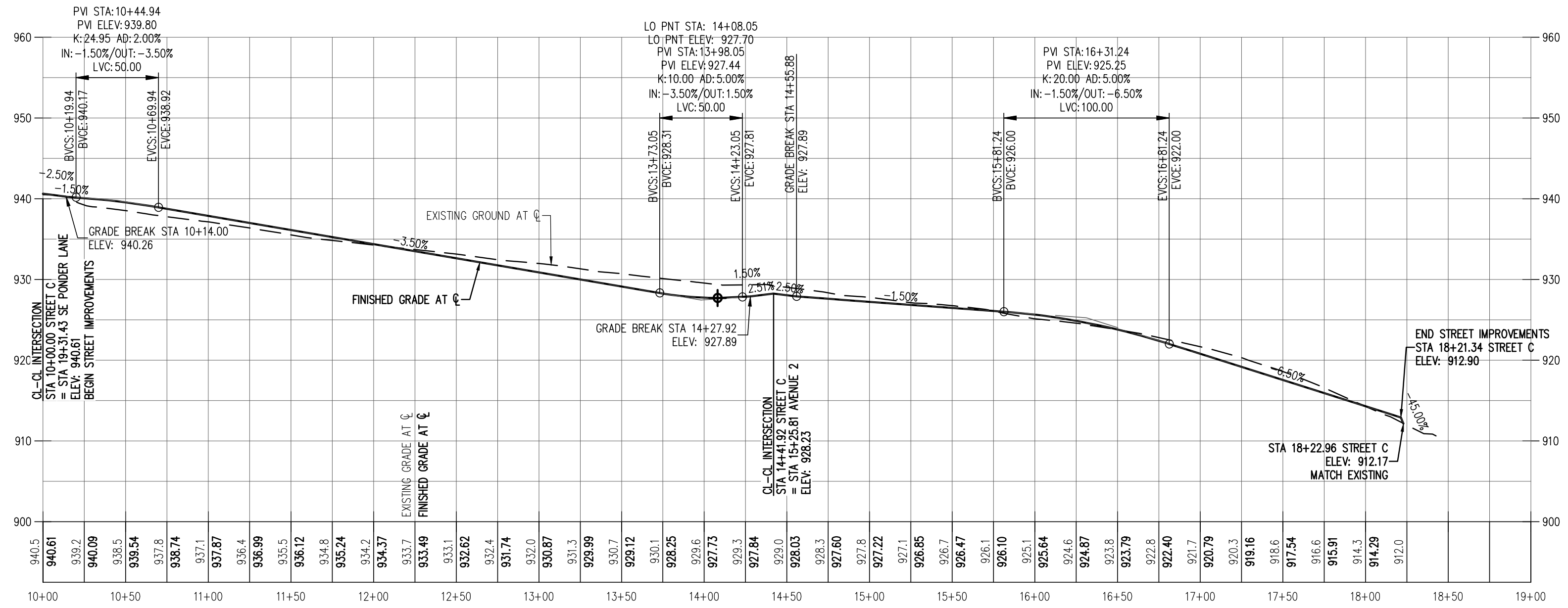
PONDER LANE (WEST) PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'

PRELIMINARY STREET PROFILES

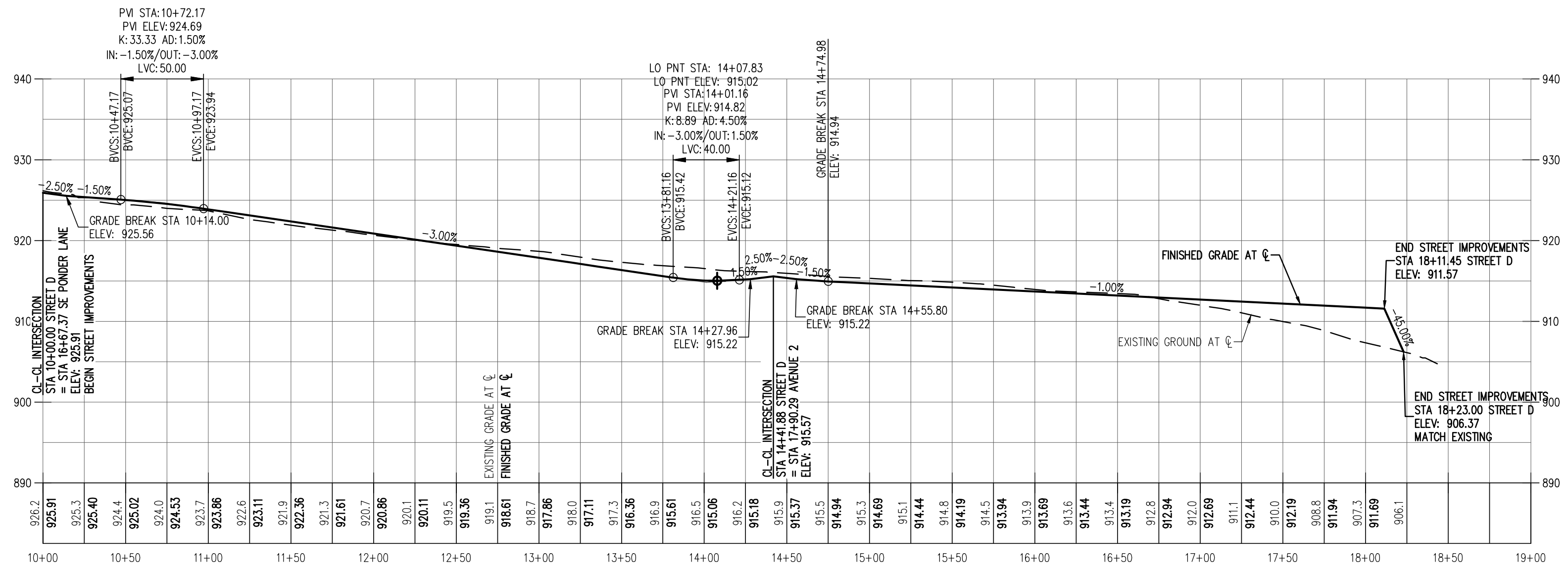
**BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: WN
 DRAWN BY: CL
 CHECKED BY: RSW



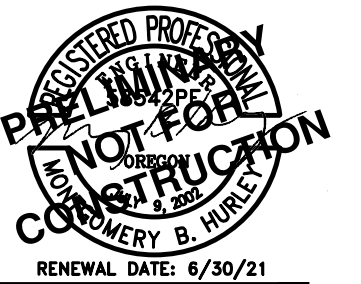
STREET C PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



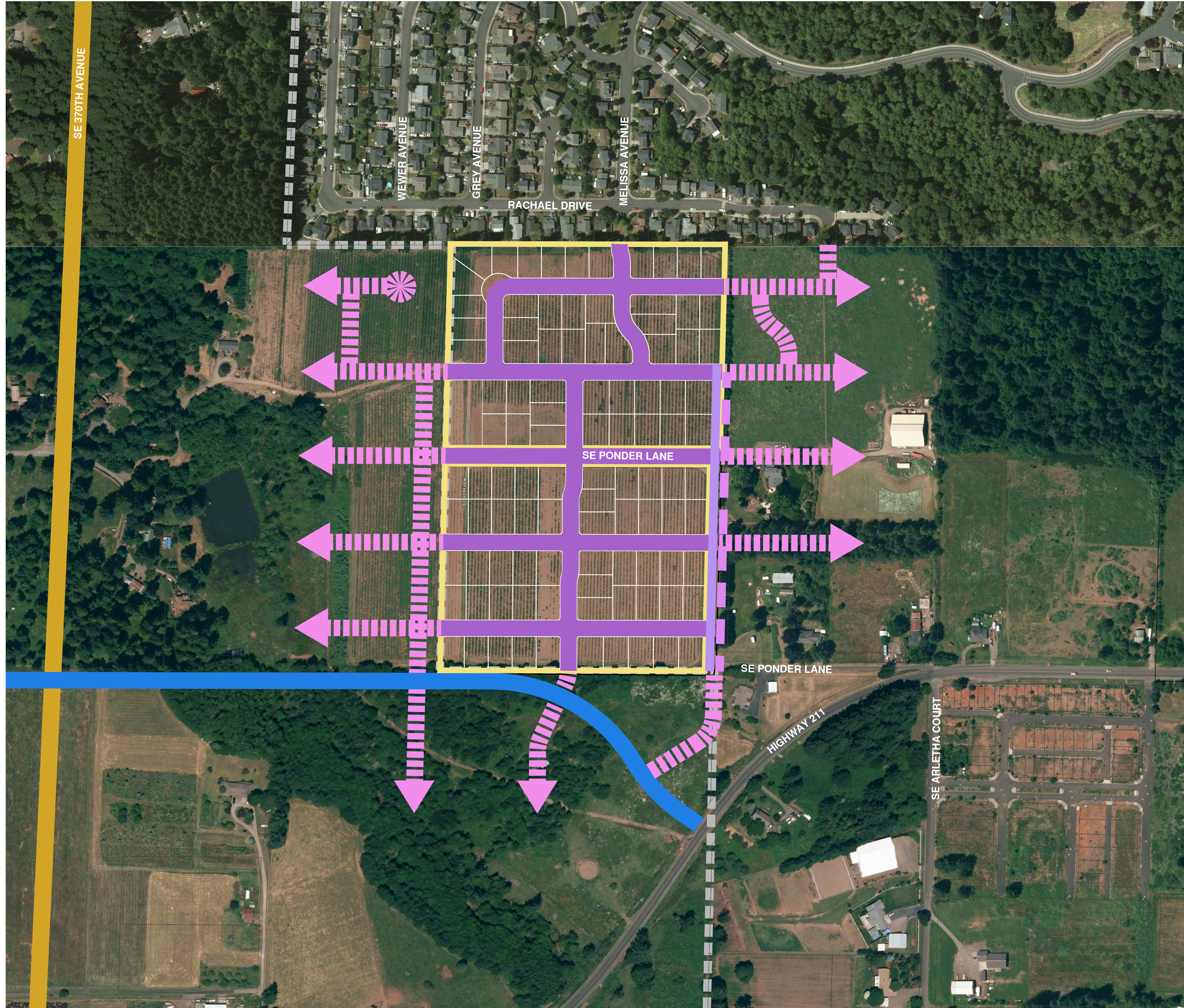
STREET D PROFILE
 HOR. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'

PRELIMINARY STREET PROFILES


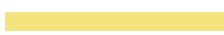






**BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
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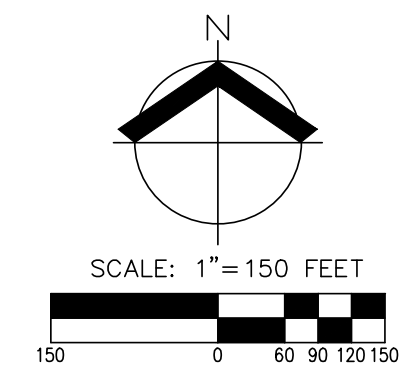


LEGEND

- URBAN GROWTH BOUNDARY 
- PROJECT SITE BOUNDARY 
- PLANNED LOCAL STREET 
- PLANNED LOCAL STREET (FEE-IN-LIEU FOR 1/2 STREET IMPROVEMENTS) 
- FUTURE MINOR ARTERIAL (ON TSP) 
- FUTURE COLLECTOR (ON TSP) 
- FUTURE LOCAL STREET 
- FUTURE LOCAL STREET (1/2 STREET IMPROVEMENTS) 

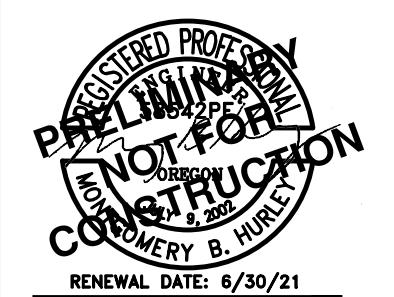
NOTES

1. THIS PLAN IS INCLUDED TO MEET THE SUBMITTAL REQUIREMENTS FOR THE CITY OF SANDY FOR THE BAILEY MEADOWS SUBDIVISION APPLICATION.
2. CONCEPTUAL FUTURE STREET LOCATIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES FOR THE LAND USE APPLICATION ONLY AND ARE NOT PROPOSED WITH THIS SUBDIVISION AND ARE NOT BINDING ON ANY OFFSITE PROPERTIES.



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**CONCEPTUAL FUTURE
 STREET PLAN
 BAILEY MEADOWS
 SANDY, OREGON**

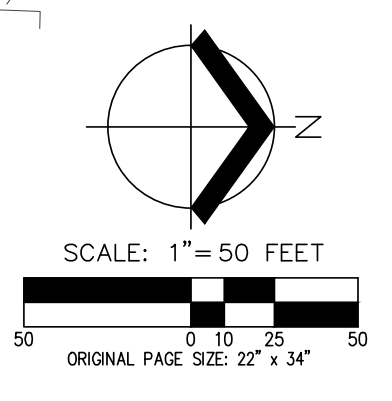
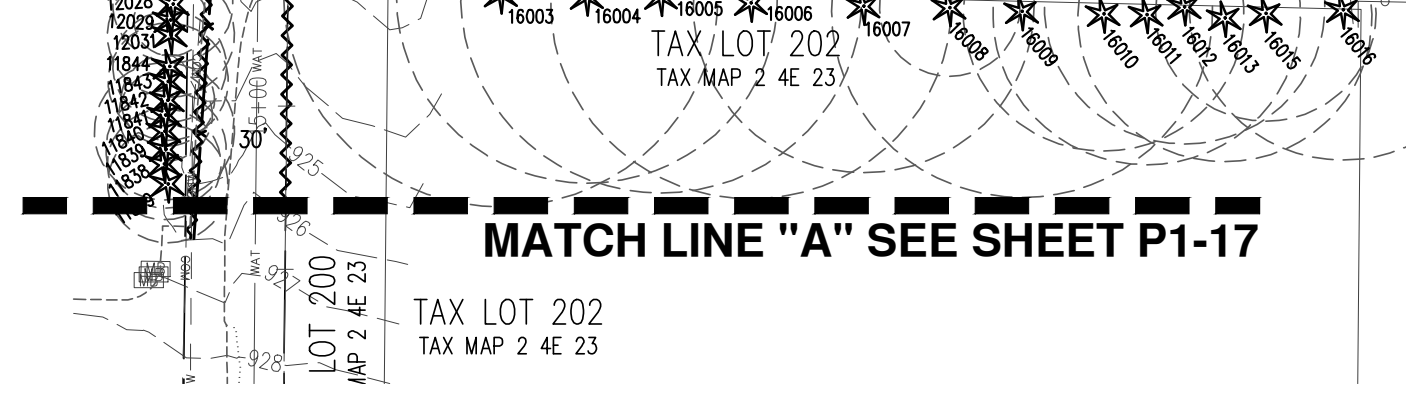


RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

**PRELIMINARY TREE PRESERVATION & REMOVAL PLAN & ARBORIST REPORT
 BAILEY MEADOWS
 SANDY, OREGON**

REGISTERED PROFESSIONAL ARBORIST
BRUCE R. BALDWIN
 EXPIRES: 12/31/2021
 RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

MATCH LINE "C" SEE SHEET P1-17



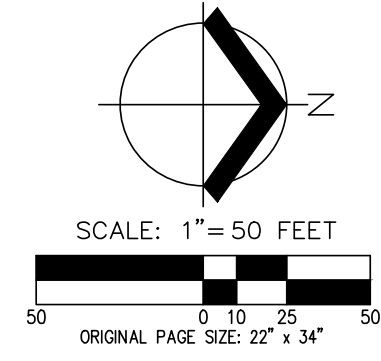
LEGEND

| | | | |
|--|-----|---|-------|
| EXISTING GROUND CONTOUR (1 FT) | 149 | EXISTING CONIFEROUS TREE | * |
| EXISTING GROUND CONTOUR (5 FT) | 150 | EXISTING DECIDUOUS TREE | o |
| FINISHED GRADE CONTOUR (1 FT) | 149 | TREE REMOVAL | x |
| FINISHED GRADE CONTOUR (5 FT) | 150 | TREE PROTECTION/CONSTRUCTION FENCE (TREE PROTECTION AREA) | ~ |
| OPTIMAL TREE ROOT ZONE (1-FEET RADIUS PER 1-IN OF DBH) | | SEDIMENT FENCE | - - - |

- NOTES:**
- TREES WITH A DIAMETER OF 11" OR GREATER ARE SHOWN.
 - SEE THE TREE PRESERVATION & REMOVAL TABLE FOR ADDITIONAL TREE RELATED INFORMATION.

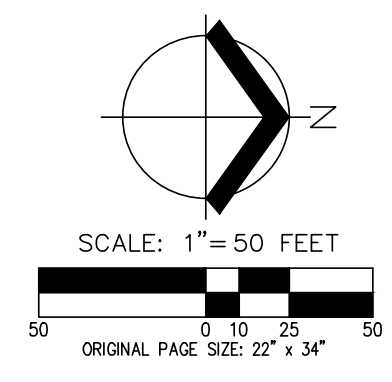
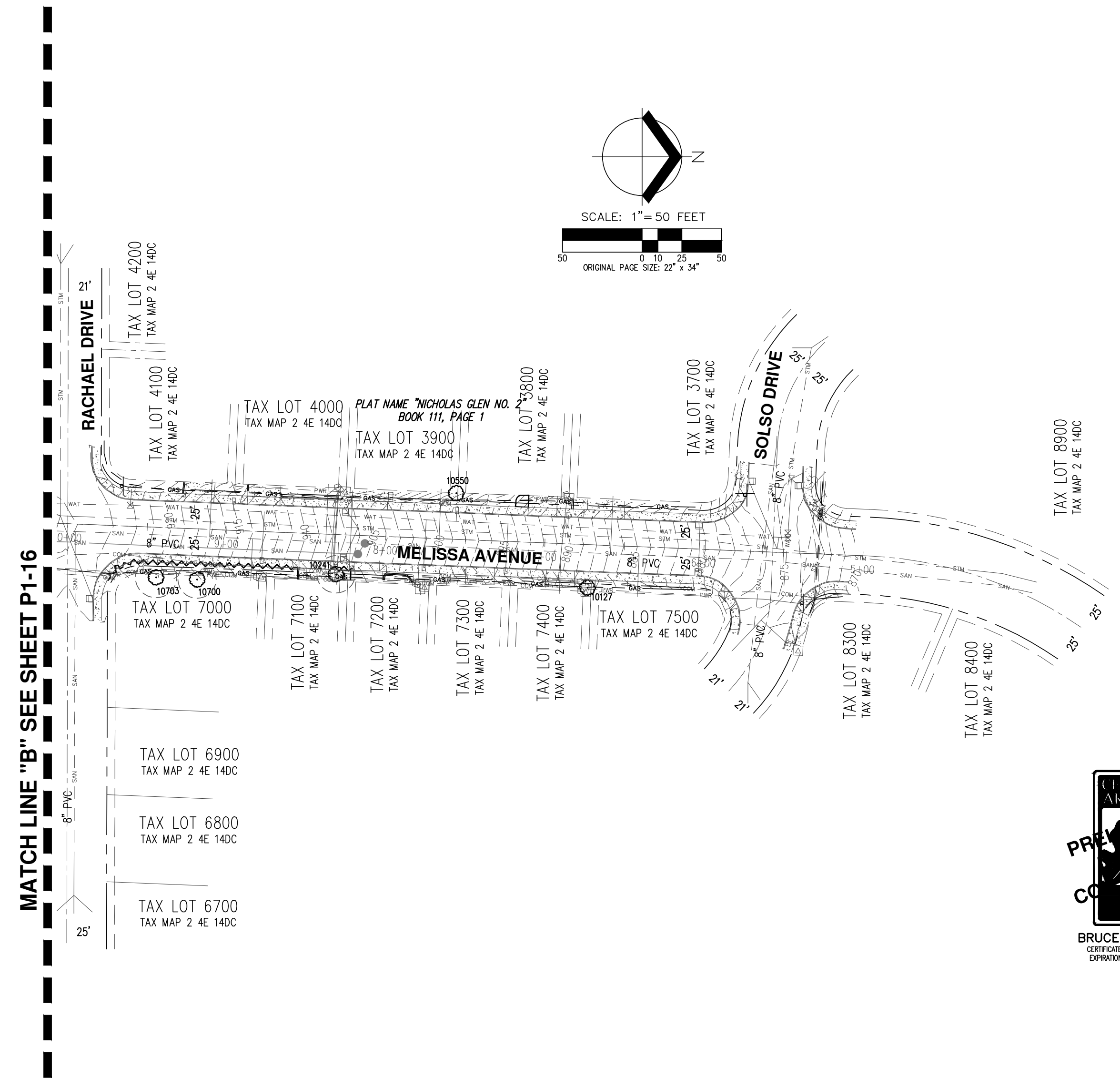
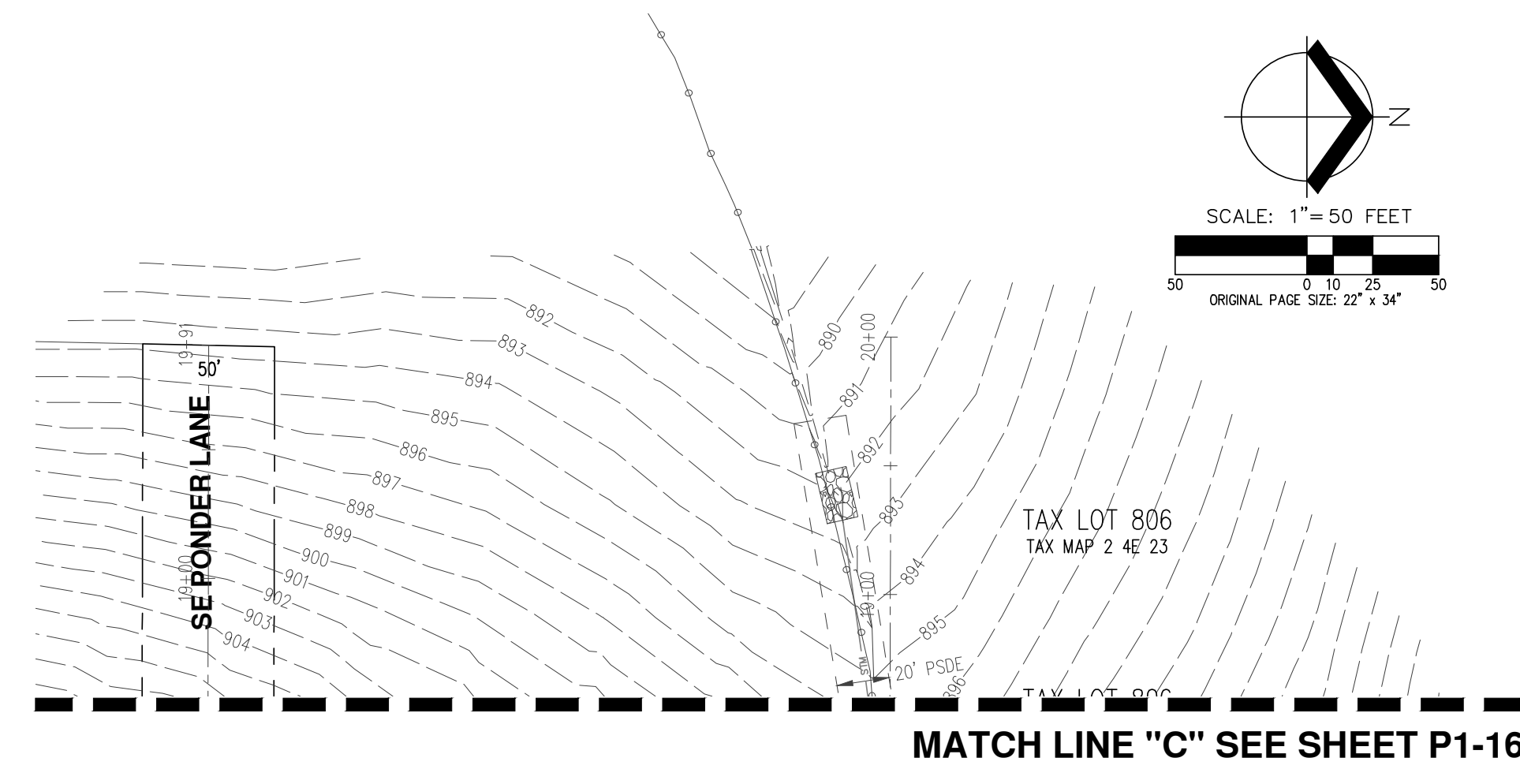
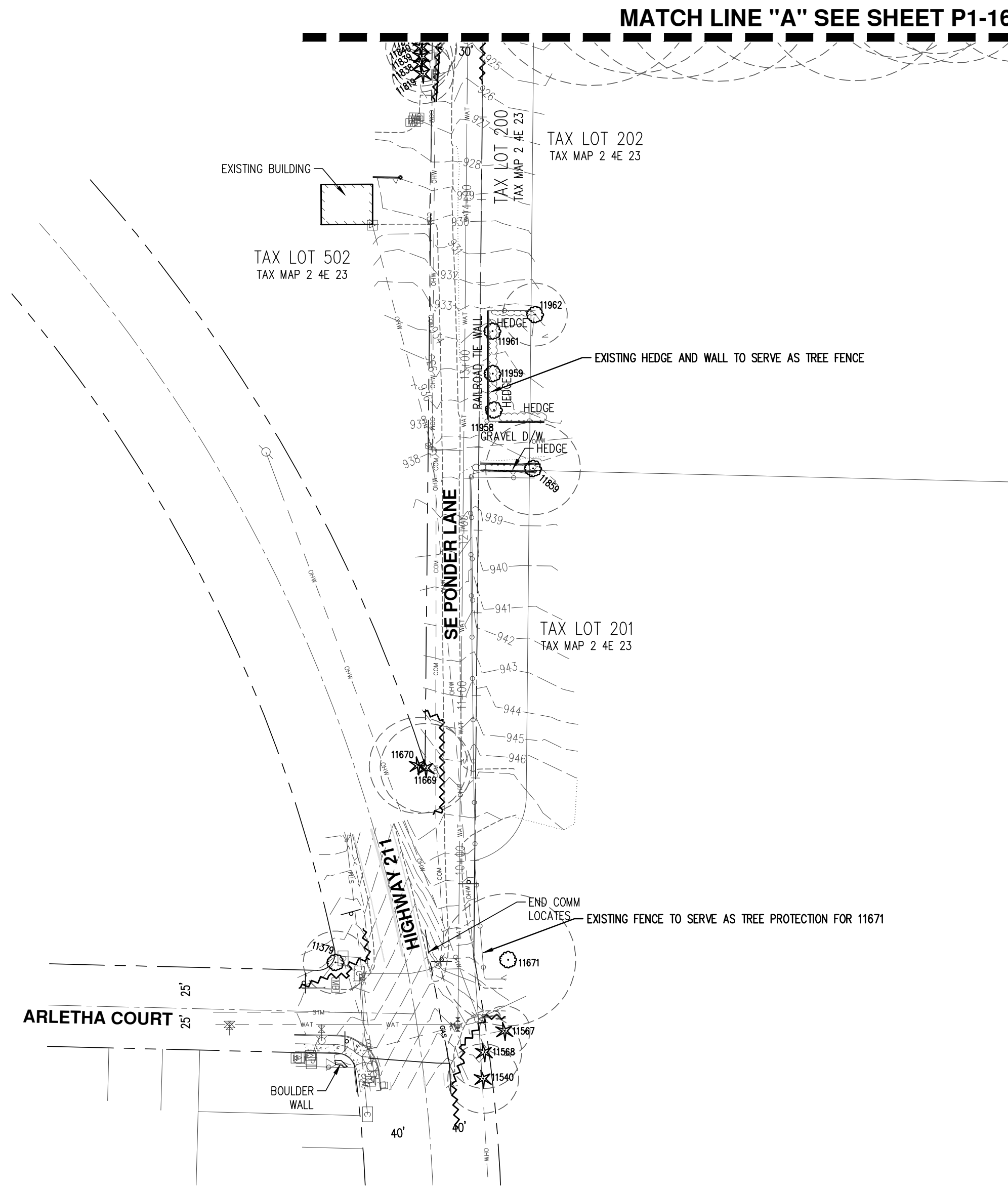
PROFESSIONAL ARBORIST
BRUCE R. BALDWIN
 CERTIFICATE NUMBER: PA-6664
 EXPIRES: 12/31/2021

PLAT NAME: "NICHOLAS CLEV. NO. 2"
 BOOK 111, PAGE 1
 RACHAEL DRIVE
 MATCH LINE "B" SEE SHEET P1-17



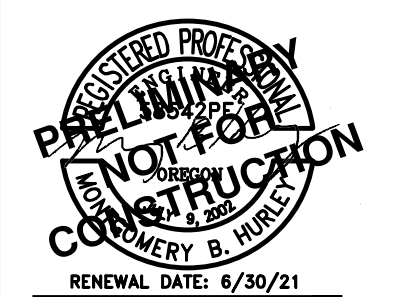
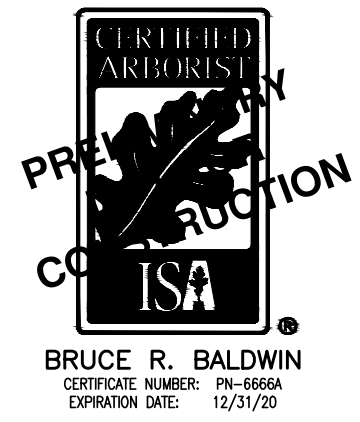
| LEGEND | | | |
|--|-----|-----|---|
| EXISTING GROUND CONTOUR (1 FT) | --- | 149 | EXISTING CONIFEROUS TREE |
| EXISTING GROUND CONTOUR (5 FT) | --- | 150 | EXISTING DECIDUOUS TREE |
| FINISHED GRADE CONTOUR (1 FT) | --- | 149 | TREE REMOVAL |
| FINISHED GRADE CONTOUR (5 FT) | --- | 150 | TREE PROTECTION/CONSTRUCTION FENCE (TREE PROTECTION AREA) |
| OPTIMAL TREE ROOT ZONE (1-FT RADIUS PER 1-IN OF DBH) | ○ | | SEDIMENT FENCE |

- NOTES:**
- TREES WITH A DIAMETER OF 11" OR GREATER ARE SHOWN.
 - SEE THE TREE PRESERVATION & REMOVAL TABLE FOR ADDITIONAL TREE RELATED INFORMATION.



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**PRELIMINARY TREE PRESERVATION & REMOVAL PLAN & ARBORIST REPORT
 BAILEY MEADOWS
 SANDY, OREGON**



| | |
|---------------|------------|
| RENEWAL DATE: | 6/30/21 |
| JOB NUMBER: | 7107 |
| DATE: | 07/03/2019 |
| DESIGNED BY: | WN |
| DRAWN BY: | CL |
| CHECKED BY: | RSW |

P1-17

Detailed Tree Inventory for Bailey Meadows

AKS Job No. 7107 - Evaluation Date: 5/30/2019

| Tree # | DBH (in.) | Avg. Crown Radius (ft) | Tree Species Common Name (Scientific name) | Comments | Health Rating* | Structure Rating** | Reason for Removal*** |
|--------|-----------------|------------------------|---|--|----------------|--------------------|-----------------------|
| 16055 | 12, 12 | 16 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence); Codominant top | 1 | 2 | Preserve |
| 16056 | 16 | 15 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16057 | 14 | 17 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16058 | 14 | 15 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16059 | 12 | 12 | Western Red Cedar (<i>Thuja plicata</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16061 | 21 | 15 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16062 | 16 | 18 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16063 | 14 | 13 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16064 | 14 | 15 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16065 | 11 | 12 | Western Red Cedar (<i>Thuja plicata</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16067 | 20 | 18 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16068 | 17 | 18 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16069 | 14 | 18 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16070 | 15 | 21 | Douglas-fir (<i>Pseudotsuga menziesii</i>) | OFFSITE; Evaluated from property line (behind fence) | 1 | 1 | Preserve |
| 16071 | 12 | 15 | Maple (<i>Acer</i> sp.) | OFFSITE; Evaluated from property line | 1 | 1 | Preserve |
| 50003 | 9, 9, 10, 11, 8 | 22 | Willow (<i>Salicaceae</i> sp.) | OFFSITE; Codominant; Dead branches; lean (S); Crooked | 2 | 2 | Preserve |

Total # of Existing Trees inventoried = 192

Total # of Existing Onsite Trees = 19

Total # of Existing Onsite Trees to be Preserved = 19
Total # of Existing Onsite Trees to be Removed = 0

Total # of Existing Offsite Trees = 173

Total # of Existing Offsite Trees to be Preserved = 168
Total # of Existing Offsite Trees to be Removed = 5

Total # of Existing Offsite Trees to be Removed that are Exempt from Urban Forestry Regulations = 5

Health Rating:

- 1 = Good Health - A tree that exhibits typical foliage, bark, and root characteristics, for its respective species, shows no signs of infection or infestation, and has a high level of vigor and vitality.
- 2 = Fair Health - A tree that exhibits some abnormal health characteristics and/or shows some signs of infection or infestation, but may be reversed or abated with supplemental treatment.
- 3 = Poor Health - A tree that is in significant decline, to the extent that supplemental treatment would not likely result in reversing or abating its decline.

Structure Rating:

- 1 = Good Structure - A tree that exhibits typical physical form characteristics, for its respective species, shows no signs of structural defects of the canopy, trunk, and/or root system.
- 2 = Fair Structure - A tree that exhibits some abnormal physical form characteristics and/or some signs of structural defects, which reduce the structural integrity of the tree, but are not indicative of imminent physical failure, and may be corrected using arboricultural abatement methods.
- 3 = Poor Structure - A tree that exhibits extensively abnormal physical form characteristics and/or significant structural defects that substantially reduces the structural viability of the tree, cannot feasibly be abated, and are indicative of imminent physical failure.

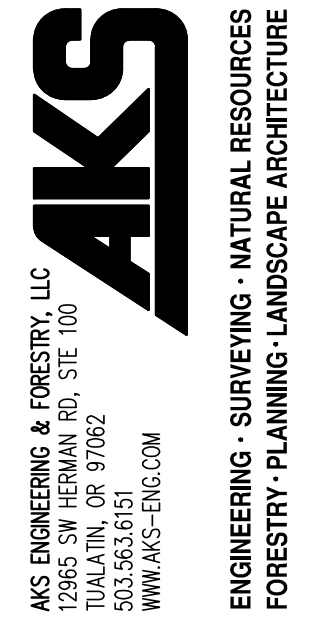
Reason for Removal:

- (A) - This tree is proposed for removal to facilitate the installation of roads, utilities, grading, retaining walls, etc. for the Melissa Avenue extension. This tree is exempt from Chapter 17.102 - Urban Forestry per Sandy Development Code Chapter 17.102.20 B. 1.
- (B) - This tree is proposed for removal to facilitate the installation of roads, utilities, grading, etc. for the half street improvement of SE Ponder Lane. This tree is exempt from Chapter 17.102 - Urban Forestry per Sandy Development Code Chapter 17.102.20 B. 1.

Arborist Disclosure Statement:

Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the health of trees, and attempt to reduce the risk of living near trees. The Client and Jurisdiction may choose to accept or disregard the recommendations of the arborist, or seek additional advice. Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like medicine, cannot be guaranteed. Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees. Neither this author nor AKS Engineering & Forestry, LLC have assumed any responsibility for liability associated with the trees on or adjacent to this site.

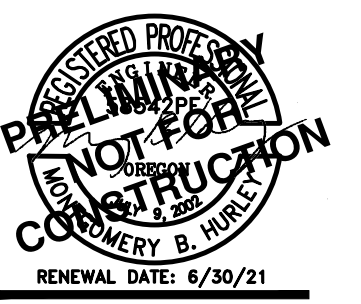
At the completion of construction, all trees should once again be reviewed. Land clearing and removal of adjacent trees can expose previously unseen defects and otherwise healthy trees can be damaged during construction.



**PRELIMINARY TREE PRESERVATION & REMOVAL TABLE & ARBORIST REPORT
BAILEY MEADOWS
SANDY, OREGON**

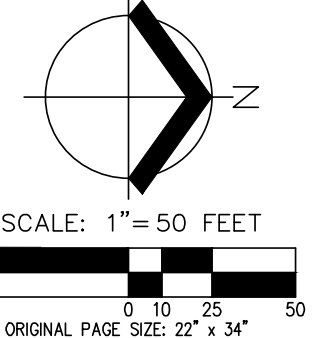


BRUCE R. BALDWIN
CERTIFICATE NUMBER: 794-9554
EXPIRATION DATE: 12/31/20



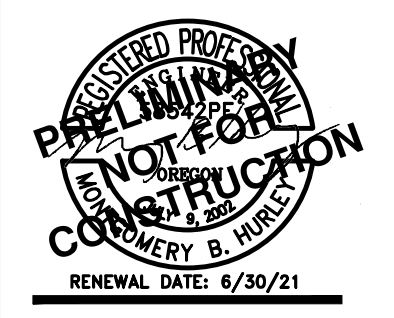
JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY: WN
DRAWN BY: CL
CHECKED BY: RSW

P1-19



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**PRELIMINARY
 DEMOLITION PLAN
 BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 8/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

P1-20

MATCH LINE "C" SEE SHEET P1-21

MATCH LINE "B" SEE SHEET P1-21



DEMOLITION KEYED NOTES:

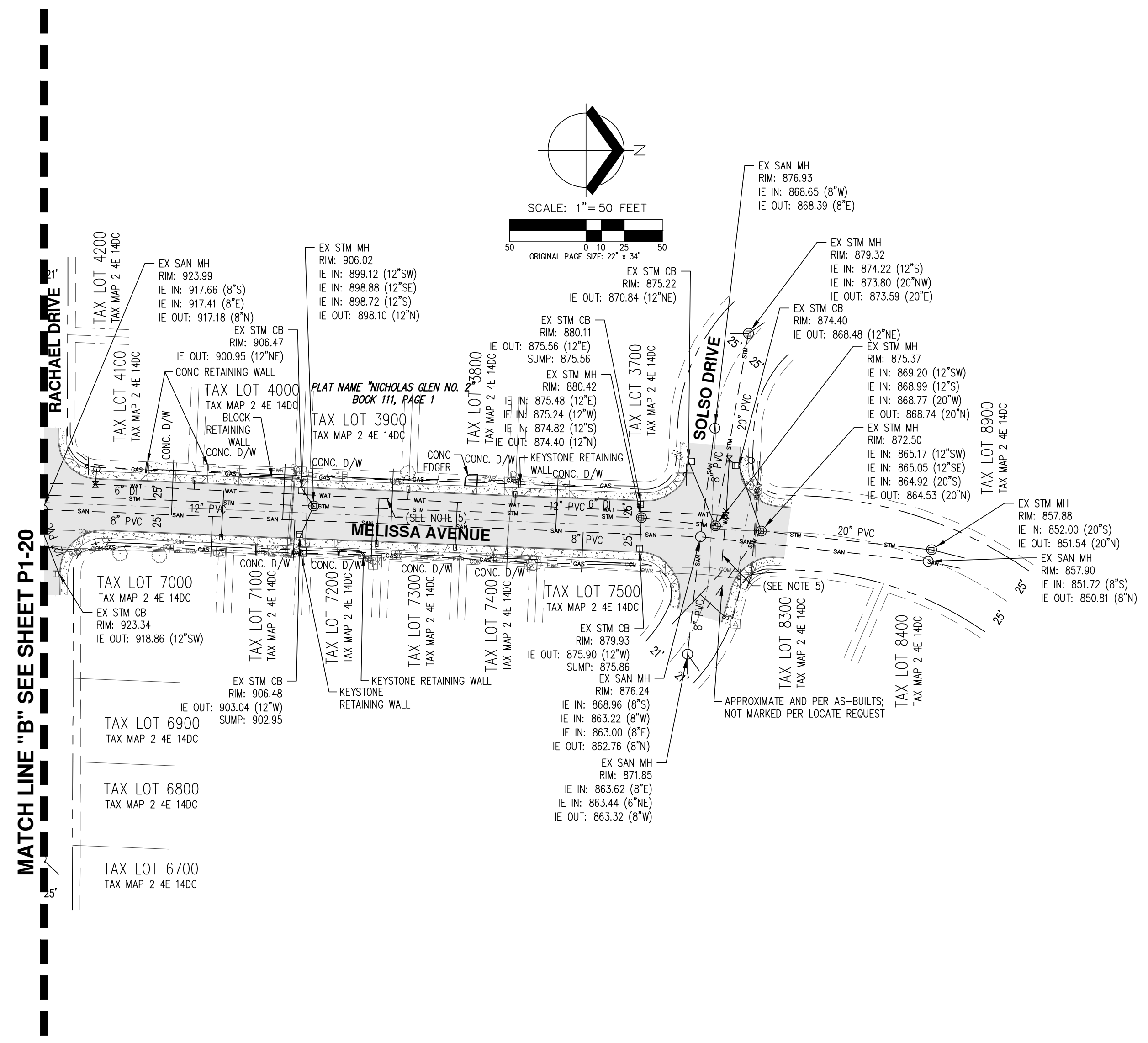
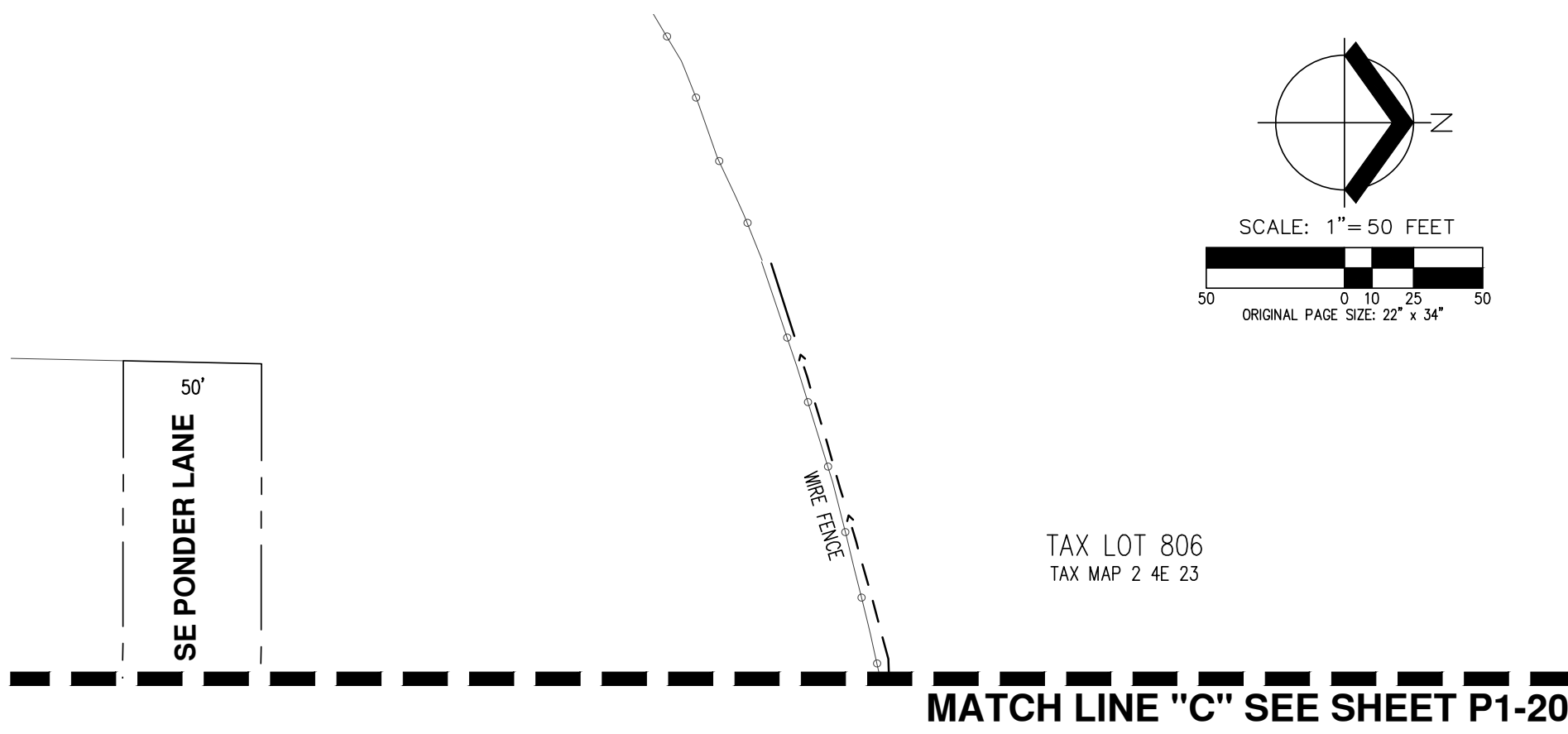
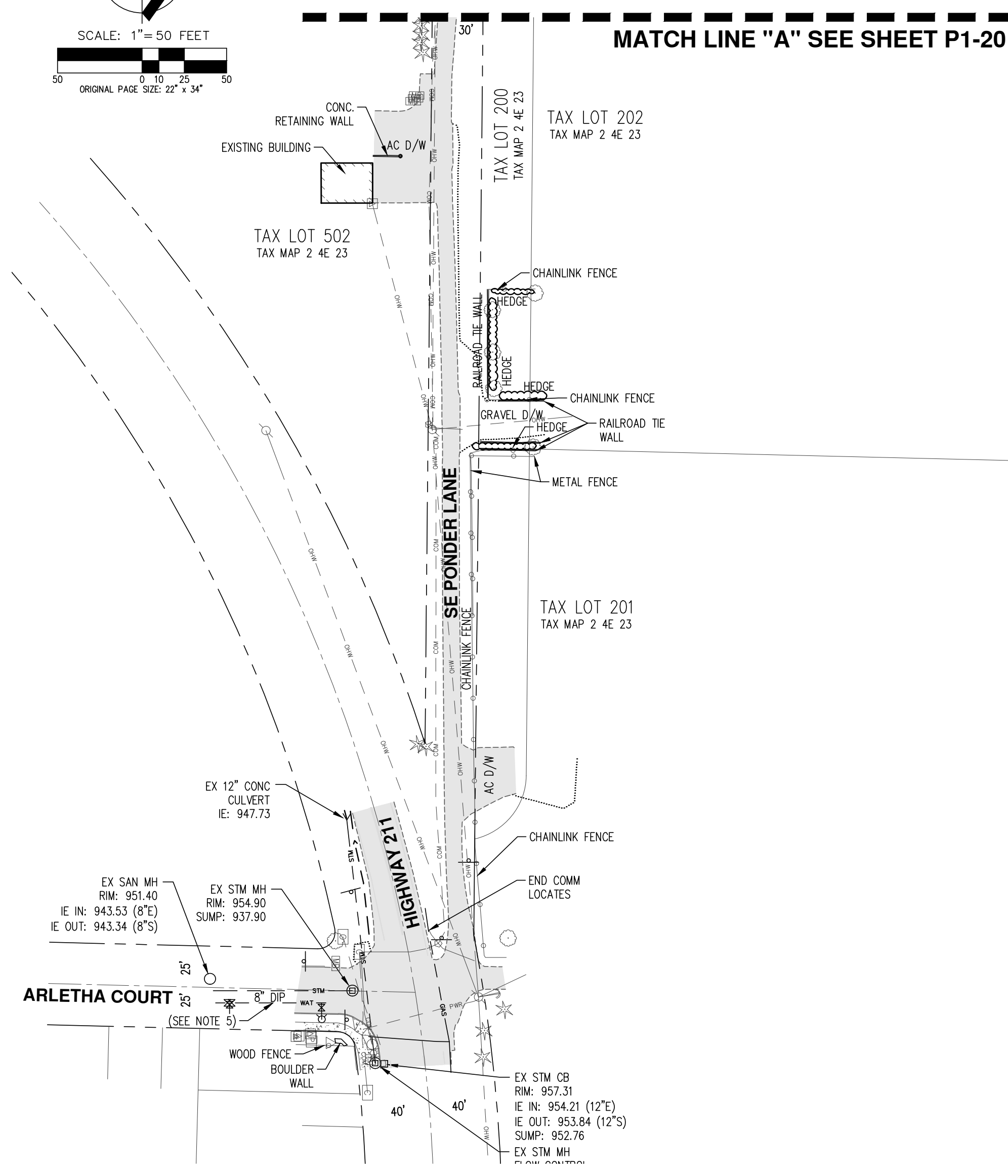
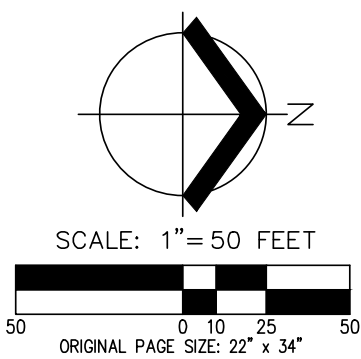
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|--|---|--|
| <p>1 REMOVE EXISTING FENCE.</p> <p>2 PRESERVE EXISTING FENCE. PROTECT FROM DAMAGE.</p> <p>3 REMOVE EXISTING GRAVEL DRIVEWAY.</p> | <p>4 REMOVE/RELOCATE EXISTING POWER POLE, GUY WIRES, AND OVERHEAD LINES, COORDINATE WITH POWER AND COMMUNICATION PROVIDERS.</p> <p>5 REMOVE EXISTING BARRICADES</p> <p>6 REMOVE/REPLACE EXISTING PAVEMENT</p> | <p>7 PROTECT EXISTING TREES (TYP). SEE TREE PRESERVATION AND REMOVAL PLAN.</p> <p>8 REMOVE EXISTING TREES (TYP). SEE TREE PRESERVATION AND REMOVAL PLAN.</p> |
|--|---|--|

MATCH LINE "A" SEE SHEET P1-21

AKS DRAWING FILE: 7107 DEMOLITION LAYOUT: P1-20

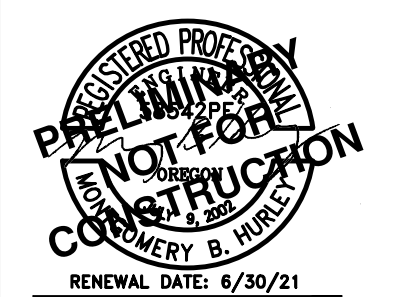
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- 1 REMOVE EXISTING FENCE.
- 2 PRESERVE EXISTING FENCE. PROTECT FROM DAMAGE.
- 3 REMOVE EXISTING GRAVEL DRIVEWAY.
- 4 REMOVE/RELOCATE EXISTING POWER POLE, GUY WIRES, AND OVERHEAD LINES. COORDINATE WITH POWER AND COMMUNICATION PROVIDERS.
- 5 REMOVE EXISTING BARRICADES
- 6 REMOVE/REPLACE EXISTING PAVEMENT
- 7 PROTECT EXISTING TREES (TYP). SEE TREE PRESERVATION AND REMOVAL PLAN.
- 8 REMOVE EXISTING TREES (TYP). SEE TREE PRESERVATION AND REMOVAL PLAN.



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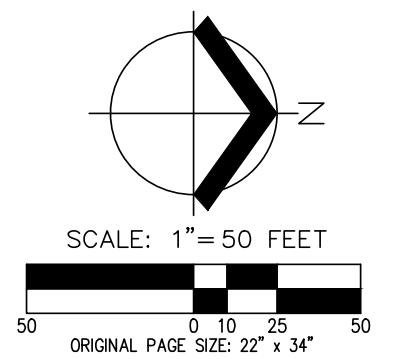
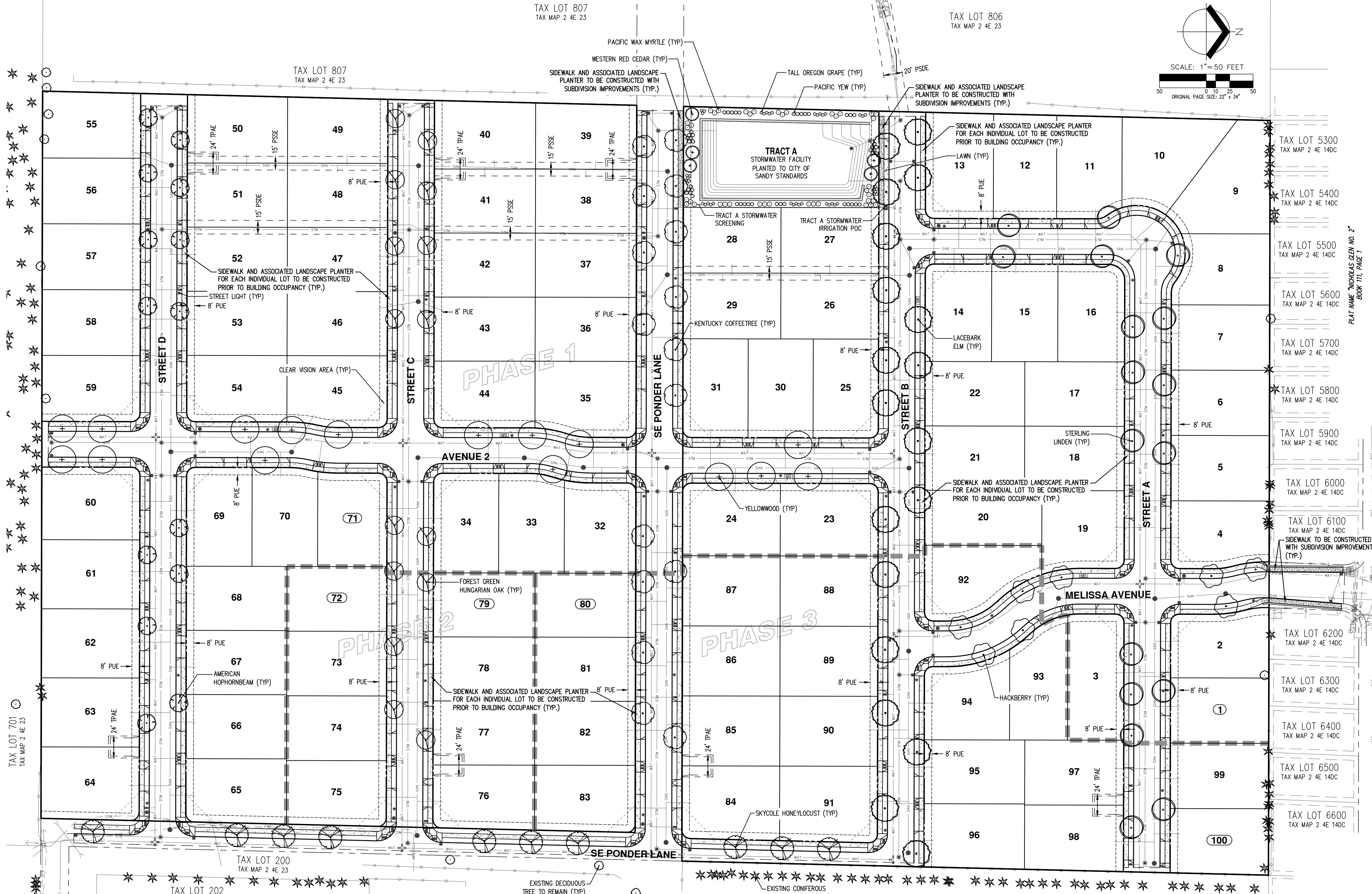
**PRELIMINARY
 DEMOLITION PLAN
 BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 6/30/21
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 DATE: 07/03/2019
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P1-21

AKS DRAWING FILE: 7107 STREET TREE LAYOUT: P1-22



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**PRELIMINARY STREET TREE AND
 STORMWATER SCREENING PLANTING PLAN
 BAILEY MEADOWS
 SANDY, OREGON**

REGISTERED
 PRELIMINARY
 NOT FOR
 CONSTRUCTION
 COAPE ARCHITECTURE

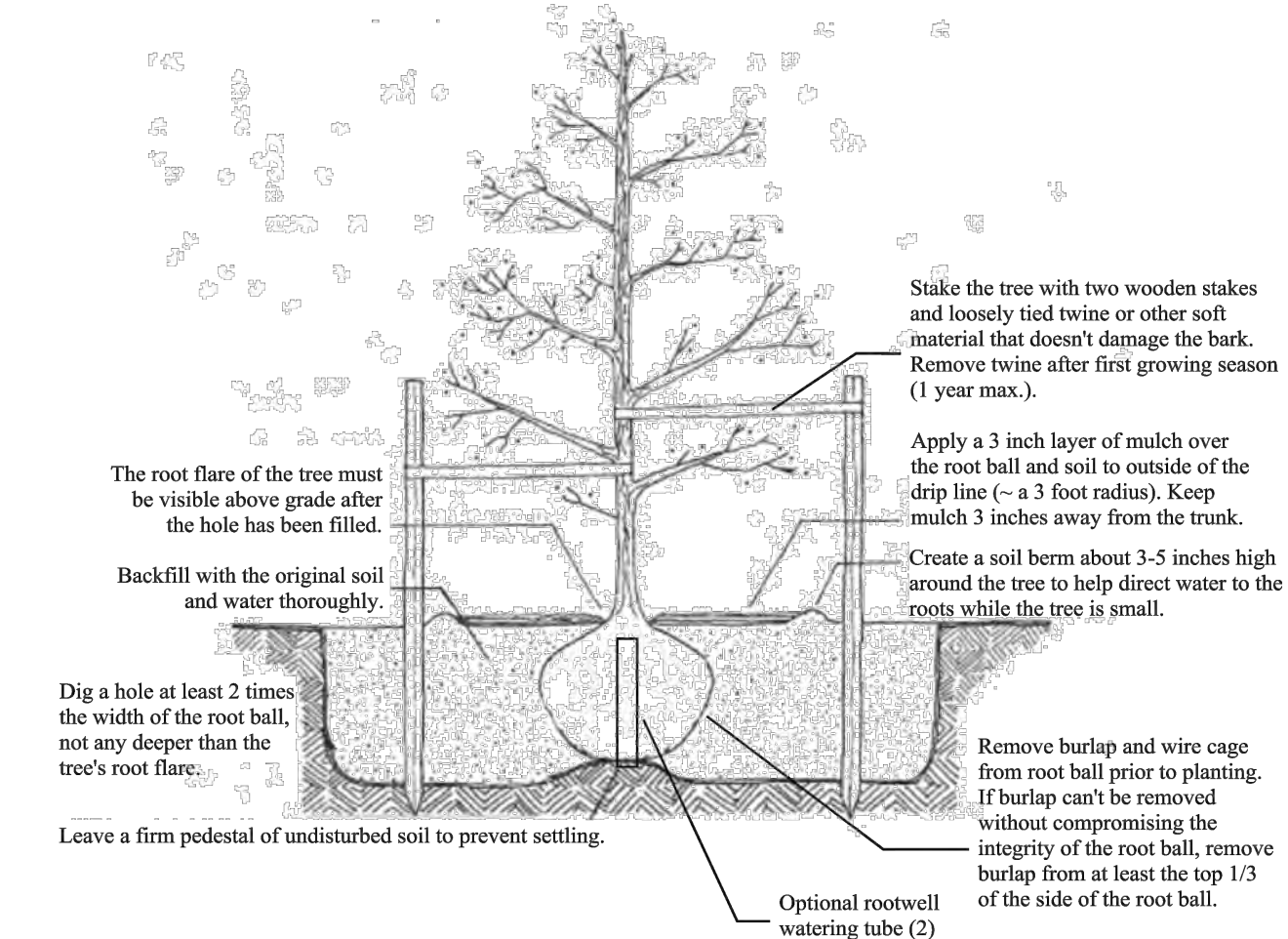
JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: NKP
 DRAWN BY: NKP
 CHECKED BY: KAH

P1-22

REFER TO SHEET P1-23 FOR PRELIMINARY
 PLANT SCHEDULES, NOTES, AND DETAILS

STREET TREE STANDARD PLANTING DETAIL

Profile of a newly planted street tree. Diagram not to scale.



- Please water your trees regularly for the first 2 to 3 years. During the summer dry season (roughly May to October), deep-root watering is recommended. Begin with 15 gallons of water per tree per week, and adjust as needed. During the remaining months of the year, monitor the root zone for dryness and water as needed. Good watering practices will promote vigorous growth, ensure well-formed root development, and help produce a beautiful tree for years to come.
- Make sure stakes are placed at the edge of the mulch pile and are pounded securely into the ground so they cannot be easily pulled out. Loosely tie the tree to the stakes with twine or another flexible material. The ties should be located no higher than 2/3 the height of the tree. The tree should be able to sway in the wind, which helps establish strong support roots and trunk. Check the twine periodically to make sure there is room for the tree to grow and the twine is not damaging the trunk. Remove the twine immediately if there are signs of damage on the trunk. Do not leave trees staked for more than one year or the tree may not develop its own proper support structure.
- Reapply mulch as necessary to maintain a 3 inch depth. Keep weeds and grass from growing in the mulch area to reduce competition for water and nutrients.
- Remove any twine, tape, or tags from the tree's trunk and branches prior to planting.

PRELIMINARY LANDSCAPE NOTES:

1. LANDSCAPE PLAN IS PRELIMINARY AND INTENDED TO SHOW DESIGN INTENT ONLY. PLANTING TYPES, LOCATIONS, QUANTITIES, AND DETAILS ARE CONCEPTUAL AND SUBJECT TO CHANGE PRIOR TO FINAL APPROVAL BASED ON SITE PLAN REFINEMENT. LANDSCAPING SHALL COMPLY WITH APPLICABLE CITY OF SANDY STANDARDS. SUBSTITUTIONS TO STREET TREES MUST BE APPROVED AND SELECTED FROM THE CITY'S APPROVED STREET TREE LIST.
2. STREET TREES SHALL COMPLY WITH CITY OF SANDY STANDARDS, INCLUDING APPROPRIATE MAINTENANCE AND WATERING. MEDIUM CANOPY TREES SHALL BE PLANTED 30' ON-CENTER, LARGE TREES SHALL BE PLANTED 50' ON-CENTER. PER CITY OF SANDY CODE 17.92.30, TREES MAY NOT BE PLANTED WITHIN 5' OF PERMANENT HARD SURFACE PAVING OR WALKWAYS, 10' OF FIRE HYDRANTS AND UTILITY POLES, 20' OF STREET LIGHT STANDARDS, 5' FROM AN EXISTING CURB FACE, 10' OF A PUBLIC SANITARY SEWER, STORM DRAINAGE, OR WATER LINE; AND 30' FROM INTERSECTIONS. TREES SHALL BE PRUNED TO PROVIDE A MINIMUM 8' CLEARANCE ABOVE SIDEWALKS AND 12' CLEARANCE ABOVE STREET AND ROADWAY SURFACES.
3. LANDSCAPE PLANT MATERIAL SHALL BE HEALTHY, FREE FROM DISEASE OR PESTS, SYMMETRICAL, AND TYPICAL FOR ITS SPECIES. PLANT MATERIAL, INCLUDING TREES, SHALL COMPLY WITH THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1). DOUBLE STAKE ALL TREES.
4. SOIL PREPARATION: ALL PLANTING AREAS SHALL HAVE SUFFICIENT SOIL DEPTH AND FERTILITY TO SUPPORT HEALTHY PLANT GROWTH. TOPSOIL MAY BE NON-COMPACTED, NATIVE EXISTING TOPSOIL, FROM CLEAN SOURCES STOCKPILED ON SITE, OR FROM IMPORTED SOURCES IF REQUIRED. TOPSOIL SHALL BE FREE OF ROOTS, WEEDS/WEED SEEDS, CLAY LUMPS, DEBRIS, ROCKS, LARGE WOODY MATERIAL, AND OTHER EXTRANEOUS, NON-ORGANIC MATERIAL HARMFUL TO PLANT GROWTH. ALL PLANTINGS IN PLANTING BEDS SHALL BE POCKET-PLANTED WITH AMENDED SOIL CONTAINING 2/3 NATIVE TOPSOIL, AND 1/3 ORGANIC COMPOST. FINISH GRADE OF NEW PLANTING AREAS SHALL SEAMLESSLY MEET GRADE OF SURROUNDING AREAS AND GRADES SHOWN ON GRADING PLANS.
5. MULCH: APPLY 3" DEEP BY MINIMUM 3' DIAMETER BARK MULCH RING AROUND STREET TREES. BARK MULCH SHALL BE DARK HEMLOCK, MEDIUM GRIND OR SHREDDED, OR SIMILAR AGED BARK MULCH. AVOID COVERING ROOT FLARES. ADJUST ROOT BALL DEPTH TO ACCOMMODATE MULCH APPLICATION.
6. IRRIGATION: LANDSCAPING SHALL BE IRRIGATED, EITHER WITH A MANUAL OR AUTOMATIC SYSTEM, TO SUSTAIN VIABLE PLANT LIFE. A WATER-EFFICIENT IRRIGATION SYSTEM IS RECOMMENDED FOR HEALTHY PLANT ESTABLISHMENT AND SURVIVABILITY. ALTERNATIVE METHODS OF IRRIGATION, SUCH AS HAND WATERING OR WATER BAGS, MAY BE APPROVED BY THE CITY OF SANDY. IF USED, IRRIGATION SYSTEMS SHALL BE DESIGN-BUILD BY THE LANDSCAPE CONTRACTOR AND REQUIRE ITS OWN SERVICE METER AND BACKFLOW PREVENTION DEVICE.

PRELIMINARY STREET TREE AND FRONTAGE PLANT SCHEDULE

| TREES | QTY | BOTANICAL NAME | COMMON NAME | SIZE/CONTAINER | SPACING |
|---------------|--------|--|----------------------------|--------------------|---------------------|
| | 8 | CELTIS OCCIDENTALIS LARGE TREE | HACKBERRY | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 16 | CLADRASTIS KENTUKEA LARGE TREE | YELLOWWOOD | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 10 | OLEDTISIA TRIACANTHOS INERMIS 'SKYCOLE' TM LARGE TREE | SKYCOLE HONEYLOCUST | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 16 | GYMNOCALADUS DIOICA 'ESPRESSO' LARGE TREE | KENTUCKY COFFEETREE | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 14 | OSTRYA VIRGINIANA LARGE TREE | AMERICAN HOPHORNBEAM | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 15 | QUERCUS FRAINETTO 'SCHMIDT' LARGE TREE | FOREST GREEN HUNGARIAN OAK | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 17 | TILIA TOMENTOSA 'STERLING' LARGE TREE | STERLING LINDEN | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| | 19 | ULMUS PARVIFOLIA LARGE TREE | LACEBARK ELM | 1.5" MIN. CAL. B&B | 50' O.C OR AS SHOWN |
| GROUND COVERS | QTY | DESCRIPTION | | | |
| | 952 SF | LAWN | | | |

PRELIMINARY STORMWATER FACILITY SCREENING PLANT SCHEDULE

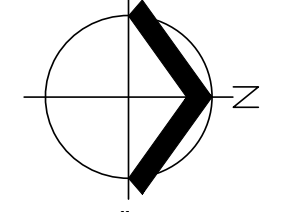
| TREES | QTY | BOTANICAL NAME | COMMON NAME | SIZE/CONTAINER | SPACING |
|--------|-----|--------------------|--------------------|----------------|----------|
| | 5 | THUJA PLICATA | WESTERN RED CEDAR | 5' MIN. B&B | AS SHOWN |
| SHRUBS | QTY | BOTANICAL NAME | COMMON NAME | SIZE/CONTAINER | SPACING |
| | 43 | MAHONIA AQUIFOLIUM | TALL OREGON GRAPE | 2 GAL. CONT. | 36" o.c. |
| | 39 | MYRICA CALIFORNICA | PACIFIC WAX MYRTLE | 2 GAL. CONT. | 60" o.c. |
| | 46 | TAXUS BREVIFOLIA | PACIFIC YEW | 2 GAL. CONT. | 48" o.c. |

PRELIMINARY LANDSCAPE NOTES AND DETAILS
BAILEY MEADOWS SANDY, OREGON



JOB NUMBER: 7107
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P1-23



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TAX LOT 5300
TAX MAP 2 4E 14DC

TAX LOT 5400
TAX MAP 2 4E 14DC

TAX LOT 5500
TAX MAP 2 4E 14DC

TAX LOT 5600
TAX MAP 2 4E 14DC

TAX LOT 5700
TAX MAP 2 4E 14DC

TAX LOT 5800
TAX MAP 2 4E 14DC

TAX LOT 5900
TAX MAP 2 4E 14DC

TAX LOT 6000
TAX MAP 2 4E 14DC

TAX LOT 6100
TAX MAP 2 4E 14DC

TAX LOT 6200
TAX MAP 2 4E 14DC

TAX LOT 6300
TAX MAP 2 4E 14DC

TAX LOT 6400
TAX MAP 2 4E 14DC

TAX LOT 6500
TAX MAP 2 4E 14DC

TAX LOT 6600
TAX MAP 2 4E 14DC

TAX LOT 701
TAX MAP 2 4E 23

TAX LOT 200
TAX MAP 2 4E 23

TAX LOT 202
TAX MAP 2 4E 23

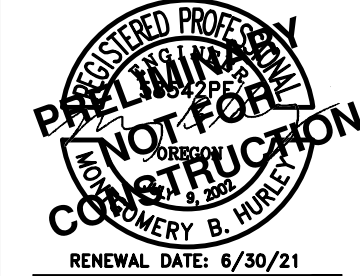
PLAT NAME: "MIRACLES CEN. NO. 2"
BOOK 111, PAGE 1

RACHAEL DRIVE
12" PVC

NOTE:
 TOTAL ON-STREET PARKING SPACES: 122
 LOCATIONS FOR PARKINGS, DRIVEWAYS, STREET TREES, STREET LIGHTS, MAILBOXES, ETC. AS SHOWN ARE CONCEPTUAL AND TO BE DETERMINED DURING THE FINAL CONSTRUCTION PLAN REVIEW PROCESS.

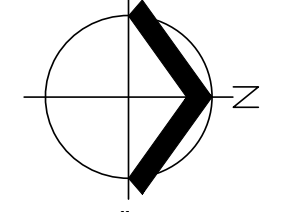
* TEMPORARY EMERGENCY VEHICLE AND FRANCHISE WASTE HAULER TURNAROUND. LOCATIONS SHOWN AREA CONCEPTUAL AND TO BE DETERMINED DURING THE FINAL CONSTRUCTION PLAN REVIEW PROCESS.

**PRELIMINARY
 PARKING PLAN
 BAILEY MEADOWS
 SANDY, OREGON**



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 07/03/2019
 DESIGNED BY: WN
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P1-24



SCALE: 1" = 50 FEET
ORIGINAL PAGE SIZE: 22" x 34"

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FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

MATCH LINE "C" SEE SHEET P1-26

TAX LOT 807
TAX MAP 2 4E 23

TAX LOT 806
TAX MAP 2 4E 23

TAX LOT 5300
TAX MAP 2 4E 14DC

TAX LOT 5400
TAX MAP 2 4E 14DC

TAX LOT 5500
TAX MAP 2 4E 14DC

TAX LOT 5600
TAX MAP 2 4E 14DC

TAX LOT 5700
TAX MAP 2 4E 14DC

TAX LOT 5800
TAX MAP 2 4E 14DC

TAX LOT 5900
TAX MAP 2 4E 14DC

TAX LOT 6000
TAX MAP 2 4E 14DC

TAX LOT 6100
TAX MAP 2 4E 14DC

TAX LOT 6200
TAX MAP 2 4E 14DC

TAX LOT 6300
TAX MAP 2 4E 14DC

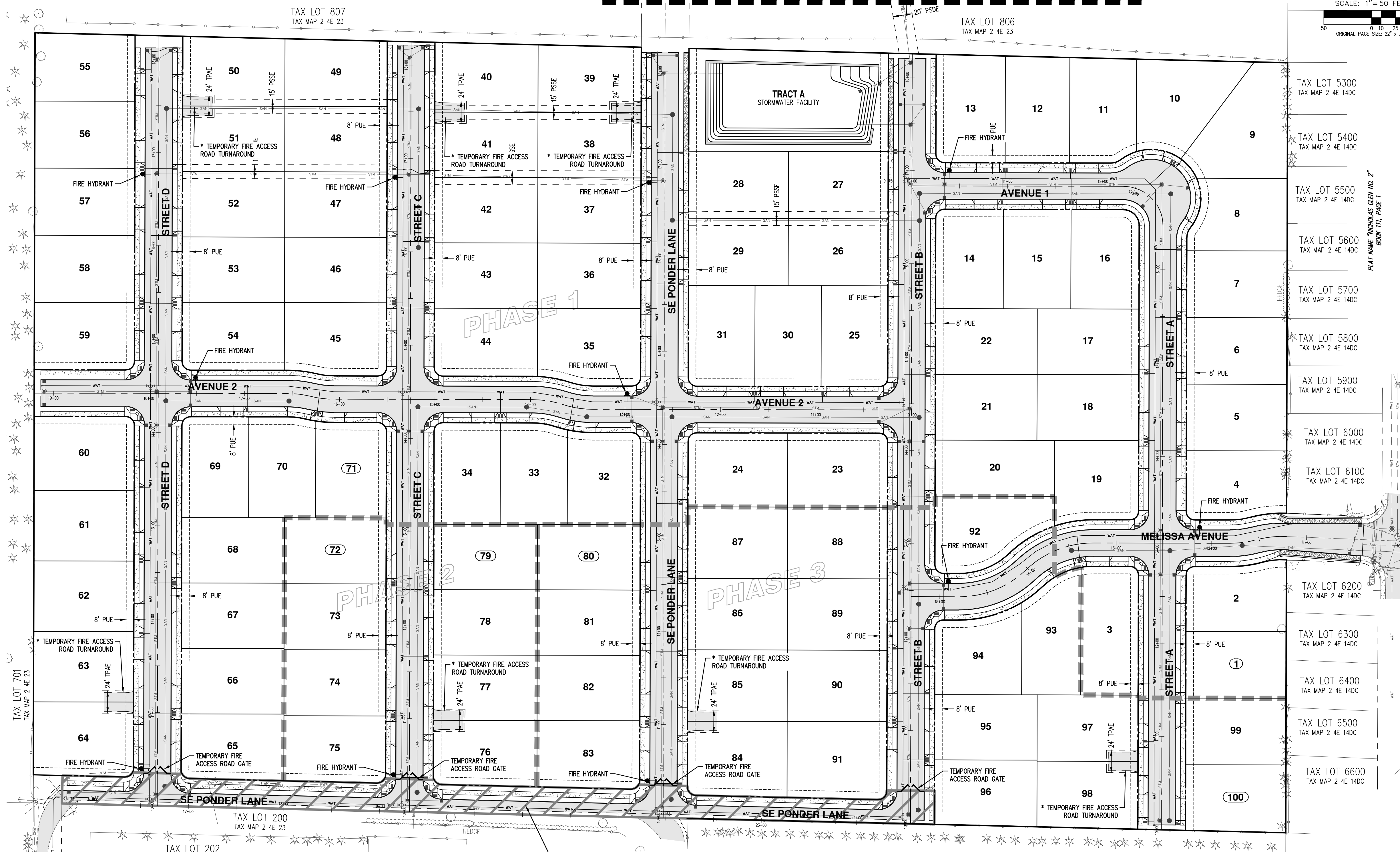
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TAX LOT 6500
TAX MAP 2 4E 14DC

TAX LOT 6600
TAX MAP 2 4E 14DC

PLAT NAME: "MORIAS GEN. NO. 2"
BOOK 111, PAGE 1

MATCH LINE "B" SEE SHEET P1-26

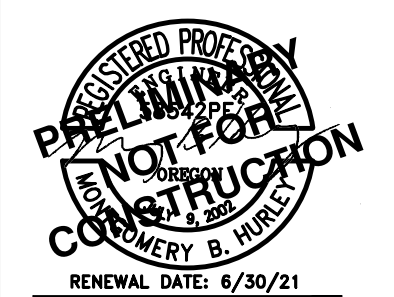


MATCH LINE "A" SEE SHEET P1-26

FEE-IN-LIEU OF STREET IMPROVEMENTS

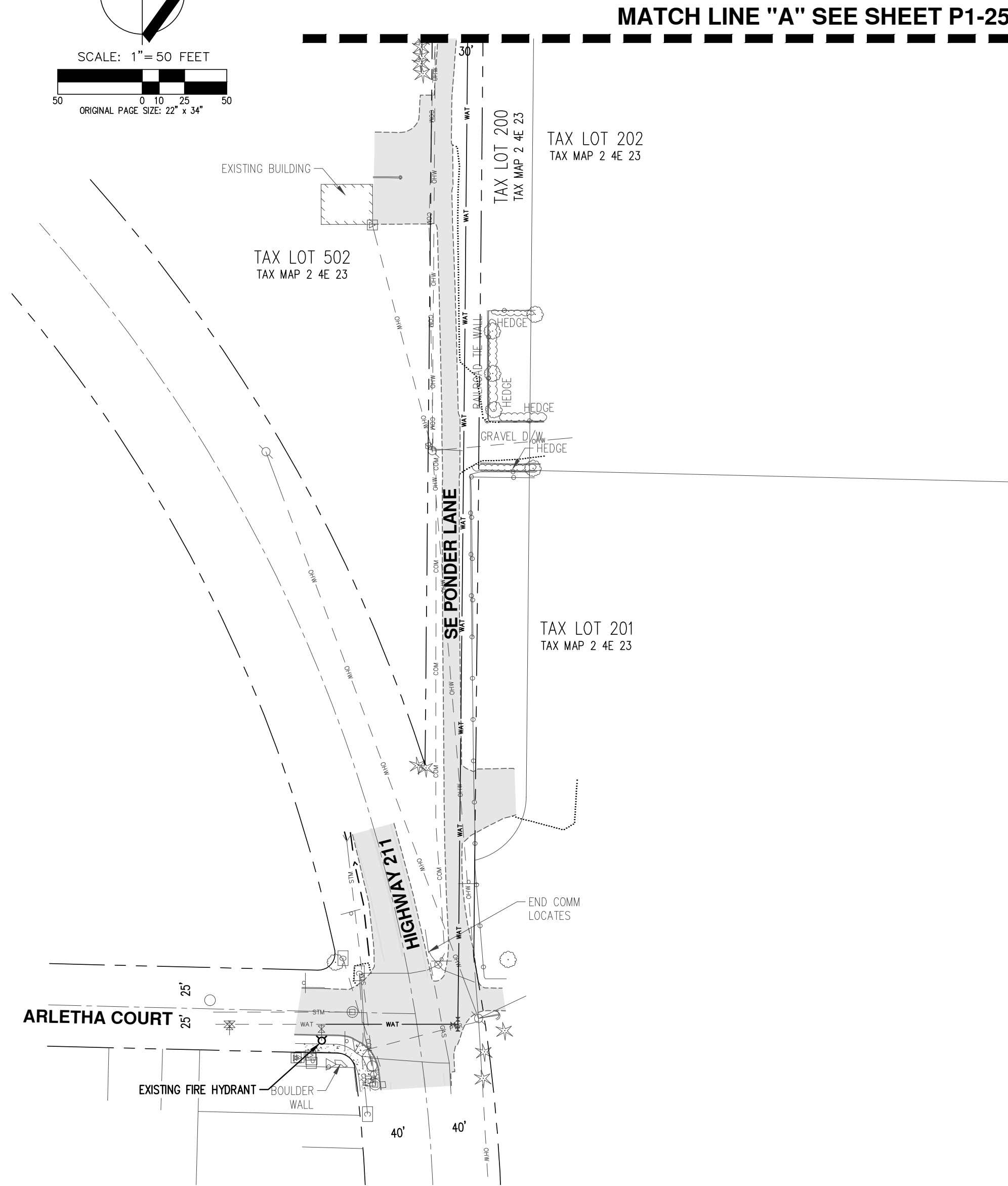
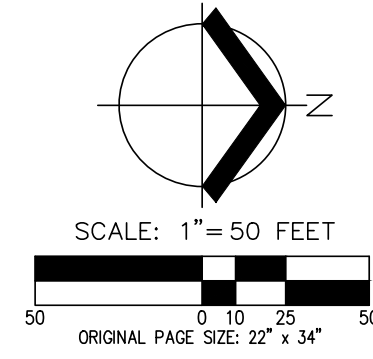
* TEMPORARY EMERGENCY VEHICLE AND FRANCHISE WASTE HAULER TURNAROUND. LOCATIONS SHOWN AREA CONCEPTUAL AND TO BE DETERMINED DURING THE FINAL CONSTRUCTION PLAN REVIEW PROCESS.

**PRELIMINARY EMERGENCY
VEHICLE ACCESS PLAN
BAILEY MEADOWS
SANDY, OREGON**

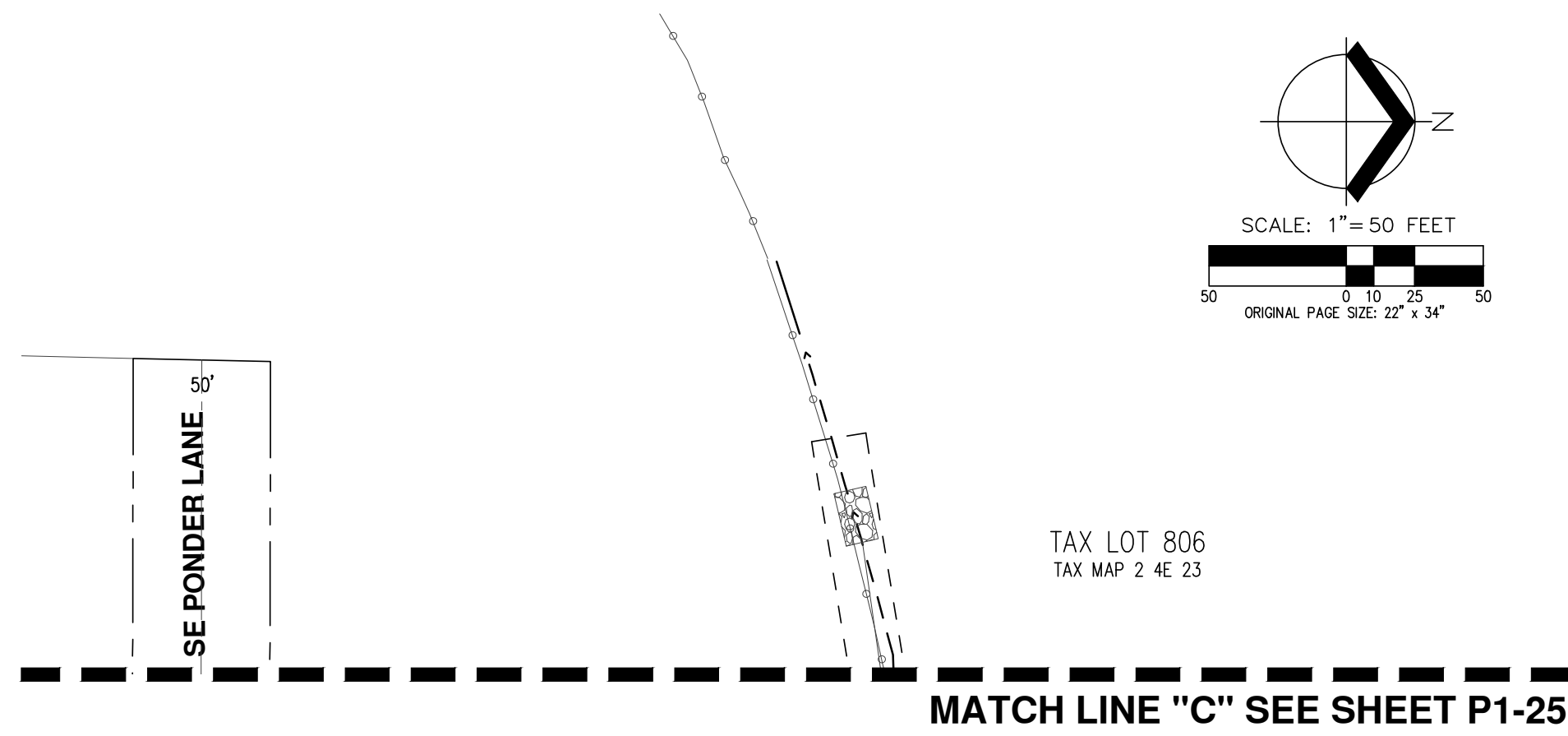
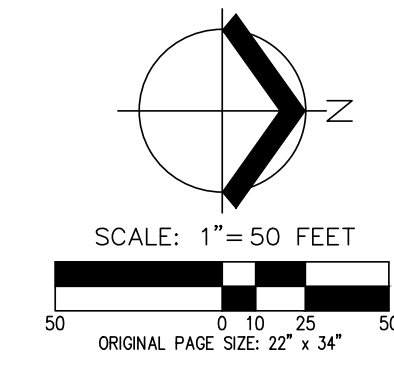


RENEWAL DATE: 6/30/21
JOB NUMBER: 7107
DATE: 07/03/2019
DESIGNED BY: VN
DRAWN BY: CL
CHECKED BY: RSW

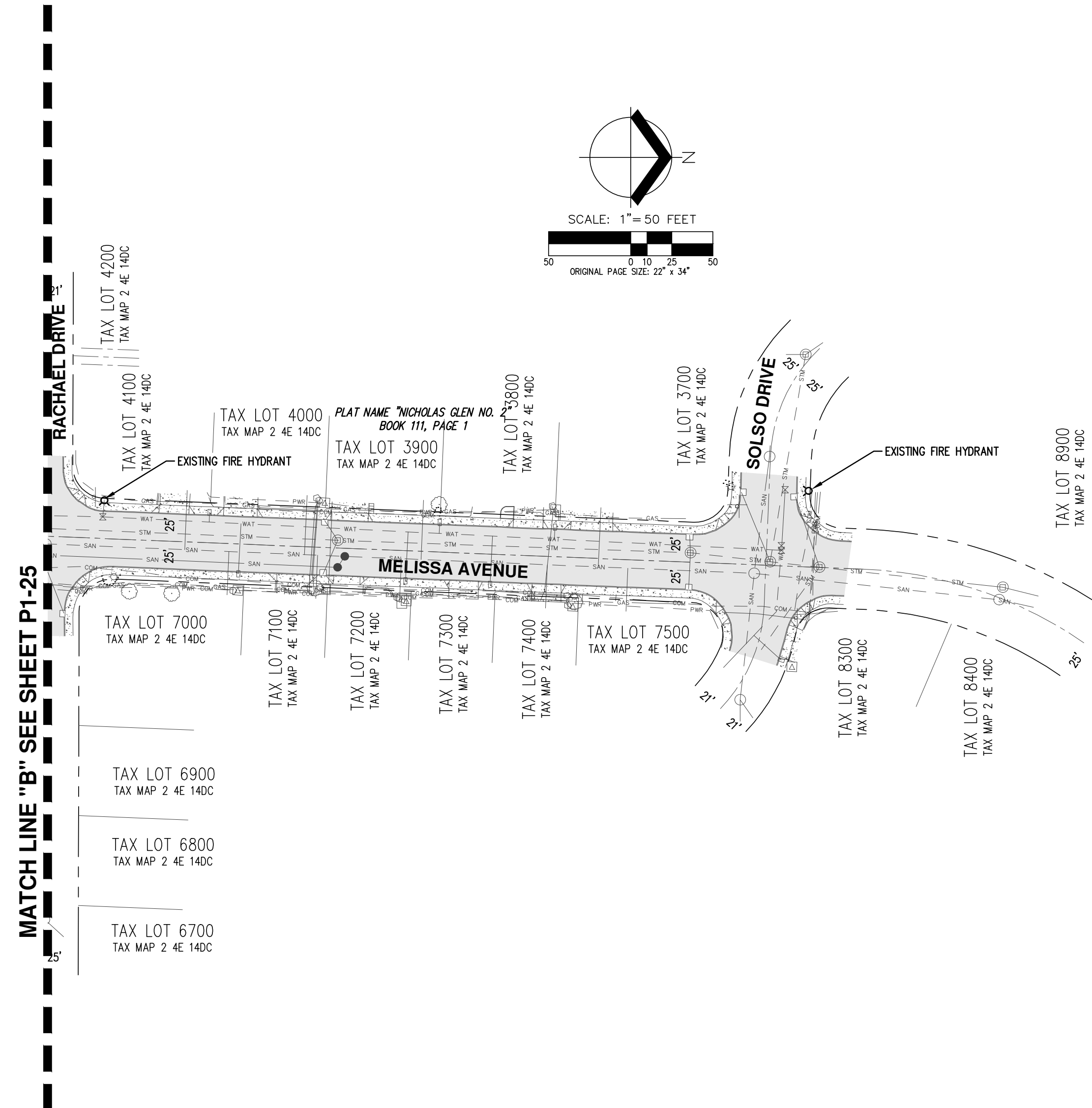
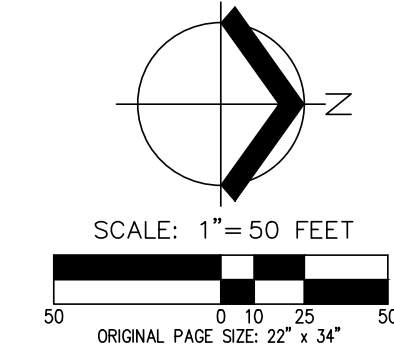
P1-25



MATCH LINE "A" SEE SHEET P1-25



MATCH LINE "C" SEE SHEET P1-25

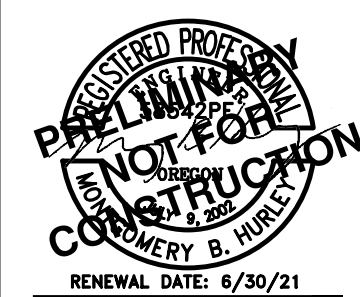


MATCH LINE "B" SEE SHEET P1-25

AKS DRAWING FILE: 7107 FIRE ACCESS/DWG LAYOUT: P1-26

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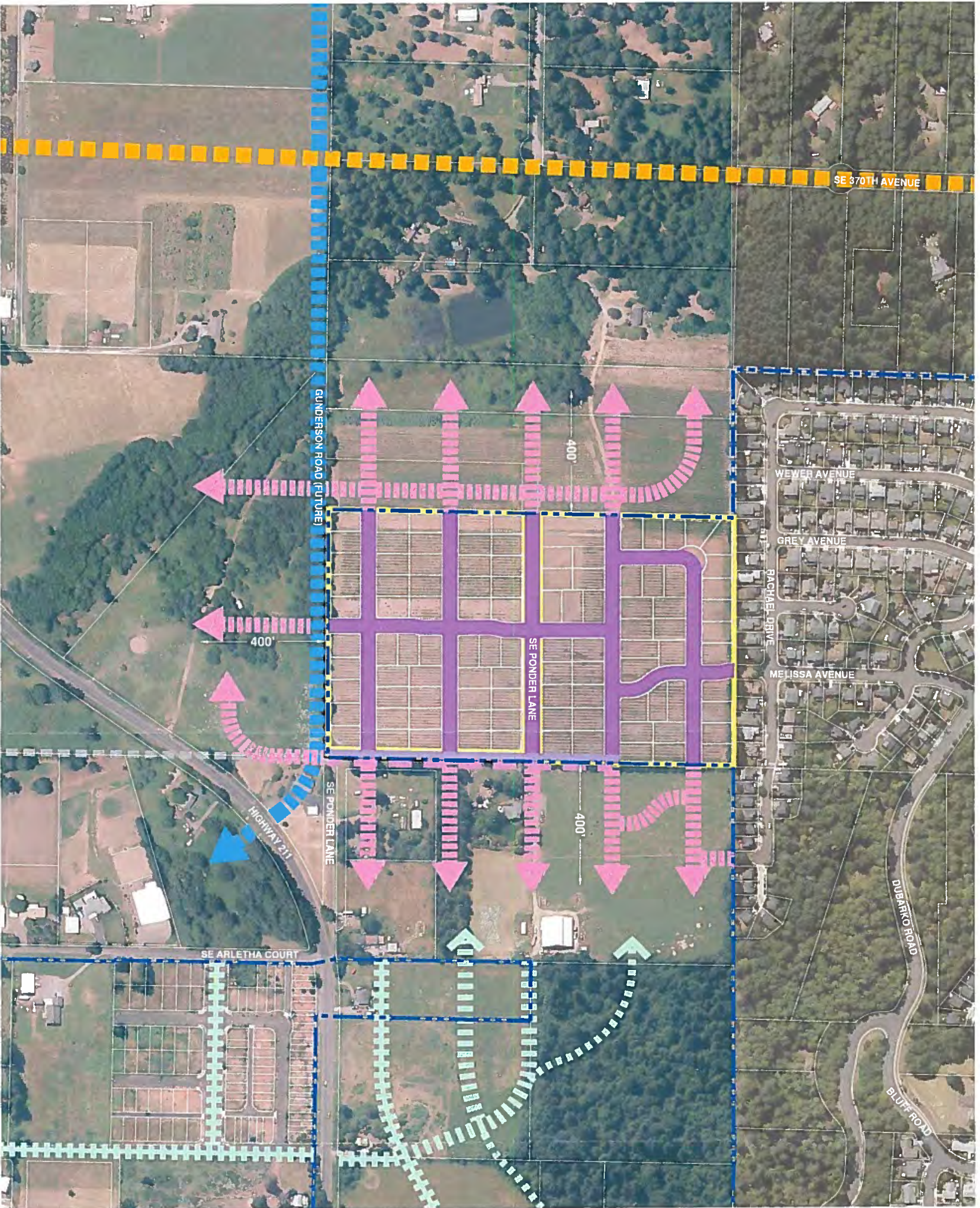
**PRELIMINARY EMERGENCY
 VEHICLE ACCESS PLAN
 BAILEY MEADOWS
 SANDY, OREGON**



| | |
|---------------|------------|
| RENEWAL DATE: | 6/30/21 |
| JOB NUMBER: | 7107 |
| DATE: | 07/03/2019 |
| DESIGNED BY: | WN |
| DRAWN BY: | CL |
| CHECKED BY: | RSW |

P1-26

EXHIBIT D

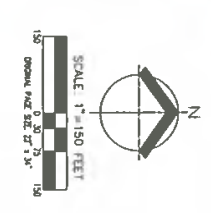


LEGEND

| | |
|--|--------------------|
| CITY LIMITS | Blue dashed line |
| URBAN GROWTH BOUNDARY | Grey dashed line |
| PROJECT SITE BOUNDARY | Yellow dashed line |
| PLANNED LOCAL STREET | Purple solid line |
| PLANNED LOCAL STREET (1/2 STREET IMPROVEMENTS) | Blue solid line |
| FUTURE LAVOR ARTERIAL (0+ 12') | Blue dashed line |
| FUTURE COLLECTOR (0+ 12') | Yellow dashed line |
| FUTURE LOCAL STREET | Pink dashed line |
| FUTURE LOCAL STREET (1/2 STREET IMPROVEMENTS) | Blue dashed line |
| CONCEPTUAL STREET FROM BOSTON VALLEY SPECIFIC AREA PLAN ILLUSTRATING STREET PLAN DATED 6/16/2003 | Green dashed line |

NOTES

1. THIS PLAN IS ACQUAINTED TO MEET THE SUBMITTAL REQUIREMENTS FOR A CITY OF SMOOT FOR THE BALEY MEADOWS SUBDIVISION APPLICATION.
2. CONCEPTUAL FUTURE STREET LOCATIONS ARE SHOWN FOR ILLUSTRATING PURPOSES FOR THE LAND USE APPLICATION ONLY. BEARING ON ANY OTHER PROPERTIES.



| | |
|---|----------------------|
| DATE: 06/09/2018 | DRAWN: C |
| PROJECT: BALEY MEADOWS CONCEPTUAL CONNECTIVITY PLAN | CHECKED: C |
| BY: ANDY DOWLING & FORESTRY, LLC | DATE: 06/09/2018 |
| PROJECT NO.: 1703 SW 26TH AVE, STE 100 | SCALE: 1" = 150 FEET |
| SHEET NO.: 7107 | DATE: 06/09/2018 |
| BY: ANDY DOWLING & FORESTRY, LLC | DATE: 06/09/2018 |
| PROJECT NO.: 1703 SW 26TH AVE, STE 100 | DATE: 06/09/2018 |
| SHEET NO.: 7107 | DATE: 06/09/2018 |

EXHIBIT E



- NOTES:**
- TOTAL ON-STREET PARKING SPACES: 122
 - LOCATIONS FOR PARKING SPACES, DRIVEWAYS, STREET REEFS, STREET LIGHTS, WALLBOARDS, ETC. AS SHOWN ARE CONCEPTUAL AND TO BE DETERMINED DURING THE FINAL CONSTRUCTION PLAN REVIEW PROCESS.
 - PARKING SPACES ALLOCATED TO SPECIFIC PARCELS SHOWN ON THIS CONCEPTUAL AND SUBJECT TO CHANGE.
 - NEIGHBORHOOD LOT NUMBERS THAT PARKING SPACES IS ASSOCIATED WITH.
 - NEIGHBORHOOD DISTANCE FROM LOT TO PARKING SPACE.

DATE: 09/20/2018
 PRELIMINARY NUMBERED PARKING PLAN
 SHEET D
 17365 SW HERMAN RD. ST. 101
 ALAIN, OR 97102
 503.531.9151 WWW.AKS-ENC.COM

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 ARCHITECTS & ENGINEERS, LLC
 17365 SW HERMAN RD. ST. 101
 ALAIN, OR 97102
 503.531.9151 WWW.AKS-ENC.COM

Bailey Meadows Subdivision

Traffic Impact Analysis
Sandy, Oregon

Date:

June 20, 2019

Prepared for:

Cody Bjugan, Allied Homes & Development

Prepared by:

Jessica Hijar
Todd Mobley, PE



RENEWS: 12/31/2020



321 SW 4th Ave., Suite 400 | Portland, OR 97204 | 503.248.0313 | lancasterengineering.com



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Executive Summary

1. A 100-lot single family detached swelling unit subdivision is proposed for the following tax lots in Sandy, Oregon: 24E23 800, 801, 802, 803, and 804.
2. Access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.
3. The proposed subdivision is calculated to generate 74 trips during the morning peak hour, 99 trips during the evening peak hour, and 944 trips each weekday.
4. Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.
5. Due to insufficient major and minor street volumes, preliminary traffic signal warrants were not met at the study intersections under all analysis scenarios.
6. Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not met under any analysis scenario.
7. All study intersections, including the intersection of Melissa Avenue at Dubarko Road, are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.



Project Description

Introduction

The proposed development will include the construction of a 100-lot subdivision to be located on tax lots 24E23 800, 801, 802, 803, and 804 in Sandy, Oregon. The site is currently within the City of Sandy Urban Growth Boundary, the city limits, and is zoned Single Family Residential (SFR), which allows the subdivision as proposed. The project will be built in three phases, with the expected completion year of 2022.

This report includes traffic counts and a full operational analysis at the intersections listed below. This scope was developed based on City of Sandy's Traffic Impact Analysis (TIA) requirements and was approved by Replinger and Associates, the City's consulting transportation engineer. Coordination of the scope of work with the Oregon Department of Transportation (ODOT) was not necessary since no intersections on the state highway are affected.

1. SE 362nd Drive at Dubarko Road,
2. Ruben Lane at Dubarko Road,
3. Dubarko Road at Melissa Avenue, and
4. Dubarko Road at Bluff Road.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of supporting the existing uses as well as the proposed subdivision and to determine if mitigation is necessary. Detailed information on traffic counts, trip generation calculations, safety analyses, and level-of-service calculations is included in the appendix to this report.

Location Description

The subject site is located south of Rachel Drive and west of Ponder Lane in Sandy, Oregon. Although roadway stubs will be provided within the site for future roadway connections, access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.

Access to the subdivision cannot be provided via SE Ponder Lane in the southeast corner of the site since the existing right-of-way along SE Ponder Lane does not allow for two directions of travel and the current configuration of SE Ponder Lane at Highway 211 cannot support additional vehicle trips. There is not sufficient right-of-way available to realign Ponder Lane at its intersection with Highway 211. It is expected that additional access will be available to the east of the site as other properties develop.

Vicinity Streets

Five roadways have been identified in the traffic study scope. Table 1 provides a description of each of the roadways.



Table 1: Vicinity Roadway Descriptions

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|----------------------------|---------------|----------------------|------------------|---------|-----------|---------------|
| SE 362 nd Drive | City of Sandy | Rural Minor Arterial | 35 mph posted | Partial | Partial | Partial |
| Ruben Lane | City of Sandy | Collector | 25 mph posted | Yes | Partial | Yes |
| Dubarko Road | City of Sandy | Minor Arterial | 25 mph posted | Yes | Yes | Partial |
| Melissa Avenue | City of Sandy | Local Road | 25 mph statutory | Yes | Yes | No |
| Bluff Road | City of Sandy | Minor Arterial | 25 mph posted | Partial | Partial | Partial |

Study Intersections

Four nearby intersections were identified in discussions with City staff that are expected to be impacted by the proposed project. Table 2 below provides a summary of each of the study intersections.

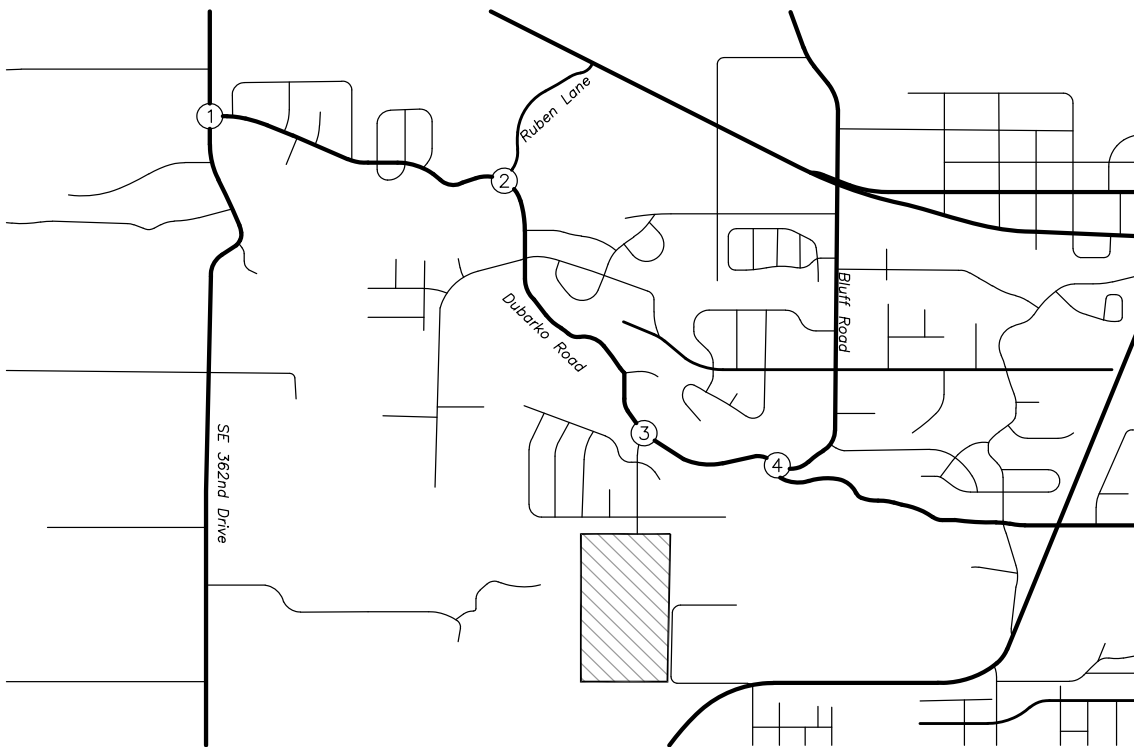
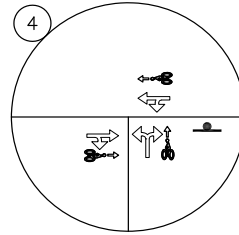
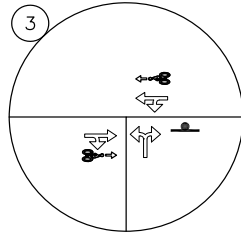
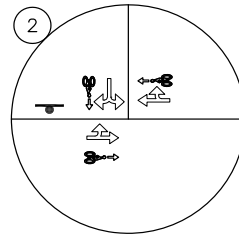
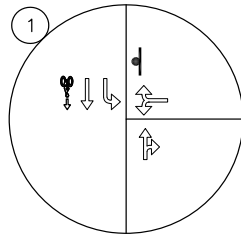
Table 2: Vicinity Intersection Descriptions

| Number | Intersection | Geometry | Traffic Control | Stopped Approaches |
|--------|--|--------------|-------------------------|--------------------|
| 1 | SE 362 nd Drive at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Westbound |
| 2 | Ruben Lane at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Southbound |
| 3 | Dubarko Road at Melissa Avenue | Three-Legged | Two-Way Stop Controlled | Northbound |
| 4 | Dubarko Road at Bluff Rod | Three-Legged | All-Way Stop Controlled | All |

The figure on the following page shows the site vicinity and the study intersection configurations.

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY



VICINITY MAP



FIGURE 1

PAGE 4



Site Trips

Trip Generation

To estimate the number of trips that will be generated by the proposed use, trip rates from the *Trip Generation Manual*¹ were used. Data from land use codes 210, *Single-Family Detached Housing*, was used to estimate the proposed development’s trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed subdivision is projected to generate 74 morning peak hour trips, 99 evening peak hour trips, and 944 average weekday trips. The trip generation estimates are summarized in Table 3 below and detailed trip generation calculations are included as an attachment to this report.

Table 3: Trip Generation Summary

| Land Use Code | Size | Morning Peak Hour | | | Evening Peak Hour | | | Weekday Total |
|--------------------------------------|-----------|-------------------|-----|-------|-------------------|-----|-------|---------------|
| | | In | Out | Total | In | Out | Total | |
| 210 – Single-Family Detached Housing | 100 units | 19 | 55 | 74 | 62 | 37 | 99 | 944 |

Custom Trip Rates

Based on traffic counts collected at the existing intersection of Melissa Avenue at Dubarko Road and 24-hour counts collected along Melissa Avenue, a localized trip rate was derived for the existing subdivision that accesses Dubarko Road via Melissa Avenue. The custom trip rate was calculated to be 0.49 trips per unit during the morning peak hour, 0.63 trips per unit during the evening peak hour, and 6.90 trips per unit during each weekday. A comparison of the ITE trip rates and the trip rates based on localized data is provided in the following table.

Table 4: Trip Rate Comparison

| Data | Morning Trip Rate | Evening Trip Rate | Weekday Trip Rate |
|------------|-------------------|-------------------|-------------------|
| ITE | 0.74 trips/unit | 0.99 trips/unit | 9.44 trips/unit |
| Local Data | 0.49 trips/unit | 0.63 trips/unit | 6.90 trips/unit |

Since the localized data shows lower trip rates during all analysis periods, it can be expected that the proposed subdivision will yield site trips at a similar rate. Although this lower trip generation rate was not used for analysis, it should be noted that the trip generation based on ITE rates represents a conservative, worst-case analysis.

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Trip Distribution

The directional distribution of site trips to and from the proposed development was calculated based on travel patterns of trips to and from the existing neighborhood that is served by Melissa Avenue. In addition, the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution was estimated and used for analysis:

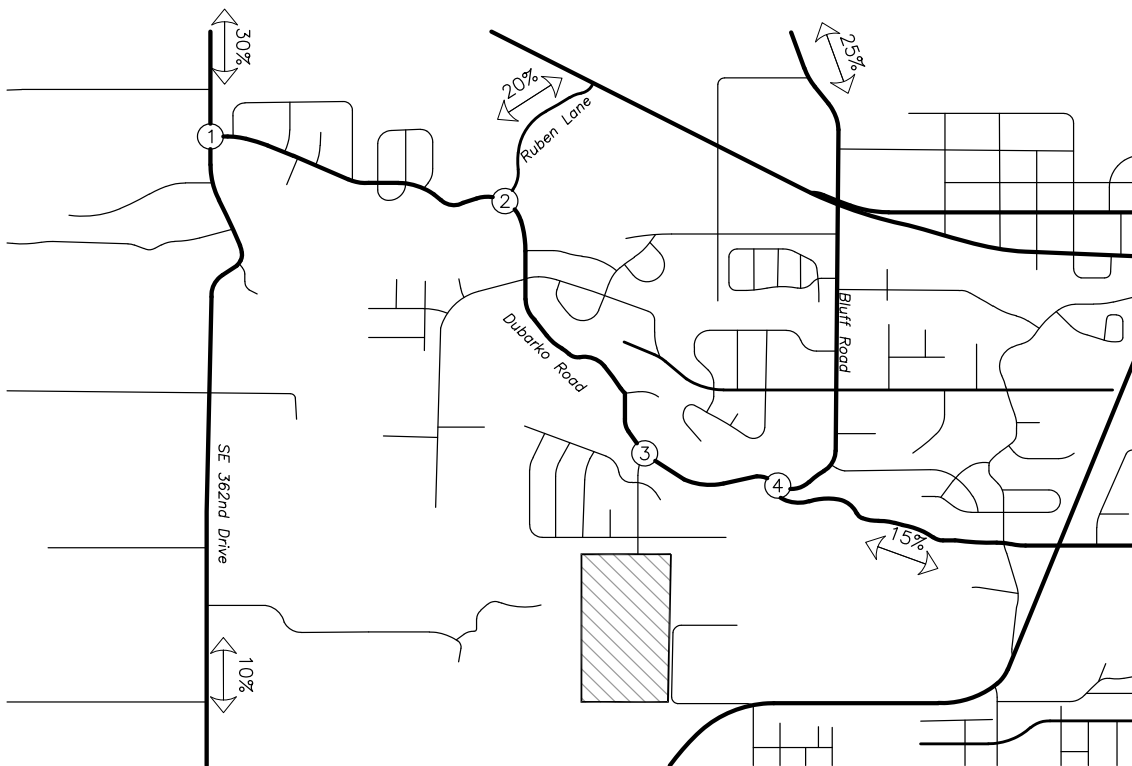
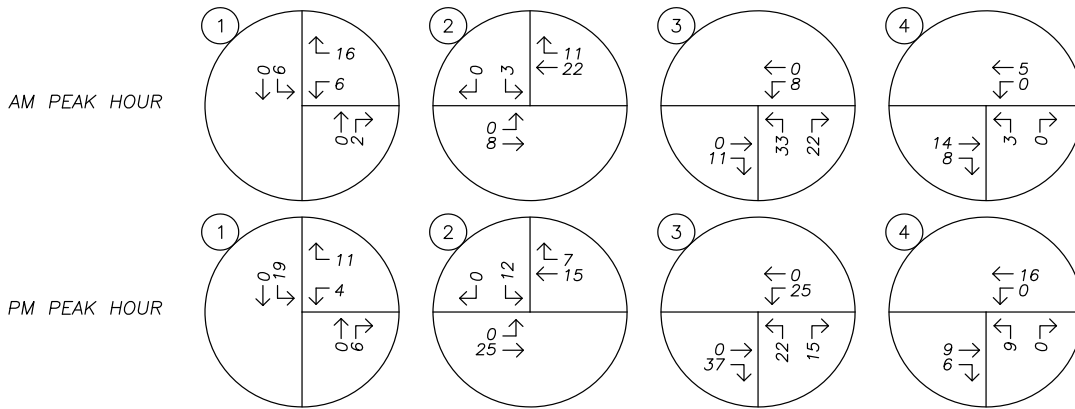
- Approximately 30 percent of site trips will travel to/from the north along SE 362nd Drive;
- Approximately 25 percent of site trips will travel to/from the north along Bluff Road;
- Approximately 20 percent of site trips will travel to/from the north on Ruben Lane;
- Approximately 15 percent of site trips will travel to/from the east along Dubarko Road; and
- Approximately 10 percent of site trips will travel to/from the south along SE 362nd Drive.

Figure 2 on page 7 shows the distribution and assignment of site trips for the proposed development.

LEGEND

XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |



SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours



FIGURE
2
PAGE
7



Traffic Volumes

Existing Conditions

Traffic counts were conducted at the intersection of Melissa Avenue at Dubarko Road on Thursday, April 25th, 2019 from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM. Traffic counts were conducted at all other study intersections on Wednesday, May 22nd, 2019 from 4:00 PM to 6:00 PM, and on Thursday, May 23rd, 2019 from 7:00 AM to 9:00 AM. Each intersection's respective morning and evening peak hours were used for analysis.

Background Conditions

In order to calculate the future traffic volumes on local streets, an exponential growth rate of two percent per year for an assumed period of three years was applied to the measured existing traffic volumes to approximate year 2022 background conditions.

In-Process Trips

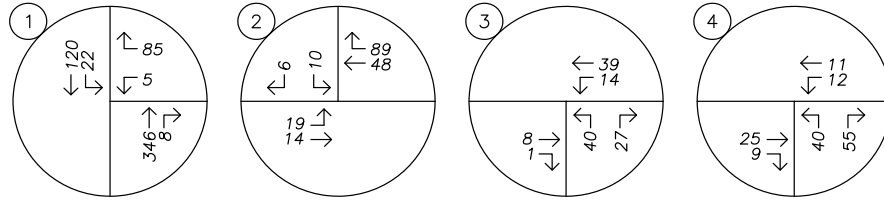
In-process trips associated with previously approved developments were added to the background volumes in order to represent future traffic volumes at the study intersections prior to the approval of the subject development. Trips associated with the approved 138-unit Sandy Heights Apartments were added to the study intersections.

Buildout Conditions

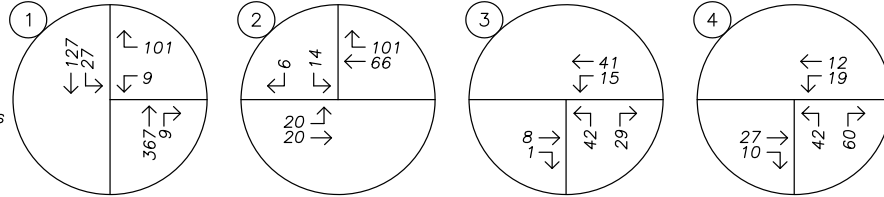
Trips to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2022 background traffic volumes to obtain the expected year 2022 buildout volumes.

Figure 3 on page 9 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the morning peak hour. Figure 4 on page 10 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the evening peak hour.

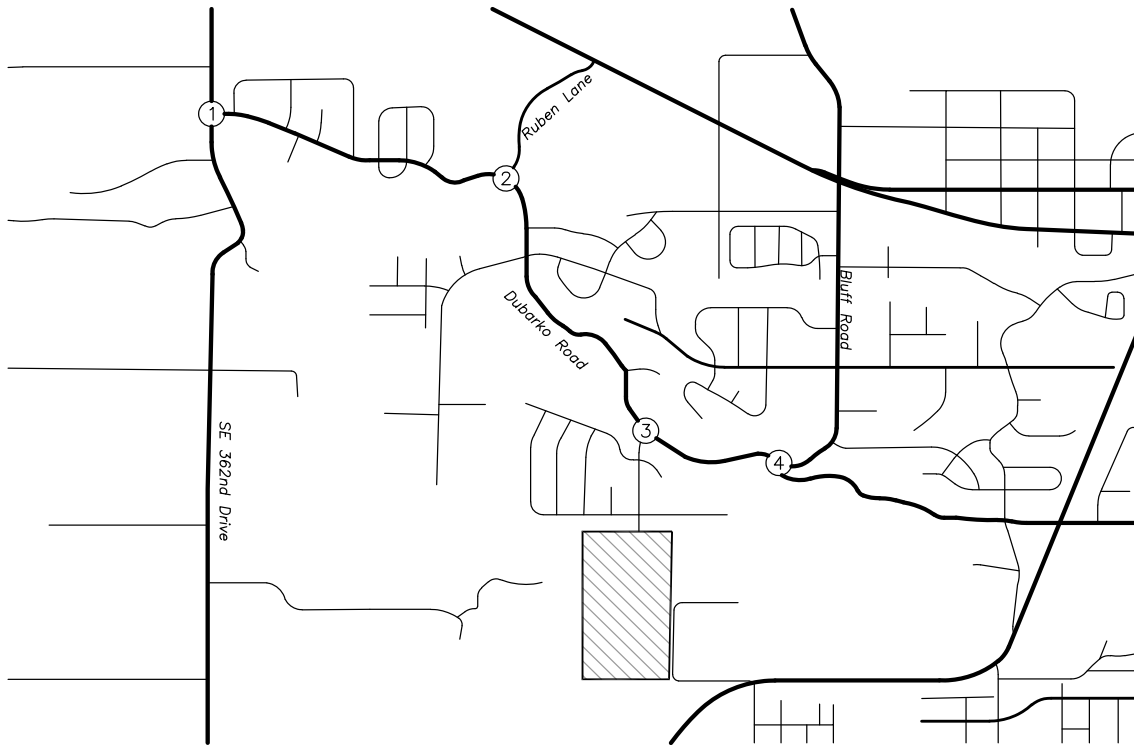
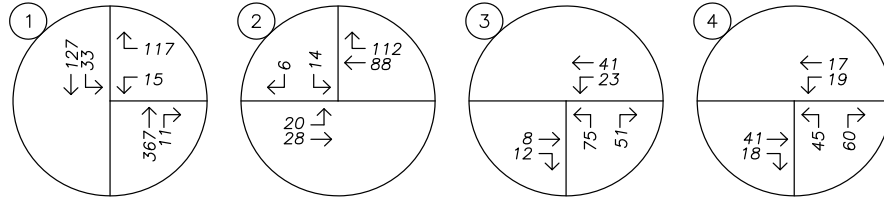
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



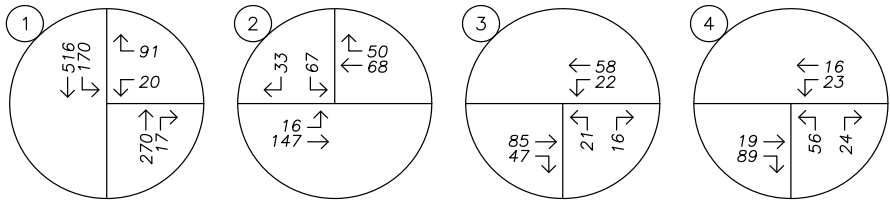
TRAFFIC VOLUMES
All Analysis Scenarios
AM Peak Hour



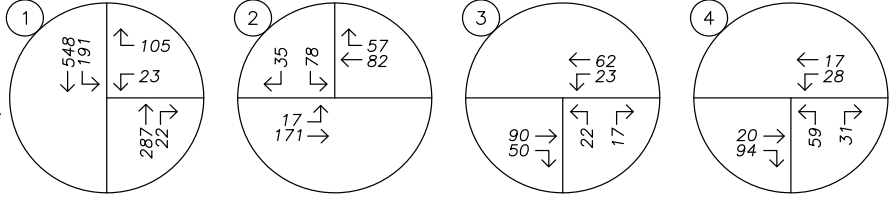
FIGURE 3

PAGE 9

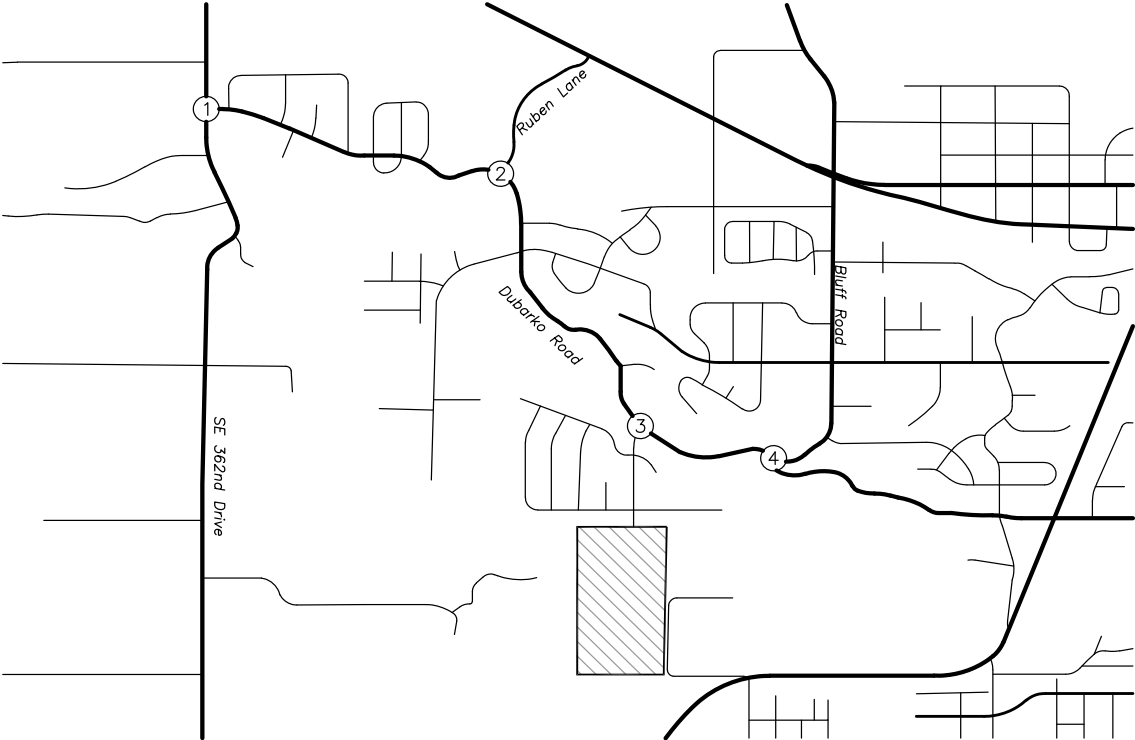
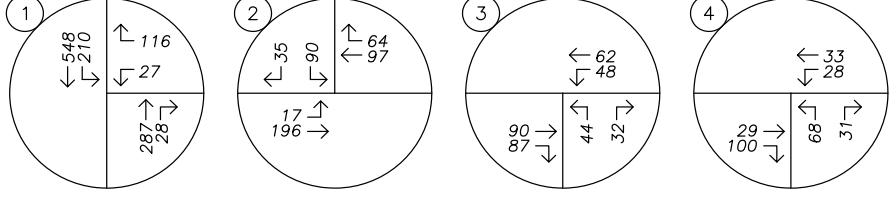
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



TRAFFIC VOLUMES
All Analysis Scenarios
PM Peak Hour



FIGURE 4
PAGE 10



Safety Analysis

Crash History Review

Using data obtained from the ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2012 to December 2016) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

Table 5: Crash Analysis Summary

| Intersection | Crash Type | | Crash Severity | Total | AADT | Crash Rate |
|--|------------|-----------|----------------|-------|--------|------------|
| | Turn | Sideswipe | PDO | | | |
| Dubarko Road at SE 362 nd Drive | 0 | 1 | 1 | 1 | 10,840 | 0.05 |
| Dubarko Road at Melissa Avenue | 2 | 0 | 2 | 2 | 2,490 | 0.44 |

The calculated crash rates at the intersections of Dubarko Road at SE 362nd Drive and at Melissa Avenue are not indicative of safety deficiencies or design flaws. No mitigation is recommended.

No reported crashes were found at the intersections of Dubarko Road at Ruben Lane and Dubarko Road at Bluff Road during the analysis period. Accordingly, no safety concerns were identified at these study intersections.

Warrant Analysis

Traffic Signal Warrants

Traffic signal warrants were examined for all study intersections based on the methodologies in the *Manual on Uniform Traffic Control Devices*² (MUTCD). Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT. Volumes were used for the year 2022 buildout conditions. Traffic signal warrants were not met at any of the study intersections due to low major and minor street

² Federal Highway Administration (FTA), America Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010.



traffic volumes. Detailed information on the traffic signal warrant analysis is included in the attached appendix.

Left-Turn Lane Warrants

Left-turn lane warrants were examined for the westbound left-turn lane at the intersection of Melissa Avenue at Dubarko Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream. Warrants were based on the methodology outlined in the National Cooperative Highway Research Program (NCHRP) Report Number 457³. These turn-lane warrants were evaluated based on the number of left-turning vehicles, the number of advancing and opposing vehicles, and the roadway travel speed.

Left-turn lanes were not warranted during any of the analysis scenarios. No new left-turn lanes are recommended.

³ Bonneson, James A. and Michael D. Fontaine, *NCHRP Report 457: An Engineering Study Guide for Evaluating Intersection Improvements*, Transportation Research Board, 2001.



Operational Analysis

Delay & Capacity Analysis

A capacity and delay analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*⁴ (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s Transportation System Plan states that both signalized and unsignalized intersections are required to operate at LOS D or better.

Based on the results of the operational analysis, shown in Table 6, the study intersections are currently operating acceptably and are projected to continue operating acceptably through the 2022 buildout year of the site. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 6: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Existing Conditions | 12 | B | 0.17 | 16 | C | 0.27 |
| Year 2022 Background Conditions | 13 | B | 0.22 | 18 | C | 0.34 |
| Year 2022 Buildout Conditions | 13 | B | 0.27 | 21 | C | 0.40 |
| Ruben Lane at Dubarko Road | | | | | | |
| Existing Conditions | 9 | A | 0.02 | 11 | B | 0.15 |
| Year 2022 Background Conditions | 10 | A | 0.03 | 11 | B | 0.18 |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Existing Conditions | 9 | A | 0.09 | 10 | A | 0.05 |
| Year 2022 Background Conditions | 9 | A | 0.09 | 10 | A | 0.06 |
| Year 2022 Buildout Conditions | 10 | A | 0.17 | 11 | B | 0.12 |
| Dubarko Road at Bluff Road | | | | | | |
| Existing Conditions | 8 | A | 0.15 | 8 | A | 0.13 |
| Year 2022 Background Conditions | 8 | A | 0.16 | 8 | A | 0.14 |
| Year 2022 Buildout Conditions | 8 | A | 0.17 | 8 | A | 0.16 |

⁴ Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Conclusions

Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.

Due to insufficient major and minor street volumes, traffic signal warrants were not met at the study intersections under all analysis scenarios.

Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not estimated to be met under any analysis scenario.

All study intersections, including the intersection of Melissa Avenue and Dubarko Road are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.

1e

Appendix



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location: General Urban/Suburban
Variable: Dwelling Units
Variable Value: 100

AM PEAK HOUR

Trip Rate: 0.74

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 25% | 75% | |
| Trip Ends | 19 | 55 | 74 |

PM PEAK HOUR

Trip Rate: 0.99

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 63% | 37% | |
| Trip Ends | 62 | 37 | 99 |

WEEKDAY

Trip Rate: 9.44

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 472 | 472 | 944 |

SATURDAY

Trip Rate: 9.54

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 477 | 477 | 954 |

Source: Trip Generation Manual, Tenth Edition

All Traffic Data Services, Inc.
alltrafficdata.net

Melissa Ave S-O Dubarko Rd

| Start Time | 25-Apr-19 Thu | NB | SB | Total | | | | | |
|-------------|---------------|------------|-------------|------------|---|---|---|---|-------|
| 12:00 AM | | 2 | 5 | 7 | | | | | |
| 01:00 | | 1 | 1 | 2 | | | | | |
| 02:00 | | 1 | 0 | 1 | | | | | |
| 03:00 | | 7 | 2 | 9 | | | | | |
| 04:00 | | 20 | 1 | 21 | | | | | |
| 05:00 | | 30 | 5 | 35 | | | | | |
| 06:00 | | 57 | 11 | 68 | | | | | |
| 07:00 | | 67 | 15 | 82 | | | | | |
| 08:00 | | 37 | 17 | 54 | | | | | |
| 09:00 | | 30 | 17 | 47 | | | | | |
| 10:00 | | 25 | 18 | 43 | | | | | |
| 11:00 | | 23 | 22 | 45 | | | | | |
| 12:00 PM | | 35 | 25 | 60 | | | | | |
| 01:00 | | 16 | 24 | 40 | | | | | |
| 02:00 | | 29 | 46 | 75 | | | | | |
| 03:00 | | 35 | 58 | 93 | | | | | |
| 04:00 | | 44 | 64 | 108 | | | | | |
| 05:00 | | 30 | 54 | 84 | | | | | |
| 06:00 | | 32 | 74 | 106 | | | | | |
| 07:00 | | 28 | 40 | 68 | | | | | |
| 08:00 | | 16 | 36 | 52 | | | | | |
| 09:00 | | 9 | 30 | 39 | | | | | |
| 10:00 | | 5 | 12 | 17 | | | | | |
| 11:00 | | 0 | 4 | 4 | | | | | |
| Total | | 579 | 581 | 1160 | | | | | |
| Percent | | 49.9% | 50.1% | | | | | | |
| AM Peak | - | 07:00 | 11:00 | - | - | - | - | - | 07:00 |
| Vol. | - | 67 | 22 | - | - | - | - | - | 82 |
| PM Peak | - | 16:00 | 18:00 | - | - | - | - | - | 16:00 |
| Vol. | - | 44 | 74 | - | - | - | - | - | 108 |
| Grand Total | | 579 | 581 | | | | | | 1160 |
| Percent | | 49.9% | 50.1% | | | | | | |
| ADT | | ADT 11,874 | AADT 11,874 | | | | | | |

Total Vehicle Summary

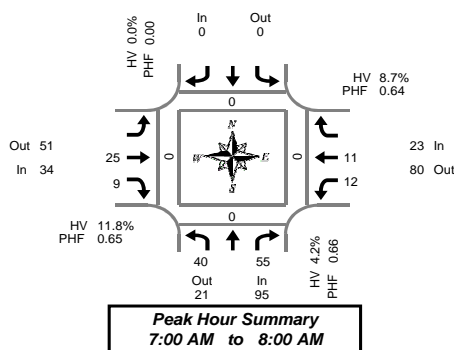


Clay Carney
(603) 833-2740

Dubarko Rd & Bluff Rd

Thursday, May 23, 2019

7:00 AM to 9:00 AM



5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 3 | 4 | 0 | | | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:05 AM | 1 | | 8 | | | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:10 AM | 3 | 7 | 0 | | | 0 | 5 | 1 | 0 | 2 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 6 | 0 | | | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:25 AM | 6 | 7 | 0 | | | 0 | 3 | 2 | 0 | 4 | 2 | 0 | 24 | 0 | 0 | 0 | 0 |
| 7:30 AM | 3 | 2 | 0 | | | 0 | 6 | 1 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:35 AM | 1 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:40 AM | 3 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 2 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| 7:50 AM | 5 | 6 | 0 | | | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 0 | 0 | 0 |
| 7:55 AM | 4 | 2 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:00 AM | 2 | 1 | 0 | | | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:05 AM | 2 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 5 | 0 | | | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:15 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:20 AM | 3 | 2 | 0 | | | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 5 | 0 | | | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 5 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:35 AM | 3 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 8:40 AM | 3 | 2 | 0 | | | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:45 AM | 1 | 1 | 0 | | | 0 | 1 | 1 | 0 | 3 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| 8:55 AM | 1 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 7 | 19 | 0 | | | 0 | 9 | 2 | 0 | 3 | 2 | 0 | 42 | 0 | 0 | 0 | 0 |
| 7:15 AM | 16 | 20 | 0 | | | 0 | 7 | 2 | 0 | 5 | 4 | 0 | 54 | 0 | 0 | 0 | 0 |
| 7:30 AM | 7 | 6 | 0 | | | 0 | 8 | 2 | 0 | 3 | 2 | 0 | 28 | 0 | 0 | 0 | 0 |
| 7:45 AM | 10 | 10 | 0 | | | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 28 | 0 | 0 | 0 | 0 |
| 8:00 AM | 5 | 7 | 0 | | | 0 | 3 | 3 | 0 | 3 | 2 | 0 | 23 | 0 | 0 | 0 | 0 |
| 8:15 AM | 8 | 14 | 0 | | | 0 | 4 | 3 | 0 | 4 | 1 | 0 | 34 | 0 | 0 | 0 | 0 |
| 8:30 AM | 6 | 7 | 0 | | | 0 | 0 | 6 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 2 | 0 | | | 0 | 1 | 4 | 0 | 4 | 1 | 0 | 14 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-------|-----------------------|-----|-------|-------|--------------------|-----|-------|-------|--------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 95 | 21 | 116 | 0 | 0 | 0 | 0 | 0 | 34 | 51 | 85 | 0 | 23 | 80 | 103 | 0 | 152 | 0 | 0 | 0 | 0 |
| %HV | 4.2% | | | | 0.0% | | | | 11.8% | | | | 8.7% | | | | 6.6% | | | | |
| PHF | 0.66 | | | | 0.00 | | | | 0.65 | | | | 0.64 | | | | 0.70 | | | | |

| By Movement | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total |
|-------------|-----------------------|----|-------|-------|-----------------------|----|-------|-------|--------------------|-------|-------|-------|--------------------|------|-------|-------|-------|
| | L | R | Total | Bikes | | | Total | Bikes | T | R | Total | Bikes | L | T | Total | Bikes | |
| Volume | 40 | 55 | 95 | 0 | | | 0 | 0 | 25 | 9 | 34 | 0 | 12 | 11 | 23 | 0 | 152 |
| %HV | 2.5% | NA | 5.5% | 4.2% | NA | NA | NA | 0.0% | NA | 12.0% | 11.1% | 11.8% | 8.3% | 9.1% | NA | 8.7% | 6.6% |
| PHF | 0.63 | | 0.65 | 0.66 | | | 0.00 | | 0.57 | 0.75 | 0.65 | | 0.50 | 0.69 | 0.64 | 0.70 | |

Rolling Hour Summary

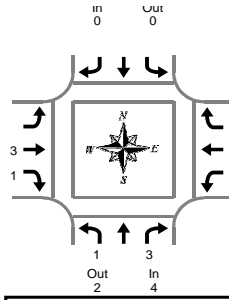
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 55 | 0 | | | 0 | 25 | 9 | 0 | 12 | 11 | 0 | 152 | 0 | 0 | 0 | 0 |
| 7:15 AM | 38 | 43 | 0 | | | 0 | 19 | 10 | 0 | 12 | 11 | 0 | 133 | 0 | 0 | 0 | 0 |
| 7:30 AM | 30 | 37 | 0 | | | 0 | 16 | 11 | 0 | 11 | 8 | 0 | 113 | 0 | 0 | 0 | 0 |
| 7:45 AM | 29 | 38 | 0 | | | 0 | 8 | 15 | 0 | 9 | 7 | 0 | 106 | 0 | 0 | 0 | 0 |
| 8:00 AM | 21 | 30 | 0 | | | 0 | 8 | 16 | 0 | 12 | 5 | 0 | 92 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:05 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7:10 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:20 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 1 | 1 | | | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 1 | 1 | | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 1 | 2 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 4 | 2 | 6 | 0 | 0 | 0 | 4 | 2 | 6 | 2 | 6 | 8 | 10 |
| PHF | 0.50 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|--|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| PHF | 0.25 | 0.75 | 0.50 | | | 0.00 | 0.38 | 0.25 | 0.50 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| 7:15 AM | 1 | 3 | 4 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 7 |
| 7:30 AM | 1 | 4 | 5 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 8 |
| 7:45 AM | 1 | 4 | 5 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| 8:00 AM | 1 | 3 | 4 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

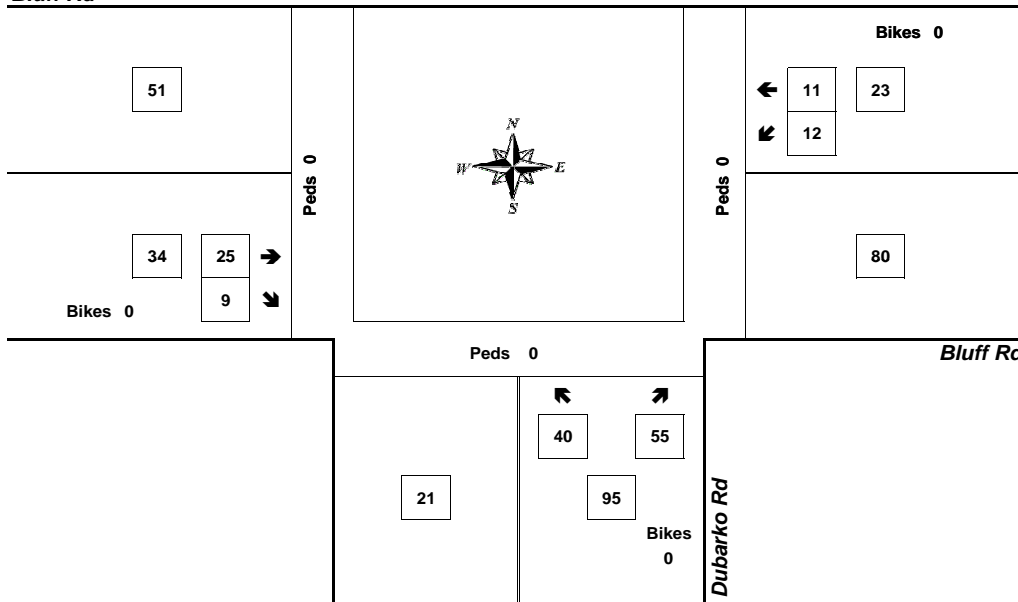
Dubarko Rd & Bluff Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019

Bikes
0

Bluff Rd

Peds 0



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.65 | 11.8% | 34 |
| WB | 0.64 | 8.7% | 23 |
| NB | 0.66 | 4.2% | 95 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.70 | 6.6% | 152 |

Count Period: 7:00 AM to 9:00 AM

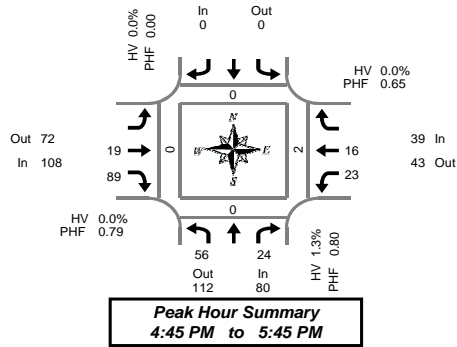
Total Vehicle Summary



Clay Carney
(603) 833-2740

Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM



Peak Hour Summary
4:45 PM to 5:45 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 4 | 0 | 0 | | | 0 | | | 0 | 4 | 7 | 0 | 5 | 0 | 0 | 0 | 0 |
| 4:05 PM | 2 | 0 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 0 |
| 4:10 PM | 7 | 1 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 |
| 4:15 PM | 5 | 1 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 1 | 0 | 0 | 0 |
| 4:20 PM | 3 | 0 | 0 | | | 0 | | | 0 | 0 | 5 | 0 | 2 | 3 | 0 | 0 | 0 |
| 4:25 PM | 7 | 2 | 0 | | | 0 | | | 0 | 3 | 8 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:30 PM | 6 | 2 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:35 PM | 2 | 2 | 0 | | | 0 | | | 0 | 3 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:40 PM | 7 | 3 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:45 PM | 7 | 0 | 0 | | | 0 | | | 0 | 0 | 10 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:50 PM | 8 | 4 | 0 | | | 0 | | | 0 | 2 | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:55 PM | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:00 PM | 4 | 3 | 0 | | | 0 | | | 0 | 1 | 5 | 0 | 3 | 2 | 0 | 0 | 0 |
| 5:05 PM | 6 | 1 | 1 | | | 0 | | | 0 | 3 | 8 | 0 | 1 | 2 | 0 | 1 | 0 |
| 5:10 PM | 1 | 0 | 0 | | | 0 | | | 0 | 4 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:15 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 9 | 0 | 1 | 2 | 0 | 0 | 0 |
| 5:20 PM | 7 | 4 | 0 | | | 0 | | | 0 | 3 | 6 | 0 | 1 | 3 | 0 | 0 | 0 |
| 5:25 PM | 1 | 2 | 0 | | | 0 | | | 0 | 0 | 8 | 0 | 3 | 1 | 0 | 0 | 0 |
| 5:30 PM | 5 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 5 | 1 | 0 | 0 | 0 |
| 5:35 PM | 3 | 0 | 0 | | | 0 | | | 0 | 2 | 9 | 0 | 2 | 3 | 0 | 0 | 0 |
| 5:40 PM | 8 | 7 | 0 | | | 0 | | | 0 | 2 | 8 | 0 | 2 | 1 | 0 | 1 | 0 |
| 5:45 PM | 7 | 1 | 0 | | | 0 | | | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:50 PM | 6 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:55 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 13 | 1 | 0 | | | 0 | | | 0 | 6 | 15 | 0 | 10 | 3 | 0 | 0 | 0 |
| 4:15 PM | 15 | 3 | 0 | | | 0 | | | 0 | 5 | 20 | 0 | 6 | 4 | 0 | 0 | 0 |
| 4:30 PM | 15 | 7 | 0 | | | 0 | | | 0 | 5 | 22 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:45 PM | 18 | 5 | 0 | | | 0 | | | 0 | 2 | 21 | 0 | 4 | 1 | 0 | 0 | 0 |
| 5:00 PM | 11 | 4 | 1 | | | 0 | | | 0 | 8 | 22 | 0 | 5 | 4 | 0 | 1 | 0 |
| 5:15 PM | 11 | 6 | 0 | | | 0 | | | 0 | 4 | 23 | 0 | 5 | 6 | 0 | 0 | 0 |
| 5:30 PM | 16 | 9 | 0 | | | 0 | | | 0 | 5 | 23 | 0 | 9 | 5 | 0 | 1 | 0 |
| 5:45 PM | 16 | 3 | 0 | | | 0 | | | 0 | 2 | 11 | 0 | 2 | 3 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

Peak Hour Summary
4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-----------------------|------|-----|--------------------|-------|------|--------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 80 | 112 | 192 | 1 | 0 | 0 | 0 | 0 | 108 | 72 | 180 | 0 | 39 | 43 | 82 | 0 | 227 |
| %HV | 1.3% | | | | 0.0% | | | | 0.0% | | | | 0.0% | | | 0.4% | |
| PHF | 0.80 | | | | 0.00 | | | | 0.79 | | | | 0.65 | | | 0.85 | |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|----|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 56 | 24 | 80 | | | 0 | 19 | 89 | 108 | 23 | 16 | 39 | 227 |
| %HV | 1.8% | NA | 0.0% | 1.3% | NA | NA | 0.0% | NA | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% |
| PHF | 0.78 | 0.67 | 0.80 | | | 0.00 | 0.59 | 0.86 | 0.79 | 0.58 | 0.67 | 0.65 | 0.85 |

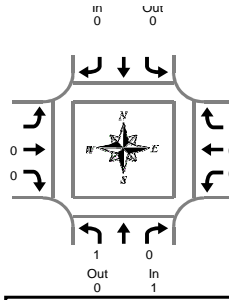
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 61 | 16 | 0 | | | 0 | | | 0 | 18 | 78 | 0 | 23 | 8 | 0 | 0 | 0 |
| 4:15 PM | 59 | 19 | 1 | | | 0 | | | 0 | 20 | 85 | 0 | 18 | 9 | 0 | 1 | 0 |
| 4:30 PM | 55 | 22 | 1 | | | 0 | | | 0 | 19 | 88 | 0 | 17 | 11 | 0 | 1 | 0 |
| 4:45 PM | 56 | 24 | 1 | | | 0 | | | 0 | 19 | 89 | 0 | 23 | 16 | 0 | 2 | 0 |
| 5:00 PM | 54 | 22 | 1 | | | 0 | | | 0 | 19 | 79 | 0 | 21 | 18 | 0 | 2 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle Peak Hour Summary

4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | | 0.00 | | | 0.00 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|---|-------|-----------------------|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Peak Hour Summary

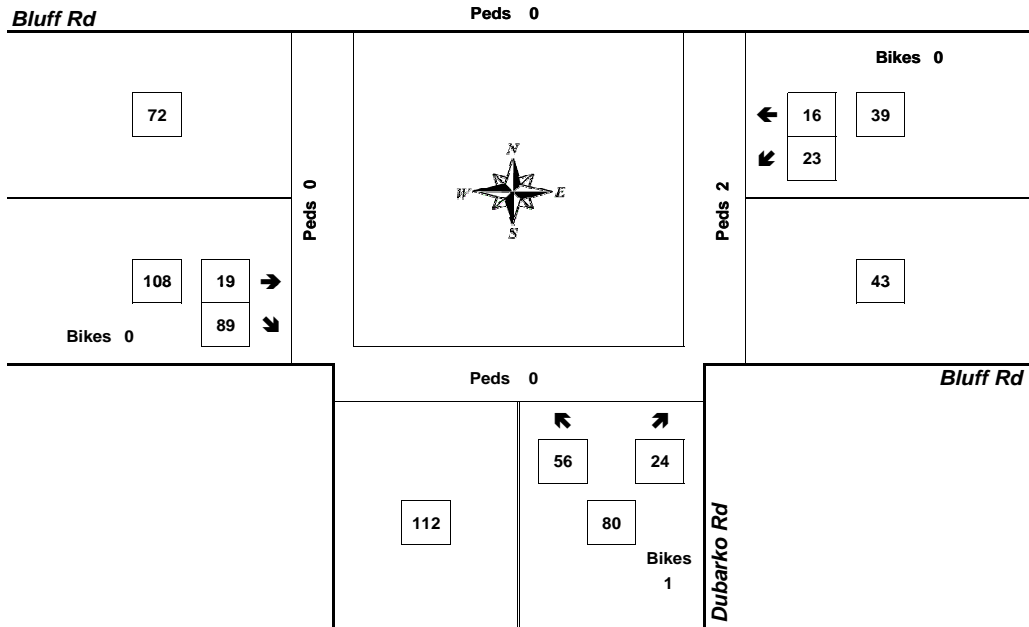


Clay Carney
(503) 833-2740

Dubarko Rd & Bluff Rd

4:45 PM to 5:45 PM
Wednesday, May 22, 2019

Bikes
0



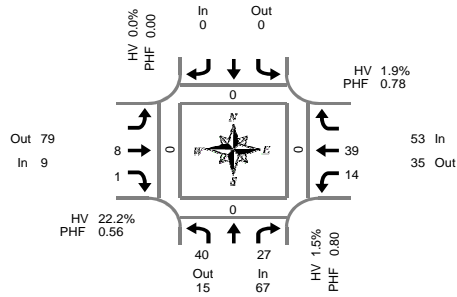
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.79 | 0.0% | 108 |
| WB | 0.65 | 0.0% | 39 |
| NB | 0.80 | 1.3% | 80 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 227 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

**Peak Hour Summary
7:00 AM to 8:00 AM**

**5-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 5 | 2 | 0 | | | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:05 AM | 4 | 6 | 0 | | | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 16 | 0 | 0 | 0 | 0 |
| 7:10 AM | 2 | 2 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:15 AM | 4 | 1 | 0 | | | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 3 | 0 | | | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:25 AM | 2 | 3 | 0 | | | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:30 AM | 6 | 4 | 0 | | | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 17 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 5 | 0 | 0 | 0 | 0 |
| 7:40 AM | 2 | 1 | 0 | | | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 4 | 1 | 0 | | | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:50 AM | 6 | 1 | 0 | | | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:55 AM | 3 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 10 | 0 | 0 | 0 | 0 |
| 8:00 AM | 3 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:05 AM | 4 | 0 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:10 AM | 3 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 0 | | | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:20 AM | 1 | 3 | 0 | | | 0 | 3 | 1 | 0 | 1 | 4 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 2 | 0 | | | 0 | 2 | 0 | 0 | 1 | 4 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:30 AM | 3 | 3 | 0 | | | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:35 AM | 2 | 1 | 0 | | | 0 | 4 | 1 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 2 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 2 | 0 | | | 0 | 5 | 1 | 0 | 0 | 5 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:55 AM | 2 | 0 | 0 | | | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 8 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | 42 | 0 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

**15-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 11 | 10 | 0 | | | 0 | 1 | 0 | 0 | 5 | 9 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 7 | 0 | | | 0 | 2 | 1 | 0 | 2 | 13 | 0 | 33 | 0 | 0 | 0 | 0 |
| 7:30 AM | 8 | 5 | 0 | | | 0 | 3 | 0 | 0 | 4 | 10 | 0 | 30 | 0 | 0 | 0 | 0 |
| 7:45 AM | 13 | 5 | 0 | | | 0 | 2 | 0 | 0 | 3 | 7 | 0 | 30 | 0 | 0 | 0 | 0 |
| 8:00 AM | 10 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 8:15 AM | 5 | 5 | 0 | | | 0 | 6 | 2 | 0 | 3 | 11 | 0 | 32 | 0 | 0 | 0 | 0 |
| 8:30 AM | 5 | 6 | 0 | | | 0 | 13 | 2 | 0 | 1 | 6 | 0 | 33 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 3 | 0 | | | 0 | 7 | 3 | 0 | 4 | 10 | 0 | 29 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | 42 | 0 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

**Peak Hour Summary
7:00 AM to 8:00 AM**

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|------------------------|------|-----|----------------------|-------|-------|----------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 67 | 15 | 82 | 0 | 0 | 0 | 0 | 0 | 9 | 79 | 88 | 0 | 53 | 35 | 88 | 0 | 129 |
| %HV | 1.5% | | | | 0.0% | | | | 22.2% | | | | 1.9% | | | 3.1% | |
| PHF | 0.80 | | | | 0.00 | | | | 0.56 | | | | 0.78 | | | 0.79 | |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | | | | |
|-------------|------------------------|----|-------|------------------------|----|-------|----------------------|------|-------|----------------------|-------|-------|-------|------|------|------|------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | | | | | |
| Volume | 40 | 27 | 67 | | | 0 | 8 | 1 | 9 | 14 | 39 | 53 | 129 | | | | |
| %HV | 2.5% | NA | 0.0% | 1.5% | NA | NA | NA | 0.0% | NA | 12.5% | ##### | 22.2% | 7.1% | 0.0% | NA | 1.9% | 3.1% |
| PHF | 0.77 | | 0.68 | 0.80 | | | 0.00 | | 0.67 | 0.25 | 0.56 | 0.70 | 0.75 | 0.78 | 0.79 | | |

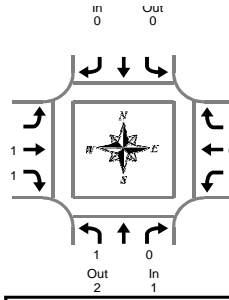
**Rolling Hour Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 27 | 0 | | | 0 | 8 | 1 | 0 | 14 | 39 | 0 | 129 | 0 | 0 | 0 | 0 |
| 7:15 AM | 39 | 18 | 0 | | | 0 | 8 | 2 | 0 | 10 | 35 | 0 | 112 | 0 | 0 | 0 | 0 |
| 7:30 AM | 36 | 16 | 0 | | | 0 | 12 | 3 | 0 | 11 | 33 | 0 | 111 | 0 | 0 | 0 | 0 |
| 7:45 AM | 33 | 17 | 0 | | | 0 | 22 | 5 | 0 | 8 | 29 | 0 | 114 | 0 | 0 | 0 | 0 |
| 8:00 AM | 22 | 15 | 0 | | | 0 | 27 | 8 | 0 | 9 | 32 | 0 | 113 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:10 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 8:20 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:25 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 1 | 2 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 2 | 3 | 0 | 0 | 0 | 2 | 1 | 3 | 1 | 1 | 2 | 4 |
| PHF | 0.25 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|---|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.25 | 0.25 | 0.50 | 0.25 | 0.00 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| 7:15 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 7:30 AM | 2 | 1 | 3 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 5 |
| 7:45 AM | 2 | 2 | 4 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 6 |
| 8:00 AM | 2 | 2 | 4 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

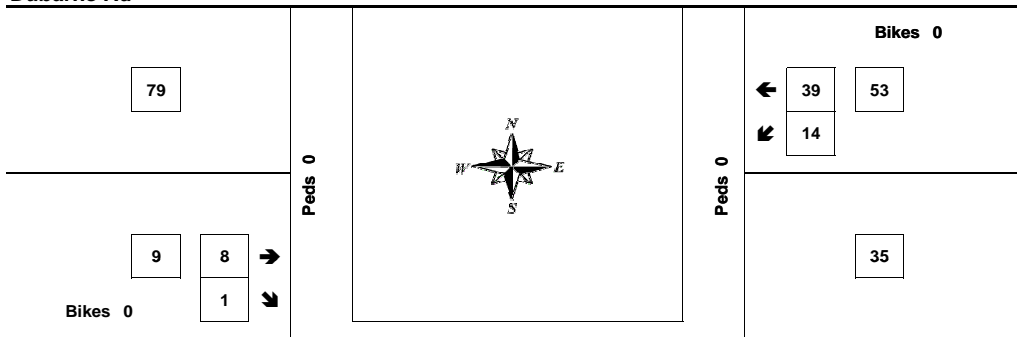
Melissa Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

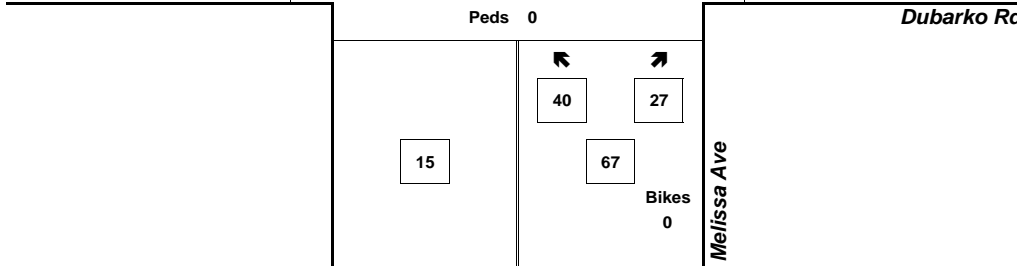
Peds 0



Bikes 0

Bikes 0

Peds 0



Dubarko Rd

Bikes
0

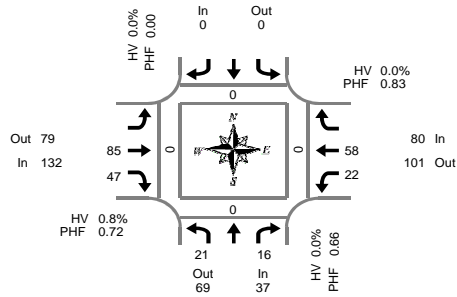
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.56 | 22.2% | 9 |
| WB | 0.78 | 1.9% | 53 |
| NB | 0.80 | 1.5% | 67 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.79 | 3.1% | 129 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 1 | 3 | 0 | | | 0 | 12 | 4 | 0 | 3 | 6 | 0 | 29 | 0 | 0 | 0 | 0 |
| 4:05 PM | 0 | 2 | 0 | | | 0 | 4 | 2 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 4:10 PM | 4 | 2 | 0 | | | 0 | 3 | 2 | 0 | 0 | 7 | 0 | 18 | 0 | 0 | 0 | 1 |
| 4:15 PM | 2 | 2 | 0 | | | 0 | 5 | 4 | 0 | 2 | 2 | 0 | 17 | 0 | 1 | 0 | 0 |
| 4:20 PM | 2 | 2 | 0 | | | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 4:25 PM | 3 | 2 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 17 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 1 | 0 | | | 0 | 7 | 4 | 0 | 2 | 4 | 0 | 18 | 0 | 0 | 0 | 0 |
| 4:35 PM | 1 | 0 | 0 | | | 0 | 8 | 2 | 0 | 3 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 4:40 PM | 1 | 2 | 0 | | | 0 | 5 | 7 | 0 | 5 | 6 | 0 | 26 | 0 | 0 | 0 | 0 |
| 4:45 PM | 5 | 2 | 0 | | | 0 | 4 | 5 | 0 | 0 | 4 | 0 | 20 | 0 | 0 | 0 | 0 |
| 4:50 PM | 2 | 1 | 0 | | | 0 | 7 | 8 | 0 | 3 | 6 | 0 | 27 | 0 | 0 | 0 | 0 |
| 4:55 PM | 2 | 2 | 0 | | | 0 | 7 | 5 | 0 | 0 | 5 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | | 0 | 14 | 5 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | | 0 | 9 | 1 | 0 | 0 | 5 | 0 | 16 | 0 | 0 | 0 | 0 |
| 5:10 PM | 2 | 1 | 0 | | | 0 | 5 | 3 | 0 | 3 | 7 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 1 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 10 | 0 | 0 | 0 | 0 |
| 5:20 PM | 3 | 3 | 0 | | | 0 | 10 | 4 | 0 | 3 | 4 | 0 | 27 | 0 | 0 | 0 | 0 |
| 5:25 PM | 1 | 1 | 0 | | | 0 | 4 | 2 | 0 | 1 | 5 | 0 | 14 | 0 | 0 | 0 | 0 |
| 5:30 PM | 2 | 1 | 0 | | | 0 | 7 | 3 | 0 | 3 | 7 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:35 PM | 2 | 2 | 0 | | | 0 | 9 | 3 | 0 | 2 | 5 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:40 PM | 3 | 0 | 0 | | | 0 | 3 | 6 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 5:45 PM | 1 | 1 | 0 | | | 0 | 8 | 2 | 0 | 4 | 5 | 0 | 21 | 0 | 0 | 0 | 1 |
| 5:50 PM | 3 | 0 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 15 | 0 | 0 | 0 | 0 |
| 5:55 PM | 2 | 0 | 0 | | | 0 | 9 | 4 | 0 | 0 | 2 | 0 | 17 | 0 | 0 | 0 | 1 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 5 | 7 | 0 | | | 0 | 19 | 8 | 0 | 3 | 16 | 0 | 58 | 0 | 0 | 0 | 1 |
| 4:15 PM | 7 | 6 | 0 | | | 0 | 17 | 7 | 0 | 2 | 8 | 0 | 47 | 0 | 1 | 0 | 0 |
| 4:30 PM | 2 | 3 | 0 | | | 0 | 20 | 13 | 0 | 10 | 15 | 0 | 63 | 0 | 0 | 0 | 0 |
| 4:45 PM | 9 | 5 | 0 | | | 0 | 18 | 18 | 0 | 3 | 15 | 0 | 68 | 0 | 0 | 0 | 0 |
| 5:00 PM | 3 | 1 | 0 | | | 0 | 28 | 9 | 0 | 4 | 13 | 0 | 58 | 0 | 0 | 0 | 0 |
| 5:15 PM | 4 | 5 | 0 | | | 0 | 18 | 7 | 0 | 5 | 12 | 0 | 51 | 0 | 0 | 0 | 0 |
| 5:30 PM | 7 | 3 | 0 | | | 0 | 19 | 12 | 0 | 5 | 13 | 0 | 59 | 0 | 0 | 0 | 0 |
| 5:45 PM | 6 | 1 | 0 | | | 0 | 22 | 8 | 0 | 4 | 12 | 0 | 53 | 0 | 0 | 0 | 2 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

Peak Hour Summary

4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|------------------------|------|-----|----------------------|-------|------|----------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 37 | 69 | 106 | 0 | 0 | 0 | 0 | 132 | 79 | 211 | 0 | 80 | 101 | 181 | 0 | 249 | |
| %HV | 0.0% | | | | 0.0% | | | | 0.8% | | | | 0.0% | | | 0.4% | |
| PHF | 0.66 | | | | 0.00 | | | | 0.72 | | | | 0.83 | | | 0.85 | |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | | | | |
|-------------|------------------------|----|-------|------------------------|----|-------|----------------------|------|-------|----------------------|------|-------|-------|------|----|------|------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | | | | | |
| Volume | 21 | 16 | 37 | | | 0 | 85 | 47 | 132 | 22 | 58 | 80 | 249 | | | | |
| %HV | 0.0% | NA | 0.0% | 0.0% | NA | NA | NA | 0.0% | NA | 1.2% | 0.0% | 0.8% | 0.0% | 0.0% | NA | 0.0% | 0.4% |
| PHF | 0.58 | | 0.80 | 0.66 | | 0.00 | 0.71 | 0.59 | 0.72 | 0.69 | 0.85 | 0.83 | 0.85 | | | | |

Rolling Hour Summary

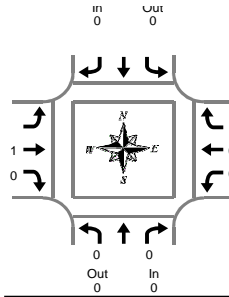
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 23 | 21 | 0 | | | 0 | 74 | 46 | 0 | 18 | 54 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:15 PM | 21 | 15 | 0 | | | 0 | 83 | 47 | 0 | 19 | 51 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:30 PM | 18 | 14 | 0 | | | 0 | 84 | 47 | 0 | 22 | 55 | 0 | 240 | 0 | 0 | 0 | 0 |
| 4:45 PM | 23 | 14 | 0 | | | 0 | 83 | 46 | 0 | 17 | 53 | 0 | 236 | 0 | 0 | 0 | 0 |
| 5:00 PM | 20 | 10 | 0 | | | 0 | 87 | 36 | 0 | 18 | 50 | 0 | 221 | 0 | 0 | 0 | 2 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 4:10 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle Peak Hour Summary

4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| PHF | 0.00 | | | 0.00 | | | 0.25 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|------|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.00 | 0.00 | 0.00 | | 0.00 | 0.25 | 0.00 | 0.25 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |

Peak Hour Summary



Clay Carney
(503) 833-2740

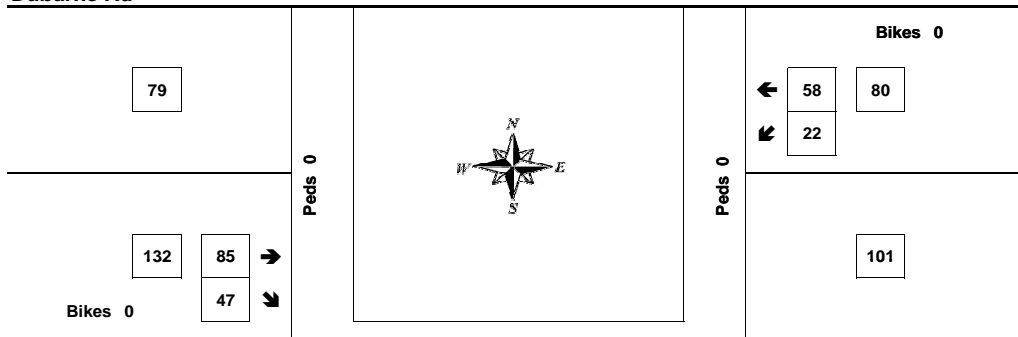
Melissa Ave & Dubarko Rd

4:40 PM to 5:40 PM
Thursday, April 25, 2019

Bikes
0

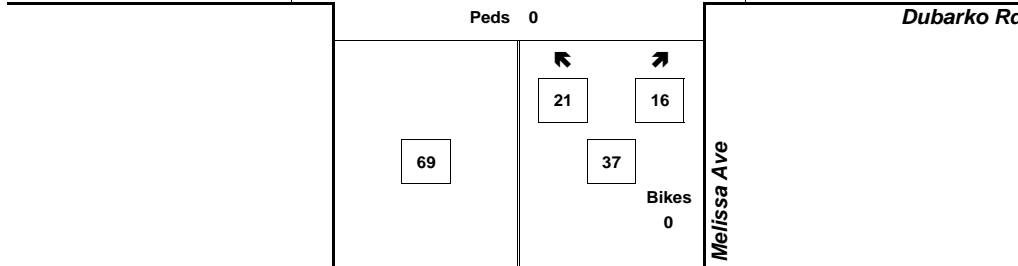
Dubarko Rd

Peds 0



Bikes 0

Peds 0



Dubarko Rd

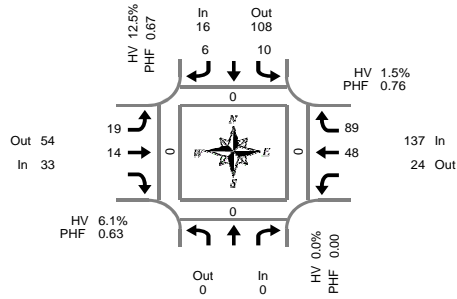
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.72 | 0.8% | 132 |
| WB | 0.83 | 0.0% | 80 |
| NB | 0.66 | 0.0% | 37 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 249 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:55 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:55 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

15-Minute Interval Summary
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

Peak Hour Summary
7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 16 | 108 | 124 | 0 | 33 | 54 | 87 | 0 | 137 | 24 | 161 | 0 | 186 | 0 | 0 | 0 | 0 |
| %HV | | | | | | | 12.5% | | | | 6.1% | | | | 1.5% | | | | | | |
| PHF | | | | | | | 0.67 | | | | 0.63 | | | | 0.76 | | | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|---------------------|----|----|------|---------------------|------|------|-------|----------------------|-------|----|------|----------------------|------|------|------|-------|
| | | | | | | | | | | | | | | | | | |
| Volume | | | | 0 | 10 | 6 | 16 | 19 | 14 | 33 | | | 48 | 89 | 137 | | |
| %HV | NA | NA | NA | 0.0% | 20.0% | NA | 0.0% | 12.5% | 0.0% | 14.3% | NA | 6.1% | NA | 2.1% | 1.1% | 1.5% | |
| PHF | | | | 0.00 | 0.50 | 0.30 | 0.67 | 0.59 | 0.70 | 0.63 | | | 0.75 | 0.77 | 0.76 | 0.89 | |

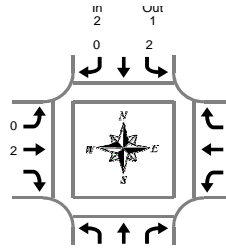
Rolling Hour Summary
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 2

Peak Hour Summary
7:05 AM to 8:05 AM

Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:10 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 7:20 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 8:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Total Survey | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 3 |
| 7:15 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Total Survey | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 4 | 6 | 6 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | 6 |
| PHF | 0.00 | 0.25 | 0.25 | 0.00 | 0.25 | 0.25 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 2 | 3 | 7 |
| 7:15 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 0 | 1 | 4 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 |

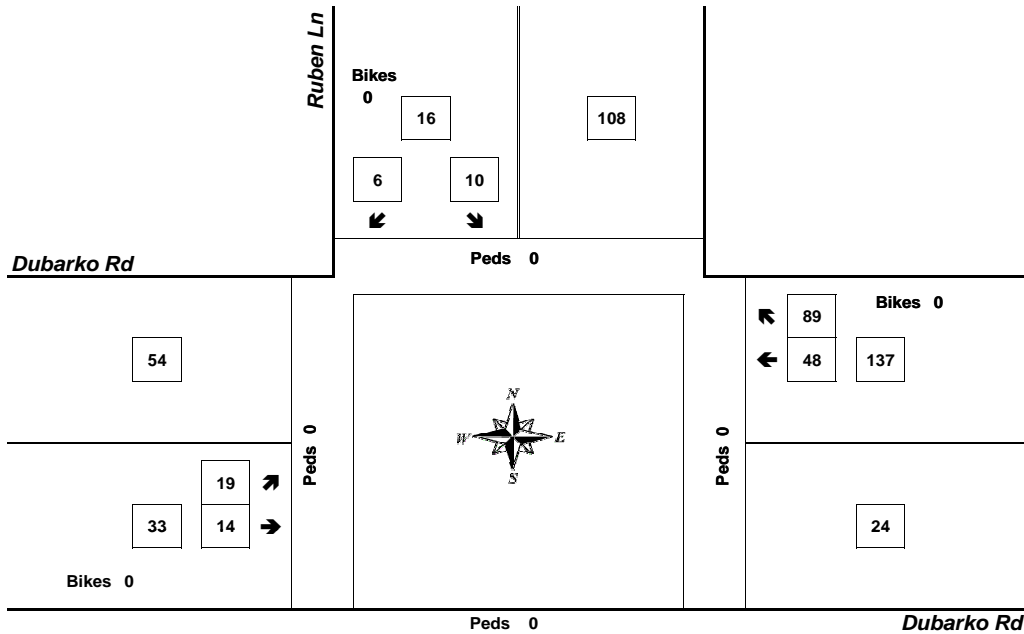
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

7:05 AM to 8:05 AM
Thursday, May 23, 2019



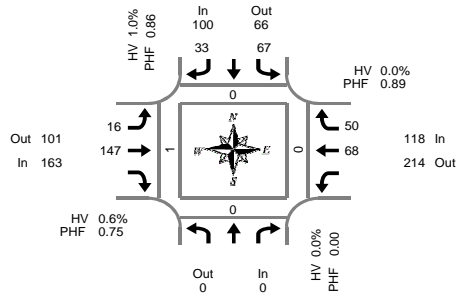
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.63 | 6.1% | 33 |
| WB | 0.76 | 1.5% | 137 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.67 | 12.5% | 16 |
| Intersection | 0.89 | 3.2% | 186 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



**Peak Hour Summary
4:25 PM to 5:25 PM**

Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

**5-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:05 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:10 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:20 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:25 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:35 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:40 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:50 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:55 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:05 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:10 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:20 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:25 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:35 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:40 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:50 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:55 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

**15-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

**Peak Hour Summary
4:25 PM to 5:25 PM**

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 100 | 66 | 166 | 0 | 163 | 101 | 264 | 0 | 118 | 214 | 332 | 0 | 381 | 0 | 0 | 0 | 1 |
| %HV | 0.0% | | | | 1.0% | | | | 0.6% | | | | 0.0% | | | | 0.5% | | | | |
| PHF | 0.00 | | | | 0.86 | | | | 0.75 | | | | 0.89 | | | | 0.89 | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|---------------------|------|------|-------|---------------------|------|-------|-------|----------------------|------|------|-------|----------------------|------|------|------|-------|
| | Total | L | R | Total | L | T | Total | Bikes | Total | T | R | Total | Bikes | | | | |
| Volume | 0 | 67 | 33 | 100 | 16 | 147 | 163 | 0 | 68 | 50 | 118 | 0 | 381 | | | | |
| %HV | NA | NA | NA | 0.0% | 0.0% | NA | 3.0% | 1.0% | 6.3% | 0.0% | NA | 0.6% | NA | 0.0% | 0.0% | 0.0% | 0.5% |
| PHF | | 0.00 | 0.80 | 0.75 | 0.86 | 0.57 | 0.75 | 0.75 | 0.75 | 0.89 | 0.83 | 0.89 | 0.89 | | | | |

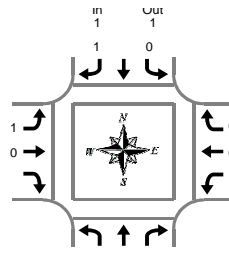
**Rolling Hour Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 1

Peak Hour Summary
4:25 PM to 5:25 PM

Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 4:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| 5:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle Peak Hour Summary 4:25 PM to 5:25 PM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.00 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|---|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | 0.00 | | 0.25 | 0.25 | 0.25 | 0.00 | | 0.25 | 0.00 | 0.00 | 0.00 | 0.50 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 4:15 PM | 0 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 3 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 0 | 1 | 1 | 4 |

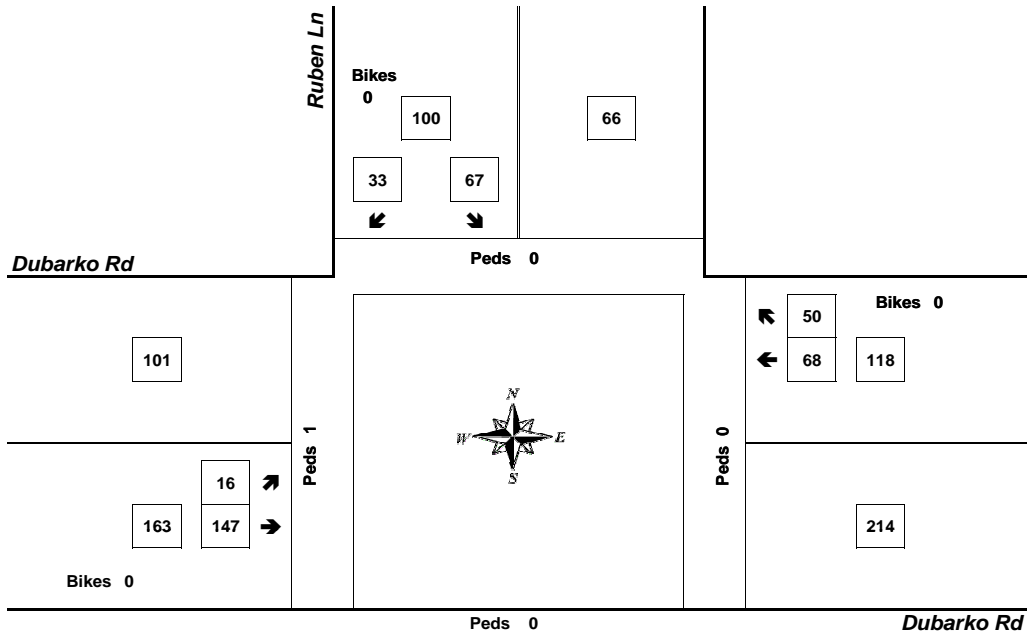
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

4:25 PM to 5:25 PM
Wednesday, May 22, 2019



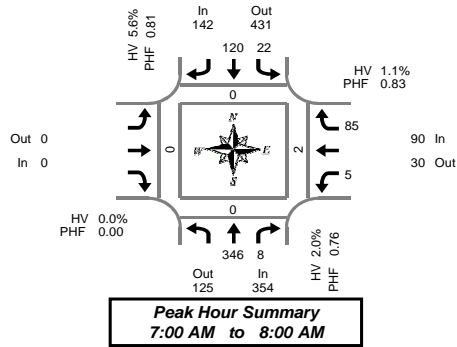
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.75 | 0.6% | 163 |
| WB | 0.89 | 0.0% | 118 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.86 | 1.0% | 100 |
| Intersection | 0.89 | 0.5% | 381 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

**5-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 33 | 0 | 0 | 0 | 10 | 0 | | 0 | 1 | 11 | 0 | 55 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 50 | 1 | 0 | 1 | 7 | 0 | | 0 | 0 | 8 | 0 | 67 | 0 | 0 | 0 | 0 | |
| 7:10 AM | 32 | 0 | 0 | 3 | 9 | 0 | | 0 | 1 | 6 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 34 | 0 | 0 | 3 | 6 | 0 | | 0 | 0 | 9 | 0 | 52 | 0 | 0 | 1 | 0 | |
| 7:20 AM | 32 | 1 | 0 | 4 | 13 | 0 | | 0 | 0 | 6 | 0 | 56 | 0 | 0 | 0 | 0 | |
| 7:25 AM | 25 | 1 | 0 | 1 | 12 | 0 | | 0 | 0 | 9 | 0 | 48 | 0 | 0 | 1 | 0 | |
| 7:30 AM | 21 | 0 | 0 | 2 | 12 | 0 | | 0 | 1 | 7 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 7:35 AM | 24 | 1 | 0 | 4 | 8 | 0 | | 0 | 0 | 7 | 0 | 44 | 0 | 0 | 0 | 0 | |
| 7:40 AM | 34 | 0 | 0 | 1 | 8 | 0 | | 0 | 2 | 4 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 26 | 2 | 0 | 1 | 17 | 0 | | 0 | 0 | 5 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:50 AM | 17 | 2 | 0 | 2 | 11 | 0 | | 0 | 0 | 10 | 0 | 42 | 0 | 0 | 0 | 0 | |
| 7:55 AM | 18 | 0 | 0 | 0 | 7 | 0 | | 0 | 0 | 3 | 0 | 28 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 26 | 0 | 0 | 4 | 7 | 0 | | 0 | 1 | 8 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:05 AM | 27 | 2 | 0 | 2 | 15 | 0 | | 0 | 1 | 4 | 0 | 51 | 0 | 0 | 1 | 0 | |
| 8:10 AM | 33 | 0 | 0 | 1 | 6 | 0 | | 0 | 1 | 0 | 0 | 41 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 24 | 2 | 0 | 4 | 16 | 0 | | 0 | 0 | 3 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:20 AM | 29 | 0 | 0 | 4 | 6 | 0 | | 0 | 1 | 6 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 33 | 1 | 0 | 3 | 7 | 0 | | 0 | 0 | 4 | 0 | 48 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 21 | 2 | 0 | 3 | 11 | 0 | | 0 | 0 | 6 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 24 | 2 | 0 | 2 | 15 | 0 | | 0 | 0 | 6 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:40 AM | 21 | 2 | 0 | 1 | 12 | 0 | | 0 | 1 | 2 | 0 | 39 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 21 | 2 | 0 | 5 | 16 | 0 | | 0 | 1 | 7 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:50 AM | 26 | 2 | 0 | 5 | 16 | 0 | | 0 | 0 | 3 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:55 AM | 16 | 1 | 0 | 1 | 18 | 0 | | 0 | 1 | 5 | 0 | 42 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

**15-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 115 | 1 | 0 | 4 | 26 | 0 | | 0 | 2 | 25 | 0 | 173 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 91 | 2 | 0 | 8 | 31 | 0 | | 0 | 0 | 24 | 0 | 156 | 0 | 0 | 2 | 0 | |
| 7:30 AM | 79 | 1 | 0 | 7 | 28 | 0 | | 0 | 3 | 18 | 0 | 136 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 61 | 4 | 0 | 3 | 35 | 0 | | 0 | 0 | 18 | 0 | 121 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 86 | 2 | 0 | 7 | 28 | 0 | | 0 | 3 | 12 | 0 | 138 | 0 | 0 | 1 | 0 | |
| 8:15 AM | 86 | 3 | 0 | 11 | 29 | 0 | | 0 | 1 | 13 | 0 | 143 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 66 | 6 | 0 | 6 | 38 | 0 | | 0 | 1 | 14 | 0 | 131 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 63 | 5 | 0 | 11 | 50 | 0 | | 0 | 2 | 15 | 0 | 146 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

**Peak Hour Summary
7:00 AM to 8:00 AM**

| By Approach | Northbound SE 362nd Ave | | | | Southbound SE 362nd Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------|-------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 354 | 125 | 479 | 0 | 142 | 431 | 573 | 0 | 0 | 0 | 0 | 0 | 90 | 30 | 120 | 0 | 586 | 0 | 0 | 2 | 0 |
| %HV | 2.0% | | | | 5.6% | | | | 0.0% | | | | 1.1% | | | | 2.7% | | | | |
| PHF | 0.76 | | | | 0.81 | | | | 0.00 | | | | 0.83 | | | | 0.85 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|-------|-------|----------------------|-------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | | Total | L | R | Total | | |
| Volume | 346 | 8 | 354 | 22 | 120 | 142 | | 0 | 5 | 85 | 90 | 586 | |
| %HV | NA | 2.0% | 0.0% | 2.0% | 13.6% | 4.2% | NA | 5.6% | NA | NA | NA | 2.7% | |
| PHF | 0.75 | 0.50 | 0.76 | 0.55 | 0.81 | 0.81 | | 0.00 | 0.42 | 0.85 | 0.83 | 0.85 | |

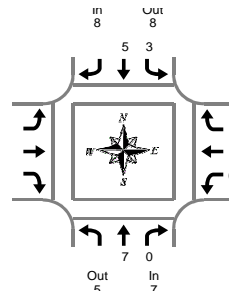
**Rolling Hour Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|---|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 346 | 8 | 0 | 22 | 120 | 0 | | 0 | 5 | 85 | 0 | 586 | 0 | 0 | 2 | 0 | |
| 7:15 AM | 317 | 9 | 0 | 25 | 122 | 0 | | 0 | 6 | 72 | 0 | 551 | 0 | 0 | 3 | 0 | |
| 7:30 AM | 312 | 10 | 0 | 28 | 120 | 0 | | 0 | 7 | 61 | 0 | 538 | 0 | 0 | 1 | 0 | |
| 7:45 AM | 299 | 15 | 0 | 27 | 130 | 0 | | 0 | 5 | 57 | 0 | 533 | 0 | 0 | 1 | 0 | |
| 8:00 AM | 301 | 16 | 0 | 35 | 145 | 0 | | 0 | 7 | 54 | 0 | 558 | 0 | 0 | 1 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

Peak Hour Summary
7:00 AM to 8:00 AM

SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 7:10 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:15 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:20 AM | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 3 | |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:35 AM | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:50 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:05 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 3 | |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 8:40 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:45 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:50 AM | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 8:55 AM | 6 | 0 | 6 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 8 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 0 | 0 | 3 | 3 | 40 | | |

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|-------|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 7:00 AM | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:15 AM | 2 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 4 | |
| 7:30 AM | 1 | 0 | 1 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 4 | |
| 8:00 AM | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 1 | 1 | 1 | 8 | |
| 8:30 AM | 1 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 8:45 AM | 8 | 0 | 8 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 11 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 0 | 0 | 3 | 3 | 40 | | |

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 7 | 5 | 12 | 8 | 8 | 16 | 0 | 0 | 0 | 1 | 3 | 4 | 16 |
| PHF | 0.44 | | | 0.50 | | | 0.00 | | | 0.25 | | | 0.67 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| Volume | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 0 | 1 | 1 | 1 | 16 |
| PHF | 0.44 | 0.00 | 0.44 | 0.38 | 0.42 | 0.50 | 0.00 | 0.00 | 0.00 | 0.25 | 0.25 | 0.25 | 0.67 |

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|---|----------------------|-------|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 7:00 AM | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 0 | 1 | 1 | 16 | |
| 7:15 AM | 5 | 0 | 5 | 3 | 6 | 9 | 0 | 0 | 0 | 1 | 1 | 15 | |
| 7:30 AM | 6 | 1 | 7 | 2 | 9 | 11 | 0 | 0 | 0 | 1 | 1 | 19 | |
| 7:45 AM | 6 | 1 | 7 | 0 | 9 | 9 | 0 | 0 | 0 | 1 | 1 | 17 | |
| 8:00 AM | 13 | 1 | 14 | 0 | 8 | 8 | 0 | 0 | 0 | 2 | 2 | 24 | |

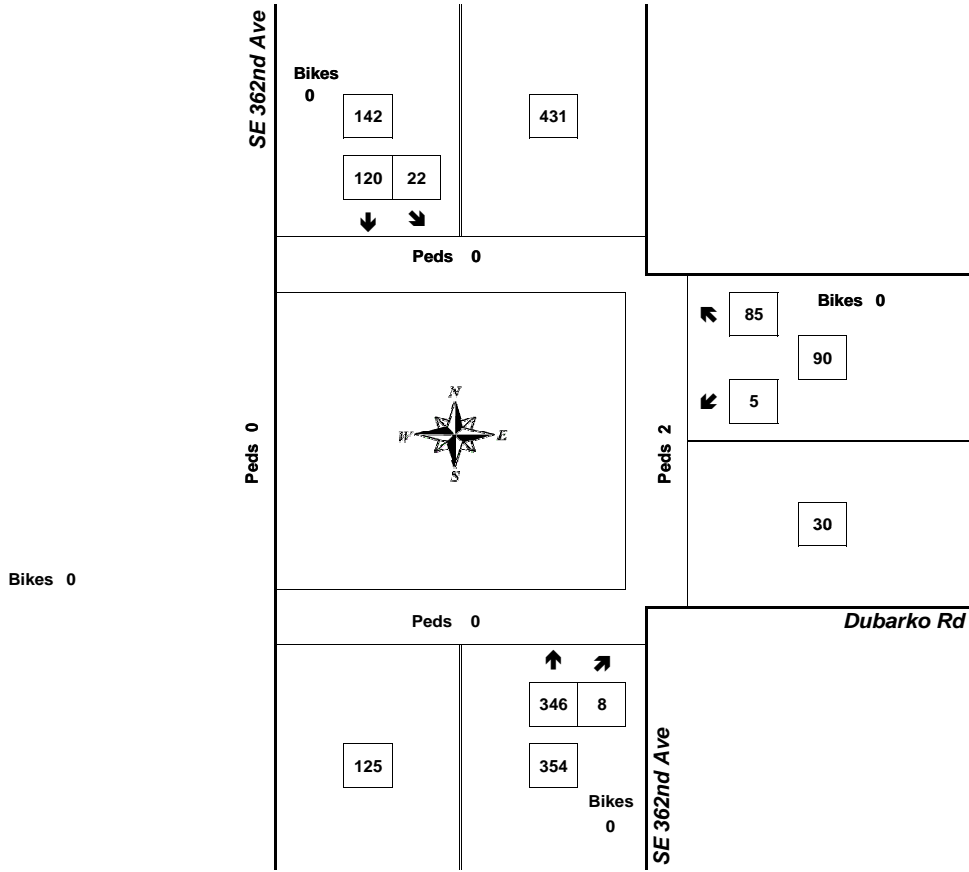
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.83 | 1.1% | 90 |
| NB | 0.76 | 2.0% | 354 |
| SB | 0.81 | 5.6% | 142 |
| Intersection | 0.85 | 2.7% | 586 |

Count Period: 7:00 AM to 9:00 AM

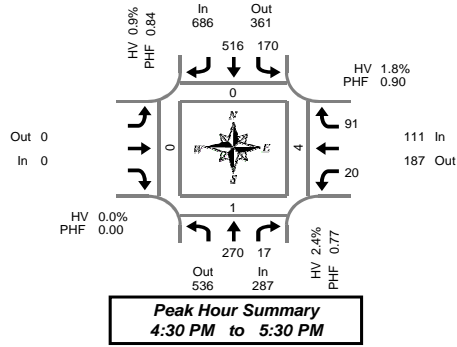
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM



Peak Hour Summary
4:30 PM to 5:30 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 25 | 0 | 0 | 11 | 35 | 0 | | 0 | 1 | 6 | 0 | 78 | 1 | 0 | 3 | 0 | |
| 4:05 PM | 21 | 2 | 0 | 7 | 36 | 0 | | 0 | 1 | 5 | 0 | 72 | 0 | 0 | 0 | 0 | |
| 4:10 PM | 19 | 2 | 0 | 8 | 36 | 0 | | 0 | 1 | 6 | 0 | 72 | 0 | 0 | 0 | 0 | |
| 4:15 PM | 26 | 3 | 0 | 8 | 32 | 0 | | 0 | 0 | 4 | 0 | 73 | 0 | 0 | 1 | 0 | |
| 4:20 PM | 22 | 1 | 0 | 14 | 45 | 0 | | 0 | 3 | 4 | 0 | 89 | 0 | 0 | 0 | 0 | |
| 4:25 PM | 21 | 2 | 0 | 15 | 34 | 0 | | 0 | 0 | 5 | 0 | 77 | 0 | 0 | 0 | 0 | |
| 4:30 PM | 19 | 2 | 0 | 18 | 30 | 0 | | 0 | 1 | 8 | 0 | 78 | 0 | 0 | 2 | 0 | |
| 4:35 PM | 27 | 0 | 0 | 9 | 42 | 0 | | 0 | 0 | 9 | 0 | 87 | 0 | 0 | 0 | 0 | |
| 4:40 PM | 17 | 3 | 0 | 12 | 33 | 0 | | 0 | 2 | 9 | 0 | 76 | 0 | 0 | 0 | 0 | |
| 4:45 PM | 28 | 0 | 0 | 7 | 46 | 0 | | 0 | 1 | 6 | 0 | 88 | 0 | 0 | 0 | 0 | |
| 4:50 PM | 28 | 2 | 0 | 14 | 33 | 0 | | 0 | 3 | 7 | 0 | 87 | 0 | 0 | 0 | 0 | |
| 4:55 PM | 30 | 2 | 0 | 10 | 51 | 0 | | 0 | 4 | 3 | 0 | 100 | 0 | 0 | 0 | 0 | |
| 5:00 PM | 30 | 1 | 0 | 15 | 42 | 0 | | 0 | 3 | 11 | 0 | 102 | 0 | 0 | 0 | 0 | |
| 5:05 PM | 21 | 4 | 0 | 16 | 45 | 0 | | 0 | 0 | 7 | 0 | 93 | 0 | 0 | 0 | 0 | |
| 5:10 PM | 21 | 1 | 0 | 20 | 49 | 0 | | 0 | 2 | 6 | 0 | 99 | 0 | 0 | 0 | 0 | |
| 5:15 PM | 16 | 1 | 0 | 14 | 60 | 0 | | 0 | 1 | 7 | 0 | 99 | 0 | 0 | 0 | 0 | |
| 5:20 PM | 17 | 1 | 0 | 19 | 42 | 0 | | 0 | 2 | 12 | 0 | 93 | 0 | 1 | 0 | 0 | |
| 5:25 PM | 16 | 0 | 0 | 16 | 43 | 0 | | 0 | 1 | 6 | 0 | 82 | 0 | 0 | 2 | 0 | |
| 5:30 PM | 19 | 0 | 0 | 16 | 24 | 0 | | 0 | 2 | 4 | 0 | 65 | 0 | 0 | 0 | 0 | |
| 5:35 PM | 16 | 1 | 0 | 12 | 33 | 0 | | 0 | 2 | 7 | 0 | 71 | 0 | 0 | 0 | 0 | |
| 5:40 PM | 26 | 0 | 0 | 9 | 39 | 0 | | 0 | 1 | 6 | 0 | 81 | 0 | 0 | 0 | 0 | |
| 5:45 PM | 18 | 2 | 0 | 13 | 36 | 0 | | 0 | 2 | 5 | 0 | 76 | 0 | 0 | 0 | 0 | |
| 5:50 PM | 19 | 2 | 0 | 17 | 43 | 0 | | 0 | 1 | 7 | 0 | 89 | 0 | 0 | 0 | 0 | |
| 5:55 PM | 17 | 3 | 0 | 17 | 29 | 0 | | 0 | 1 | 7 | 0 | 74 | 0 | 0 | 0 | 0 | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 65 | 4 | 0 | 26 | 107 | 0 | | 0 | 3 | 17 | 0 | 222 | 1 | 0 | 3 | 0 | |
| 4:15 PM | 69 | 6 | 0 | 37 | 111 | 0 | | 0 | 3 | 13 | 0 | 239 | 0 | 0 | 1 | 0 | |
| 4:30 PM | 63 | 5 | 0 | 39 | 105 | 0 | | 0 | 3 | 26 | 0 | 241 | 0 | 0 | 2 | 0 | |
| 4:45 PM | 86 | 4 | 0 | 31 | 130 | 0 | | 0 | 8 | 16 | 0 | 275 | 0 | 0 | 0 | 0 | |
| 5:00 PM | 72 | 6 | 0 | 51 | 136 | 0 | | 0 | 5 | 24 | 0 | 294 | 0 | 0 | 0 | 0 | |
| 5:15 PM | 49 | 2 | 0 | 49 | 145 | 0 | | 0 | 4 | 25 | 0 | 274 | 0 | 1 | 2 | 0 | |
| 5:30 PM | 61 | 1 | 0 | 37 | 96 | 0 | | 0 | 5 | 17 | 0 | 217 | 0 | 0 | 0 | 0 | |
| 5:45 PM | 54 | 7 | 0 | 47 | 108 | 0 | | 0 | 4 | 19 | 0 | 239 | 0 | 0 | 0 | 0 | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | |

Peak Hour Summary
4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | | Southbound SE 362nd Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------|-------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 287 | 536 | 823 | 0 | 686 | 361 | 1,047 | 0 | 0 | 0 | 0 | 0 | 111 | 187 | 298 | 0 | 1,084 | 0 | 1 | 4 | 0 |
| %HV | 2.4% | | | | 0.9% | | | | 0.0% | | | | 1.8% | | | | 1.4% | | | | |
| PHF | 0.77 | | | | 0.84 | | | | 0.00 | | | | 0.90 | | | | 0.92 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|-------|------|----------------------|-------|-------|-------|
| | T | R | Total | L | T | Total | | Total | L | R | Total | | |
| Volume | 270 | 17 | 287 | 170 | 516 | 686 | | 0 | 20 | 91 | 111 | 1,084 | |
| %HV | NA | 2.6% | 0.0% | 2.4% | 1.2% | 0.8% | NA | 0.9% | NA | NA | NA | 1.4% | |
| PHF | 0.77 | 0.61 | 0.77 | 0.80 | 0.84 | 0.84 | | 0.00 | 0.50 | 0.88 | 0.90 | 0.92 | |

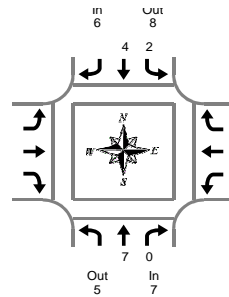
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 283 | 19 | 0 | 133 | 453 | 0 | | 0 | 17 | 72 | 0 | 977 | 1 | 0 | 6 | 0 | |
| 4:15 PM | 290 | 21 | 0 | 158 | 482 | 0 | | 0 | 19 | 79 | 0 | 1,049 | 1 | 0 | 3 | 0 | |
| 4:30 PM | 270 | 17 | 0 | 170 | 516 | 0 | | 0 | 20 | 91 | 0 | 1,084 | 0 | 1 | 4 | 0 | |
| 4:45 PM | 268 | 13 | 0 | 168 | 507 | 0 | | 0 | 22 | 82 | 0 | 1,060 | 0 | 1 | 2 | 0 | |
| 5:00 PM | 236 | 16 | 0 | 184 | 485 | 0 | | 0 | 18 | 85 | 0 | 1,024 | 0 | 1 | 2 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| 4:00 PM | 2 | 0 | 2 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 3 |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 1 |
| 4:10 PM | 2 | 0 | 2 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 3 |
| 4:15 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| 4:20 PM | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 3 | 3 | | 0 | 0 | 0 | 0 | 3 |
| 4:35 PM | 1 | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 |
| 4:40 PM | 0 | 0 | 0 | 1 | 0 | 1 | | 0 | 1 | 0 | 1 | 2 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 2 | 0 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 1 | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 |
| 5:20 PM | 1 | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 2 |
| 5:25 PM | 2 | 0 | 2 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 3 |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 5:55 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| 4:00 PM | 4 | 0 | 4 | 0 | 2 | 2 | | 0 | 0 | 1 | 1 | 7 |
| 4:15 PM | 1 | 0 | 1 | 0 | 2 | 2 | | 0 | 0 | 0 | 0 | 3 |
| 4:30 PM | 1 | 0 | 1 | 1 | 3 | 4 | | 0 | 1 | 0 | 1 | 6 |
| 4:45 PM | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 2 | 0 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 |
| 5:15 PM | 4 | 0 | 4 | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 6 |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| 5:45 PM | 1 | 0 | 1 | 1 | 1 | 2 | | 0 | 0 | 0 | 0 | 3 |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle Peak Hour Summary 4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|----------------------|---|---|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | | | |
| Volume | 7 | 5 | 12 | 6 | 8 | 14 | 0 | 0 | 0 | 2 | 4 | 15 |
| PHF | 0.44 | | | 0.38 | | | 0.00 | | 0.50 | | | 0.63 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| Volume | 7 | 0 | 7 | 2 | 4 | 6 | 0 | 1 | 1 | 2 | 15 | |
| PHF | 0.44 | 0.00 | 0.44 | 0.50 | 0.33 | 0.38 | 0.00 | 0.25 | 0.25 | 0.50 | 0.63 | |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| 4:00 PM | 6 | 0 | 6 | 1 | 8 | 9 | | 0 | 1 | 1 | 2 | 17 |
| 4:15 PM | 4 | 0 | 4 | 1 | 6 | 7 | | 0 | 1 | 0 | 1 | 12 |
| 4:30 PM | 7 | 0 | 7 | 2 | 4 | 6 | | 0 | 1 | 1 | 2 | 15 |
| 4:45 PM | 7 | 0 | 7 | 1 | 2 | 3 | | 0 | 0 | 1 | 1 | 11 |
| 5:00 PM | 8 | 0 | 8 | 2 | 2 | 4 | | 0 | 0 | 1 | 1 | 13 |

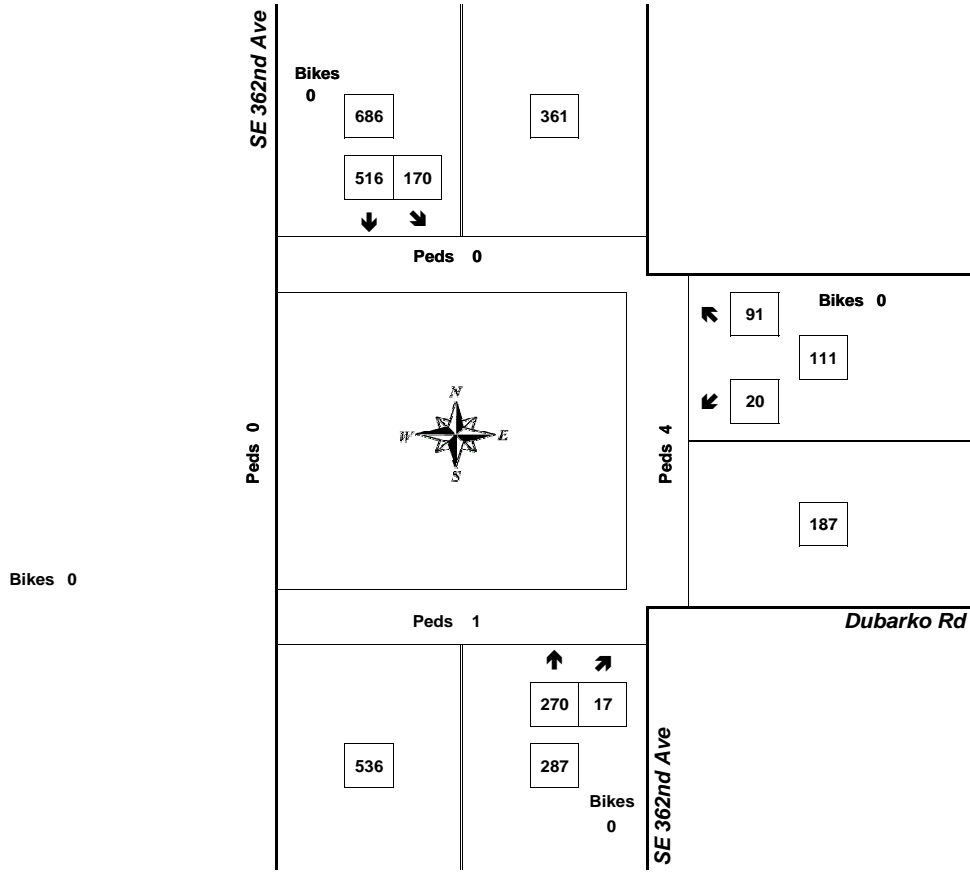
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

4:30 PM to 5:30 PM
Wednesday, May 22, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|--------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.90 | 1.8% | 111 |
| NB | 0.77 | 2.4% | 287 |
| SB | 0.84 | 0.9% | 686 |
| Intersection | 0.92 | 1.4% | 1,084 |

Count Period: 4:00 PM to 6:00 PM

CDS380
05/17/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

Page: 1

CITY OF SANDY, CLACKAMAS COUNTY

362ND DR at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

1 - 1 of 1 Crash records shown.

| SER# | S D M | P R J S W DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | INT-REL | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A S | | | | | | ACT | EVENT | CAUSE |
|--------|-----------------|----------------|-------|---------------|---------|----------|-----------|-------|-------|---------|-----------|--------|---------|-------|-----------|-------|-------|--|-----|-------|-------|
| INVEST | E A U I C O DAY | RD DPT | FROM | FIRST STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G E LICNS | PED | | | | | |
| UNLOC? | D C S V L K LAT | LONG | LRS | SECOND STREET | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# TYPE | TO | P# TYPE | SVRTY | E X RES | LOC | ERROR | | | | |
| 00737 | N N N | 02/27/2015 | 17 | DUBARKO RD | INTER | 3-LEG | N | N | UNK | S-1STOP | 01 NONE 0 | STRGHT | | | | | | | | 29 | |
| NONE | FR | 0 | | 362ND DR | E | | STOP SIGN | N | WET | SS-O | PRVTE | E -W | | | | | | | | 000 | 00 |
| N | 12P | | | | 06 | 0 | | N | DAY | PDO | PSNGR CAR | | 01 DRVR | NONE | 00 M | UNK | 026 | | | 000 | 29 |
| N | 45 23 57.42 | -122 17 | | | | | | | | | | | | | | OR<25 | | | | | |
| | | 27.9 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 02 NONE 0 | STOP | | | | | | | | 011 | 00 |
| | | | | | | | | | | | PRVTE | E -W | | | | | | | | 000 | 000 |
| | | | | | | | | | | | PSNGR CAR | | 01 DRVR | NONE | 22 M | OR-Y | | | | | 00 |
| | | | | | | | | | | | | | | | | OR<25 | | | | | |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/17/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
362ND DR at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
 DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | S P R J S W DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | INT-REL | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A S | PRTC | INJ | G E LICNS | PED | UNLOC? | D C S V L K LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E X RES | LOC | ERROR | ACT | EVENT | CAUSE |
|------|------------------|-------|-------------|---------|----------|---------|-------|------|-------|----------|------|-----|------|-----|-----------|-----|--------|-----------------|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---------|-----|-------|-----|-------|-------|
|------|------------------|-------|-------------|---------|----------|---------|-------|------|-------|----------|------|-----|------|-----|-----------|-----|--------|-----------------|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---------|-----|-------|-----|-------|-------|

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

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Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CITY OF SANDY, CLACKAMAS COUNTY

DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

1 - 2 of 2 Crash records shown.

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | ACT | EVENT | CAUSE | | | | | | | | | | | |
|--------|---|---|---|---|---|------|----------------------|----------------------|-------------|----------|---------|-------|-----------|----------|----------|-----------|-------|-------|--------|-------|-------|------|-----|------|-------|-----|-----|-----|----|--|--|
| INVEST | E | A | U | I | C | O | DIST | FIRST STREET | DIRECT | (MEDIAN) | INT-REL | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | | | | | | | | | |
| RD DPT | E | L | G | N | H | R | TIME | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | | | | | | | | | |
| UNLOC? | D | C | S | V | L | K | LAT | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | | | | | | |
| 00557 | N | N | N | | | | 02/07/2014 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | SNOW | ANGL-STP | 01 | NONE | 0 | TURN-L | | | | | | | | 124 | 08 | | | |
| NONE | | | | | | | FR | 0 | MELISSA AVE | S | | | STOP SIGN | N | ICE | TURN | PRVTE | SE-S | | | | | | | | | 000 | 124 | 00 | | |
| N | | | | | | | 3P | | 06 | 0 | | N | DAY | PDO | | PSNGR CAR | | | 01 | DRVR | NONE | 59 | M | OR-Y | | 002 | 017 | 08 | | | |
| N | | | | | | | 45 23 30.2562959 | -122 16 36.081048 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | 02 | NONE | 0 | STOP | | | | | | | | | 011 | 00 | | |
| | | | | | | | | | | | | | | | | PRVTE | S -N | | | 01 | DRVR | NONE | 57 | F | OR-Y | | 000 | 000 | 00 | | |
| | | | | | | | | | | | | | | | | PSNGR CAR | | | | | | | | | | | | | | | |
| 01045 | N | N | N | | | | 03/26/2015 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | CLR | ANGL-OTH | 01 | NONE | 0 | STRGHT | | | | | | | | | 02 | | | |
| NONE | | | | | | | TH | 0 | MELISSA AVE | CN | | | STOP SIGN | N | DRY | TURN | PRVTE | NW-SE | | | | | | | | | 000 | 00 | | | |
| N | | | | | | | 8A | | 04 | 0 | | N | DAWN | PDO | | PSNGR CAR | | | 01 | DRVR | NONE | 23 | F | OR-Y | | 000 | 000 | 00 | | | |
| N | | | | | | | 45 23 30.26 36.08 | -122 16 36.08 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | 02 | NONE | 0 | TURN-L | | | | | | | | | 015 | 00 | | |
| | | | | | | | | | | | | | | | | PRVTE | S -NW | | | 01 | DRVR | NONE | 00 | F | UNK | | 028 | 000 | 02 | | |
| | | | | | | | | | | | | | | | | PSNGR CAR | | | | | | | | | | | | | | | |

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |
|------|---|---|---|---|---|------|-------|-------------|---------|----------|-------|------|-------|----------|------|---|---|--------|---|---|---|---|---|---|------|------|---------------|--------|------|-------|-------|------|------|-------|------|------|-----|---|---|-------|-----|--------|---|---|---|---|---|---|-----|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---|---|-----|-----|-------|-----|-------|-------|
|------|---|---|---|---|---|------|-------|-------------|---------|----------|-------|------|-------|----------|------|---|---|--------|---|---|---|---|---|---|------|------|---------------|--------|------|-------|-------|------|------|-------|------|------|-----|---|---|-------|-----|--------|---|---|---|---|---|---|-----|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---|---|-----|-----|-------|-----|-------|-------|

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
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DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

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Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 538 PM Peak Hour Volumes: 103

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 5,380 | 8,850 | |
| Minor Street* | 1,030 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 5,380 | 13,300 | |
| Minor Street* | 1,030 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 5,380 | 10,640 | |
| Minor Street* | 1,030 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 248 PM Peak Hour Volumes: 19

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,480 | 8,850 | |
| Minor Street* | 190 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,480 | 13,300 | |
| Minor Street* | 190 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,480 | 10,640 | |
| Minor Street* | 190 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 84 PM Peak Hour Volumes: 113

Warrant Used:

100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 840 | 8,850 | |
| Minor Street* | 1,130 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 840 | 13,300 | |
| Minor Street* | 1,130 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 840 | 10,640 | |
| Minor Street* | 1,130 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 164 PM Peak Hour Volumes: 36

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 1,640 | 8,850 | |
| Minor Street* | 360 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 1,640 | 13,300 | |
| Minor Street* | 360 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 1,640 | 10,640 | |
| Minor Street* | 360 | 2,120 | No |

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 1073 PM Peak Hour Volumes: 114

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 10,730 | 8,850 | |
| Minor Street* | 1,140 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 10,730 | 13,300 | |
| Minor Street* | 1,140 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 10,730 | 10,640 | |
| Minor Street* | 1,140 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 374 PM Peak Hour Volumes: 116

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 3,740 | 8,850 | |
| Minor Street* | 1,160 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 3,740 | 13,300 | |
| Minor Street* | 1,160 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 3,740 | 10,640 | |
| Minor Street* | 1,160 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 287 PM Peak Hour Volumes: 68

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,870 | 8,850 | |
| Minor Street* | 680 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,870 | 13,300 | |
| Minor Street* | 680 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,870 | 10,640 | |
| Minor Street* | 680 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 220 PM Peak Hour Volumes: 61

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,200 | 8,850 | |
| Minor Street* | 610 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,200 | 13,300 | |
| Minor Street* | 610 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,200 | 10,640 | |
| Minor Street* | 610 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout AM

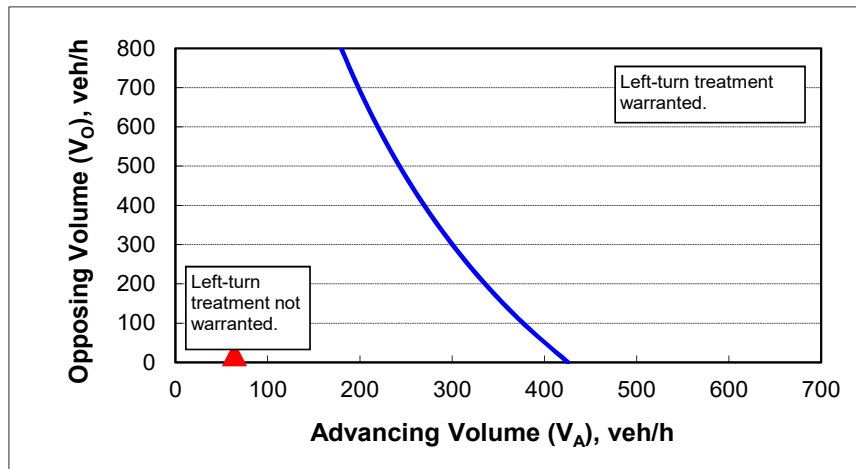
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 23 |
| Advancing volume (V_A), veh/h: | 64 |
| Opposing volume (V_O), veh/h: | 20 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 415 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout PM

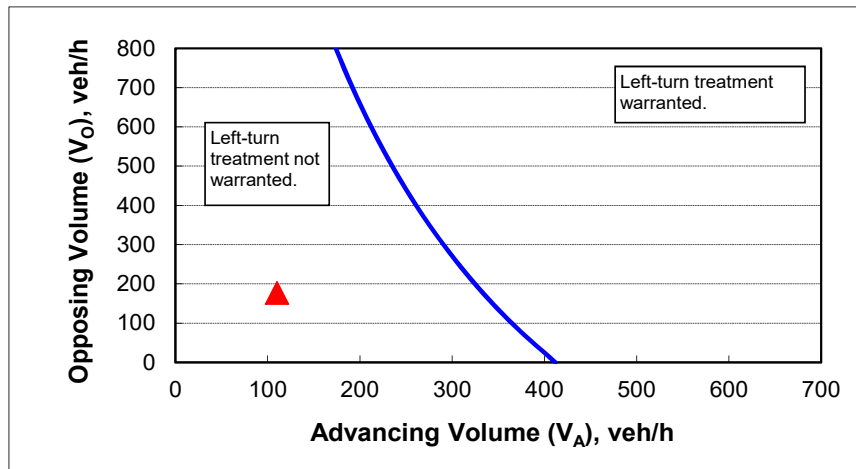
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 48 |
| Advancing volume (V_A), veh/h: | 110 |
| Opposing volume (V_O), veh/h: | 177 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 333 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.1 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Future Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 6 | 100 | 407 | 9 | 26 | 141 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---|---------------|-------|
| | Minor1 | Major1 | | Major2 | |
| Conflicting Flow All | 605 | 412 | 0 | 0 | 416 |
| Stage 1 | 412 | - | - | - | - |
| Stage 2 | 193 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 462 | 642 | - | - | 1122 |
| Stage 1 | 671 | - | - | - | - |
| Stage 2 | 842 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 451 | 642 | - | - | 1122 |
| Mov Cap-2 Maneuver | 451 | - | - | - | - |
| Stage 1 | 671 | - | - | - | - |
| Stage 2 | 822 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 11.9 | 0 | 1.3 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 627 | 1122 |
| HCM Lane V/C Ratio | - | - | 0.169 | 0.023 |
| HCM Control Delay (s) | - | - | 11.9 | 8.3 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.6 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

Intersection

Int Delay, s/veh 1.6

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Future Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 21 | 16 | 54 | 100 | 11 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 154 | 0 | - | 0 | 162 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 58 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1402 | - | - | - | 804 | 922 |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 937 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1402 | - | - | - | 792 | 922 |
| Mov Cap-2 Maneuver | - | - | - | - | 792 | - |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 4.4 | 0 | 9.4 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1402 | - | - | - | 836 |
| HCM Lane V/C Ratio | 0.015 | - | - | - | 0.022 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 9.4 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 5.5

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Future Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 18 | 49 | 51 | 34 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 96 | 11 |
| Stage 1 | - | - | - | - | 11 | - |
| Stage 2 | - | - | - | - | 85 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 903 | 1070 |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 938 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 892 | 1070 |
| Mov Cap-2 Maneuver | - | - | - | - | 892 | - |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 927 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.1 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 956 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.089 | - | - | 0.011 | - |
| HCM Control Delay (s) | 9.1 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Future Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 36 | 13 | 17 | 16 | 57 | 79 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.7 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 42% | 0% | 52% |
| Vol Thru, % | 0% | 74% | 48% |
| Vol Right, % | 58% | 26% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 95 | 34 | 23 |
| LT Vol | 40 | 0 | 12 |
| Through Vol | 0 | 25 | 11 |
| RT Vol | 55 | 9 | 0 |
| Lane Flow Rate | 136 | 49 | 33 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.145 | 0.057 | 0.04 |
| Departure Headway (Hd) | 3.844 | 4.21 | 4.435 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 927 | 844 | 801 |
| Service Time | 1.892 | 2.267 | 2.495 |
| HCM Lane V/C Ratio | 0.147 | 0.058 | 0.041 |
| HCM Control Delay | 7.6 | 7.5 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.1 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Future Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 22 | 99 | 293 | 18 | 185 | 561 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1233 | 303 | 0 | 0 | 312 | 0 |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 930 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 195 | 737 | - | - | 1254 | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 384 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 166 | 737 | - | - | 1254 | - |
| Mov Cap-2 Maneuver | 166 | - | - | - | - | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 327 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 15.7 | 0 | 2.1 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 455 | 1254 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.147 | - |
| HCM Control Delay (s) | - | - | 15.7 | 8.4 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.5 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

Intersection

Int Delay, s/veh 3.1

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Future Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 18 | 165 | 76 | 56 | 75 | 37 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 133 | 0 | - | 0 | 305 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 201 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1458 | - | - | - | 689 | 953 |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 835 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1458 | - | - | - | 679 | 953 |
| Mov Cap-2 Maneuver | - | - | - | - | 679 | - |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 823 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.7 | 0 | 10.6 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1458 | - | - | - | 750 |
| HCM Lane V/C Ratio | 0.012 | - | - | - | 0.15 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 10.6 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.5 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Future Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 100 | 55 | 26 | 68 | 25 | 19 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 155 | 0 | 248 | 128 |
| Stage 1 | - | - | - | - | 128 | - |
| Stage 2 | - | - | - | - | 120 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1438 | - | 745 | 927 |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 910 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1438 | - | 731 | 927 |
| Mov Cap-2 Maneuver | - | - | - | - | 731 | - |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 893 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.1 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 805 | - | - | 1438 | - |
| HCM Lane V/C Ratio | 0.054 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.4 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Future Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 22 | 105 | 27 | 19 | 66 | 28 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.2 | 7.6 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 70% | 0% | 59% |
| Vol Thru, % | 0% | 18% | 41% |
| Vol Right, % | 30% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 80 | 108 | 39 |
| LT Vol | 56 | 0 | 23 |
| Through Vol | 0 | 19 | 16 |
| RT Vol | 24 | 89 | 0 |
| Lane Flow Rate | 94 | 127 | 46 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.109 | 0.127 | 0.055 |
| Departure Headway (Hd) | 4.175 | 3.606 | 4.282 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 853 | 983 | 829 |
| Service Time | 2.228 | 1.668 | 2.345 |
| HCM Lane V/C Ratio | 0.11 | 0.129 | 0.055 |
| HCM Control Delay | 7.7 | 7.2 | 7.6 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.4 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | T | | T | T |
| Traffic Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Future Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 119 | 432 | 11 | 32 | 149 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 650 | 437 | 0 | 0 | 442 |
| Stage 1 | 437 | - | - | - | - |
| Stage 2 | 213 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 435 | 622 | - | - | 1097 |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 825 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 422 | 622 | - | - | 1097 |
| Mov Cap-2 Maneuver | 422 | - | - | - | - |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 801 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 12.7 | 0 | 1.5 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 599 | 1097 |
| HCM Lane V/C Ratio | - | - | 0.216 | 0.029 |
| HCM Control Delay (s) | - | - | 12.7 | 8.4 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.8 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 1.5 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Future Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 22 | 74 | 113 | 16 | 7 |

Major/Minor

| | Major1 | Major2 | Minor2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 188 | 0 | 198 |
| Stage 1 | - | - | 131 |
| Stage 2 | - | - | 67 |
| Critical Hdwy | 4.16 | - | 6.53 |
| Critical Hdwy Stg 1 | - | - | 5.53 |
| Critical Hdwy Stg 2 | - | - | 5.53 |
| Follow-up Hdwy | 2.254 | - | 3.617 |
| Pot Cap-1 Maneuver | 1362 | - | 766 |
| Stage 1 | - | - | 869 |
| Stage 2 | - | - | 929 |
| Platoon blocked, % | - | - | - |
| Mov Cap-1 Maneuver | 1362 | - | 754 |
| Mov Cap-2 Maneuver | - | - | 754 |
| Stage 1 | - | - | 869 |
| Stage 2 | - | - | 914 |

Approach

| | EB | WB | SB |
|----------------------|-----|----|-----|
| HCM Control Delay, s | 3.8 | 0 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt

| | EBL | EBT | WBT | WBR | SBLn1 |
|-----------------------|-------|-----|-----|-----|-------|
| Capacity (veh/h) | 1362 | - | - | - | 790 |
| HCM Lane V/C Ratio | 0.016 | - | - | - | 0.028 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 5.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Future Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 19 | 52 | 53 | 37 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 101 | 11 |
| Stage 1 | - | - | - | - | 11 | - |
| Stage 2 | - | - | - | - | 90 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 898 | 1070 |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 934 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 887 | 1070 |
| Mov Cap-2 Maneuver | - | - | - | - | 887 | - |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.2 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 954 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.094 | - | - | 0.012 | - |
| HCM Control Delay (s) | 9.2 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Future Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 39 | 14 | 27 | 17 | 60 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.6 | 7.8 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 41% | 0% | 61% |
| Vol Thru, % | 0% | 73% | 39% |
| Vol Right, % | 59% | 27% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 102 | 37 | 31 |
| LT Vol | 42 | 0 | 19 |
| Through Vol | 0 | 27 | 12 |
| RT Vol | 60 | 10 | 0 |
| Lane Flow Rate | 146 | 53 | 44 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.156 | 0.062 | 0.055 |
| Departure Headway (Hd) | 3.864 | 4.233 | 4.475 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 919 | 838 | 794 |
| Service Time | 1.923 | 2.299 | 2.54 |
| HCM Lane V/C Ratio | 0.159 | 0.063 | 0.055 |
| HCM Control Delay | 7.6 | 7.6 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.2 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Future Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 114 | 312 | 24 | 208 | 596 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 1335 | 324 | 0 | 0 | 336 |
| Stage 1 | 324 | - | - | - | - |
| Stage 2 | 1011 | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 |
| Pot Cap-1 Maneuver | 169 | 717 | - | - | 1229 |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 352 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 140 | 717 | - | - | 1229 |
| Mov Cap-2 Maneuver | 140 | - | - | - | - |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 292 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 18.1 | 0 | 2.2 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 412 | 1229 |
| HCM Lane V/C Ratio | - | - | 0.338 | 0.169 |
| HCM Control Delay (s) | - | - | 18.1 | 8.5 |
| HCM Lane LOS | - | - | C | A |
| HCM 95th %tile Q(veh) | - | - | 1.5 | 0.6 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 3.2

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Future Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 192 | 92 | 64 | 88 | 39 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 156 | 0 | - | 0 | 354 | 124 |
| Stage 1 | - | - | - | - | 124 | - |
| Stage 2 | - | - | - | - | 230 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1430 | - | - | - | 646 | 929 |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 811 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1430 | - | - | - | 636 | 929 |
| Mov Cap-2 Maneuver | - | - | - | - | 636 | - |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 799 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.7 | 0 | 11.2 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1430 | - | - | - | 705 |
| HCM Lane V/C Ratio | 0.013 | - | - | - | 0.18 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.2 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.7 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.1 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Future Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 59 | 27 | 73 | 26 | 20 |

Major/Minor

| | Major1 | Major2 | Minor1 | | |
|----------------------|--------|--------|--------|---|-----|
| Conflicting Flow All | 0 | 0 | 165 | 0 | 262 |
| Stage 1 | - | - | - | - | 135 |
| Stage 2 | - | - | - | - | 127 |
| Critical Hdwy | - | - | 4.1 | - | 6.4 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 |
| Pot Cap-1 Maneuver | - | - | 1426 | - | 731 |
| Stage 1 | - | - | - | - | 896 |
| Stage 2 | - | - | - | - | 904 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1426 | - | 716 |
| Mov Cap-2 Maneuver | - | - | - | - | 716 |
| Stage 1 | - | - | - | - | 896 |
| Stage 2 | - | - | - | - | 886 |

Approach

| | EB | WB | NB |
|----------------------|----|----|-----|
| HCM Control Delay, s | 0 | 2 | 9.8 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt

| | NBLn1 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 792 | - | - | 1426 | - |
| HCM Lane V/C Ratio | 0.058 | - | - | 0.019 | - |
| HCM Control Delay (s) | 9.8 | - | - | 7.6 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Future Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 24 | 111 | 33 | 20 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.3 | 7.7 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 62% |
| Vol Thru, % | 0% | 18% | 38% |
| Vol Right, % | 34% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 114 | 45 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 20 | 17 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 134 | 53 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.122 | 0.135 | 0.063 |
| Departure Headway (Hd) | 4.162 | 3.631 | 4.314 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 854 | 975 | 822 |
| Service Time | 2.222 | 1.7 | 2.385 |
| HCM Lane V/C Ratio | 0.124 | 0.137 | 0.064 |
| HCM Control Delay | 7.8 | 7.3 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Future Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 18 | 138 | 432 | 13 | 39 | 149 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 665 | 438 | 0 | 0 | 445 | 0 |
| Stage 1 | 438 | - | - | - | - | - |
| Stage 2 | 227 | - | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | - |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | - |
| Pot Cap-1 Maneuver | 427 | 621 | - | - | 1094 | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 813 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 412 | 621 | - | - | 1094 | - |
| Mov Cap-2 Maneuver | 412 | - | - | - | - | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 784 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 13.3 | 0 | 1.7 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 587 | 1094 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.035 | - |
| HCM Control Delay (s) | - | - | 13.3 | 8.4 | - |
| HCM Lane LOS | - | - | B | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.1 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.3

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 31 | 99 | 126 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 225 | 0 | - | 0 | 238 | 162 |
| Stage 1 | - | - | - | - | 162 | - |
| Stage 2 | - | - | - | - | 76 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1320 | - | - | - | 727 | 855 |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 920 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1320 | - | - | - | 715 | 855 |
| Mov Cap-2 Maneuver | - | - | - | - | 715 | - |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 904 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 3.2 | 0 | 9.9 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1320 | - | - | - | 752 |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.03 |
| HCM Control Delay (s) | 7.8 | 0 | - | - | 9.9 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 6.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Future Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 15 | 29 | 52 | 95 | 65 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 25 | 0 | 128 | 18 |
| Stage 1 | - | - | - | - | 18 | - |
| Stage 2 | - | - | - | - | 110 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1589 | - | 866 | 1061 |
| Stage 1 | - | - | - | - | 1005 | - |
| Stage 2 | - | - | - | - | 915 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1589 | - | 850 | 1061 |
| Mov Cap-2 Maneuver | - | - | - | - | 850 | - |
| Stage 1 | - | - | - | - | 1005 | - |
| Stage 2 | - | - | - | - | 898 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.6 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 924 | - | - | 1589 | - |
| HCM Lane V/C Ratio | 0.173 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.6 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.8 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Future Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 26 | 27 | 24 | 64 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.9 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 43% | 0% | 53% |
| Vol Thru, % | 0% | 69% | 47% |
| Vol Right, % | 57% | 31% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 105 | 59 | 36 |
| LT Vol | 45 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 18 | 0 |
| Lane Flow Rate | 150 | 84 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.164 | 0.099 | 0.064 |
| Departure Headway (Hd) | 3.944 | 4.224 | 4.488 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 897 | 838 | 788 |
| Service Time | 2.024 | 2.302 | 2.572 |
| HCM Lane V/C Ratio | 0.167 | 0.1 | 0.065 |
| HCM Control Delay | 7.8 | 7.8 | 7.9 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.3 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Future Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 29 | 126 | 312 | 30 | 228 | 596 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1379 | 327 | 0 | 0 | 342 | 0 |
| Stage 1 | 327 | - | - | - | - | - |
| Stage 2 | 1052 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 159 | 714 | - | - | 1223 | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 336 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 129 | 714 | - | - | 1223 | - |
| Mov Cap-2 Maneuver | 129 | - | - | - | - | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 273 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 20.5 | 0 | 2.4 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 385 | 1223 | - |
| HCM Lane V/C Ratio | - | - | 0.404 | 0.187 | - |
| HCM Control Delay (s) | - | - | 20.5 | 8.6 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.9 | 0.7 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.2 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 220 | 109 | 72 | 101 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 181 | 0 | - | 0 | 403 | 145 |
| Stage 1 | - | - | - | - | 145 | - |
| Stage 2 | - | - | - | - | 258 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1400 | - | - | - | 605 | 905 |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 787 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1400 | - | - | - | 596 | 905 |
| Mov Cap-2 Maneuver | - | - | - | - | 596 | - |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 775 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.6 | 0 | 11.9 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1400 | - | - | - | 659 | |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.213 | |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.9 | |
| HCM Lane LOS | A | A | - | - | B | |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 | |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.3

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Future Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 102 | 56 | 73 | 52 | 38 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 208 | 0 | 343 | 157 |
| Stage 1 | - | - | - | - | 157 | - |
| Stage 2 | - | - | - | - | 186 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1375 | - | 657 | 894 |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 851 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1375 | - | 629 | 894 |
| Mov Cap-2 Maneuver | - | - | - | - | 629 | - |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 815 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|------|
| HCM Control Delay, s | 0 | 3.4 | 10.7 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 719 | - | - | 1375 | - |
| HCM Lane V/C Ratio | 0.124 | - | - | 0.041 | - |
| HCM Control Delay (s) | 10.7 | - | - | 7.7 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Future Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 118 | 33 | 39 | 80 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.8 | 8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 69% | 0% | 46% |
| Vol Thru, % | 0% | 22% | 54% |
| Vol Right, % | 31% | 78% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 99 | 129 | 61 |
| LT Vol | 68 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 100 | 0 |
| Lane Flow Rate | 116 | 152 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.137 | 0.156 | 0.086 |
| Departure Headway (Hd) | 4.249 | 3.695 | 4.316 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 833 | 955 | 819 |
| Service Time | 2.33 | 1.78 | 2.401 |
| HCM Lane V/C Ratio | 0.139 | 0.159 | 0.088 |
| HCM Control Delay | 8 | 7.5 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.6 | 0.3 |

Bailey Meadows

Preliminary Stormwater Report

Date: June 2019
Client: Allied Homes and Development
Engineering Contact: Monty Hurley, PE, PLS/ Vu Nguyen, PE
Prepared By: Vu Nguyen, PE
Engineering Firm: AKS Engineering & Forestry, LLC
AKS Job No.: 7107



RENEWAL DATE: 6/30/21



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Appendices

APPENDIX A: VICINITY MAP

APPENDIX B.1: PRE-DEVELOPED CATCHMENT MAP AND DETAIL

APPENDIX B.2: PRE-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 2-YEAR STORM EVENT

APPENDIX B.3: PRE-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 5-YEAR STORM EVENT

APPENDIX B.4: PRE-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 10-YEAR STORM EVENT

APPENDIX B.5: PRE-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 25-YEAR STORM EVENT

APPENDIX C.1: POST-DEVELOPED CATCHMENT MAP AND DETAIL

APPENDIX C.2: POST-DEVELOPED HYDROGRAPH AND FLOW INFORMATION WATER QUALITY STORM
EVENT

APPENDIX C.3: POST-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 2-YEAR STORM EVENT

APPENDIX C.4: POST-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 5-YEAR STORM EVENT

APPENDIX C.5: POST-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 10-YEAR STORM EVENT

APPENDIX C.6: POST-DEVELOPED HYDROGRAPH AND FLOW INFORMATION 25-YEAR STORM EVENT

APPENDIX D: EMERGENCY OVERFLOW CALCULATIONS

APPENDIX E: SOILS INFORMATION FROM THE USDA SOIL SURVEY OF CLACKAMAS COUNTY, OREGON

APPENDIX F: RELEVANT INFORMATION FROM TECHNICAL RELEASE 55 URBAN HYDROLOGY FOR
SMALL WATERSHEDS BY NATURAL RESOURCE CONSERVATION SERVICE

Preliminary Stormwater Report **Bailey Meadows**

1.0 Purpose of Report

The purpose of this report is to analyze the effect development of this site will have on the downstream stormwater conveyance system, document the criteria the proposed stormwater system was designed to meet, identify the sources of information on which the analysis was based, detail the design methodology, and document the results of the analysis.

2.0 Project Location/Description

The development is located on Tax Lots 800, 801, 802, 803, and 804 of Clackamas County Map 2 4E 23. The project site is located northwest of the Ponder Lane and the Woodburn Sandy Highway (Hwy 211) intersection. Currently, the majority of the existing stormwater runoff from this site drains west to existing drainage ditch across the property that drains to the Bull Frog Reservoir to the west. This project includes approximately ±23.42 acres of the site.

3.0 Regulatory Design Criteria

3.1 STORMWATER QUANTITY MANAGEMENT CRITERIA

The site will provide stormwater quantity management per City of Sandy requirements, including:

- Detain the peak flow from the post-developed site to match the peak flow of the pre-developed site for 2-year, 5-year, 10-year, and 25-year frequency storm events.
- Size the storm sewer pipes to convey stormwater flows for the 25-year storm event.
- Provide an emergency overflow spillway for the 100-year storm, assuming that the flow control manhole is plugged.

The stormwater facility was designed to meet the above criteria for detention, conveyance, and overflow. Slopes in the facility will be no steeper than 3:1 or a retaining wall will be installed. Beyond the top of the stormwater facility, the ground will slope at 2:1 and daylight at the existing ground surface, or a retaining wall will be installed.

3.2 STORMWATER QUALITY MANAGEMENT CRITERIA

The stormwater facility will provide stormwater quality management per City of Sandy standards, which includes treating 80 percent of the average annual volume of stormwater runoff from the site and achieving at least 70% removal of the Total Suspended Solids.

4.0 Design Methodology

The Santa Barbara Urban Hydrograph (SBUH) method was used to design the stormwater facility. The SBUH method utilizes the SCS Type 1A 24-hour storm, as defined by the King County, Washington Surface Water Design Manual. HydroCAD computer software aided in the analysis. Representative runoff curve (CN) numbers were obtained from Technical Release 55 Urban Hydrology for Small Watersheds by the Natural Resources Conservation Service and are included in Appendix E.

5.0 Design Parameters

5.1 DESIGN STORM

5.1.1 24-Hour Rainfall Depths

2-year storm: 3.5 inches

5-year storm: 4.5 inches

10-year storm: 4.8 inches

25-year storm: 5.5 inches

100-year storm: 6.5 inches

5.1.2 On-Site Inlet and Conduit Sizing

Stormwater inlets for the site have been placed at locations that will adequately control stormwater runoff from streets. The onsite stormwater pipes will be sized using Manning's equation, based on peak flows for the 25-year, 24-hour storm event.

5.1.3 Upstream Basin

Stormwater runoff from the off-site upstream (undeveloped) basin area along the eastern property line of the site (catchment 2S) will be collected and routed to the stormwater facility as pass through. The stormwater lines that carry these runoffs will be sized using Manning's equation, based on peak flows for the fully developed 25-year, 24-hour storm event.

5.2 PRE-DEVELOPED SITE TOPOGRAPHY AND LAND USE

5.2.1 Site Topography

The existing stormwater runoff from this site drains west, with slopes ranging from 1% to 10%. The vegetative cover of the site consists of grass, trees, and crops.

5.2.2 Land Use

Currently, the land is being used for agriculture.

5.3 SOIL TYPE

The soils present on the site are classified as Cazadero silty clay loam (hydrologic group "C") and Cottrell silty clay loam (hydrologic group "C") by the USDA Soil Survey for Clackamas County. Information on these soil types is provided in Appendix F.

5.4 POST-DEVELOPED SITE TOPOGRAPHY AND LAND USE

5.4.1 Site Topography

The post-developed site topography will be altered from the pre-developed site topography to allow for the construction of public streets, single-family residential dwellings, and other associated infrastructure and features.

5.4.2 Land Use

The post-developed land use will consist of 100 residential lots, streets, and stormwater facility.

5.4.3 Future Development

The project's stormwater facilities are not sized to treat and detain any future development beyond the planned 100-lot Bailey Meadows subdivision.

5.4.4 Post-Developed Input Parameters

Per City of Sandy requirements, each of the detached single-family dwelling lots was assessed with 2,750 square feet of impervious area.

5.5 DESCRIPTION OF OFF-SITE CONTRIBUTORY BASINS

There are no off-site stormwater runoff basins contributing to this site (other than the basins described in Section 5.1.3).

6.0 Calculation Methodology

6.1 PROPOSED STORMWATER CONDUIT SIZING AND INLET SPACING

To meet City of Sandy standards, the onsite stormwater conduit will be sized using Manning's equation for the 25-year storm event. Catch basins have been placed at locations to adequately convey stormwater runoff from the streets.

6.2 PROPOSED STORMWATER QUANTITY CONTROL FACILITY DESIGN

The stormwater facility (detention pond) was designed to accommodate flows generated by the developed areas of the subject property and to meet City of Sandy water quantity requirements (described in Section 3.1).

6.3 PROPOSED STORMWATER QUALITY FACILITY DESIGN

The CDS manholes were sized to treat stormwater runoff from impervious area generated by a rainfall intensity of 0.2 inches per hour. The designed flow rate for treatment is 1.97 cubic feet per second. Two CDS manholes (CDS Model CDS 2020-5) will be utilized to accommodate flows generated by developed areas of the subject property in compliance with City of Sandy water quality requirements (described in Section 3.2).

6.4 EMERGENCY OVERFLOW CALCULATIONS

The emergency overflow weirs were sized to convey the 100-year storm event. Calculations are included in Appendix D. If the stormwater facility's outlet structures become plugged and cannot convey runoff from the site, the overflow stormwater from the stormwater facility will sheet flow across the access driveway and downhill to the existing drainage ditch.

6.6 DOWNSTREAM ANALYSIS

The stormwater discharge from the stormwater facility (post-developed condition) will discharge to the existing drainage ditch across Tax Lot 806 of Clackamas County Map 2 4E 23. It will continue to flow west to the Bull Frog Reservoir. The stormwater facility has been designed so that the duration of peak flow rates from post-development conditions will be less than or equal to the duration of peak flow rates from pre-development conditions of the 2-year, 5-year, 10-year, and 25-year storm events. This development will not negatively impact downstream capacity.

7.0 Stormwater Summary Table

The tables below summarize the pre-developed and post-developed peak flows for each storm event

that are routed to the new stormwater facility:

Table 7.1 Pre-Developed Peak Flows

| CATCHMENT | PEAK FLOWS (CFS) | | | |
|------------------------|------------------|-------|-------|-------|
| | 2-YR | 5-YR | 10-YR | 25-YR |
| 1S (Pre-Developed) | 6.60 | 10.67 | 11.96 | 15.03 |
| 2S (Existing Upstream) | 2.41* | 3.91* | 4.38* | 5.56* |

Table 7.2 Post Developed Peak Flows

| CATCHMENT | PEAK FLOWS (CFS) | | | |
|---|------------------|--------------|--------------|--------------|
| | 2-YR | 5-YR | 10-YR | 25-YR |
| 1S (Post-Developed) | 12.23 | 17.45 | 19.07 | 22.94 |
| 2S (Existing Upstream) | 2.41* | 3.91* | 4.38* | 5.56* |
| Allowable Release Rate** | 9.01 | 14.58 | 16.34 | 20.59 |
| Design Pond Release Rate | 8.68 | 14.20 | 15.41 | 17.91 |
| Undetained Rate | 0.00 | 0.00 | 0.00 | 0.00 |
| Actual Release Rate to Downstream (Design Pond Release Rate + Undetained Rate) | 8.68 | 14.20 | 15.41 | 17.91 |

*The flows from Catchment 2S are routed to the stormwater facility as pass through flows based on undeveloped area.

**The allowable release rate for the post-developed 2-year storm event per City of Sandy standards is equal to the sum of the pre-developed peak runoff rates for the 2-year storm from Catchments 1S and 2S.

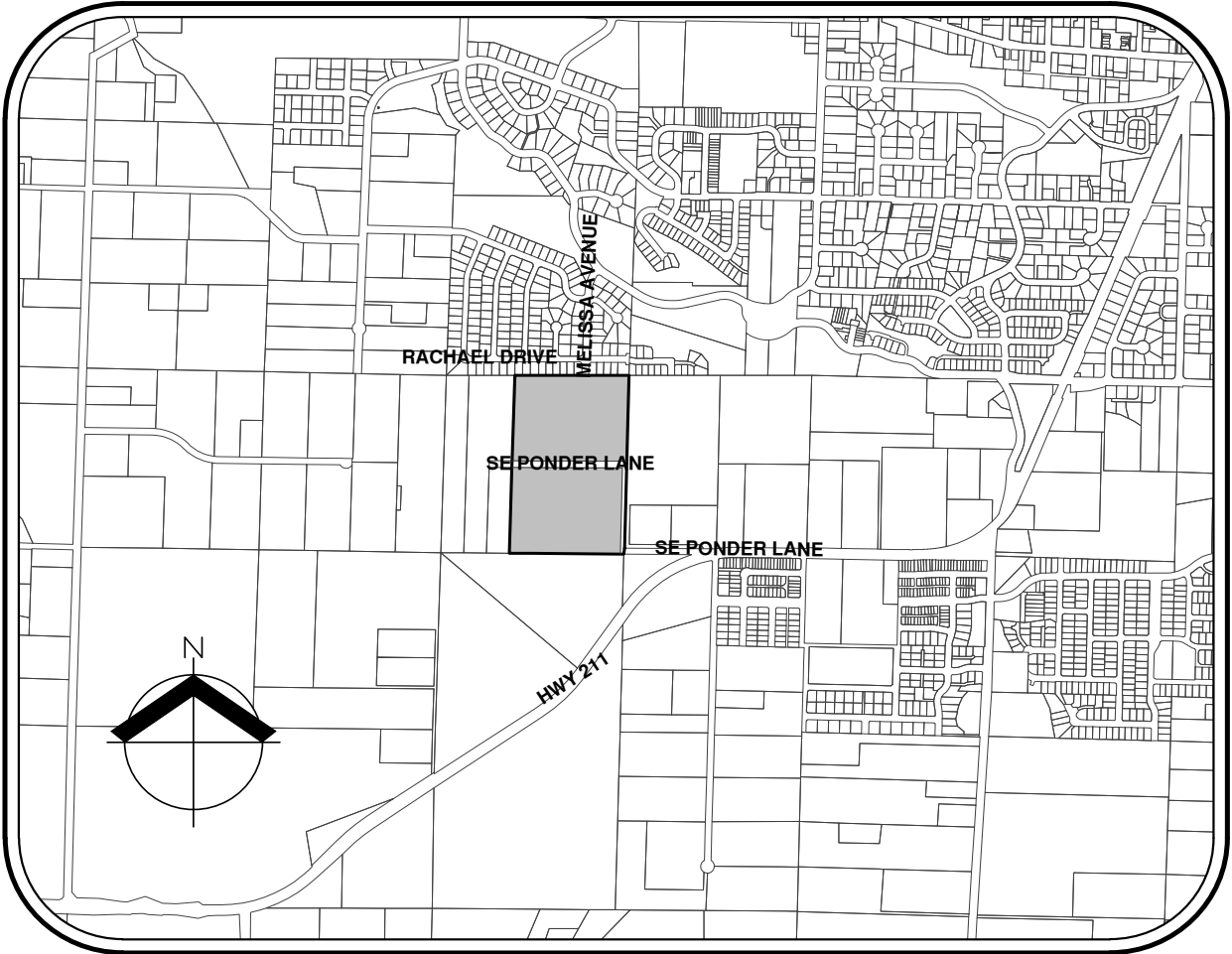
**The allowable release rate for the post-developed 5-year storm event per City of Sandy standards is equal to the sum of the pre-developed peak runoff rates for the 5-year storm from Catchments 1S and 2S.

**The allowable release rate for the post-developed 10-year storm event per City of Sandy standards is equal to the sum of the pre-developed peak runoff rates for the 10-year storm from Catchments 1S and 2S.

**The allowable release rate for the post-developed 25-year storm event per City of Sandy standards is equal to the sum of the pre-developed peak runoff rates for the 25-year storm from Catchments 1S and 2S.



Appendix A: Vicinity Map

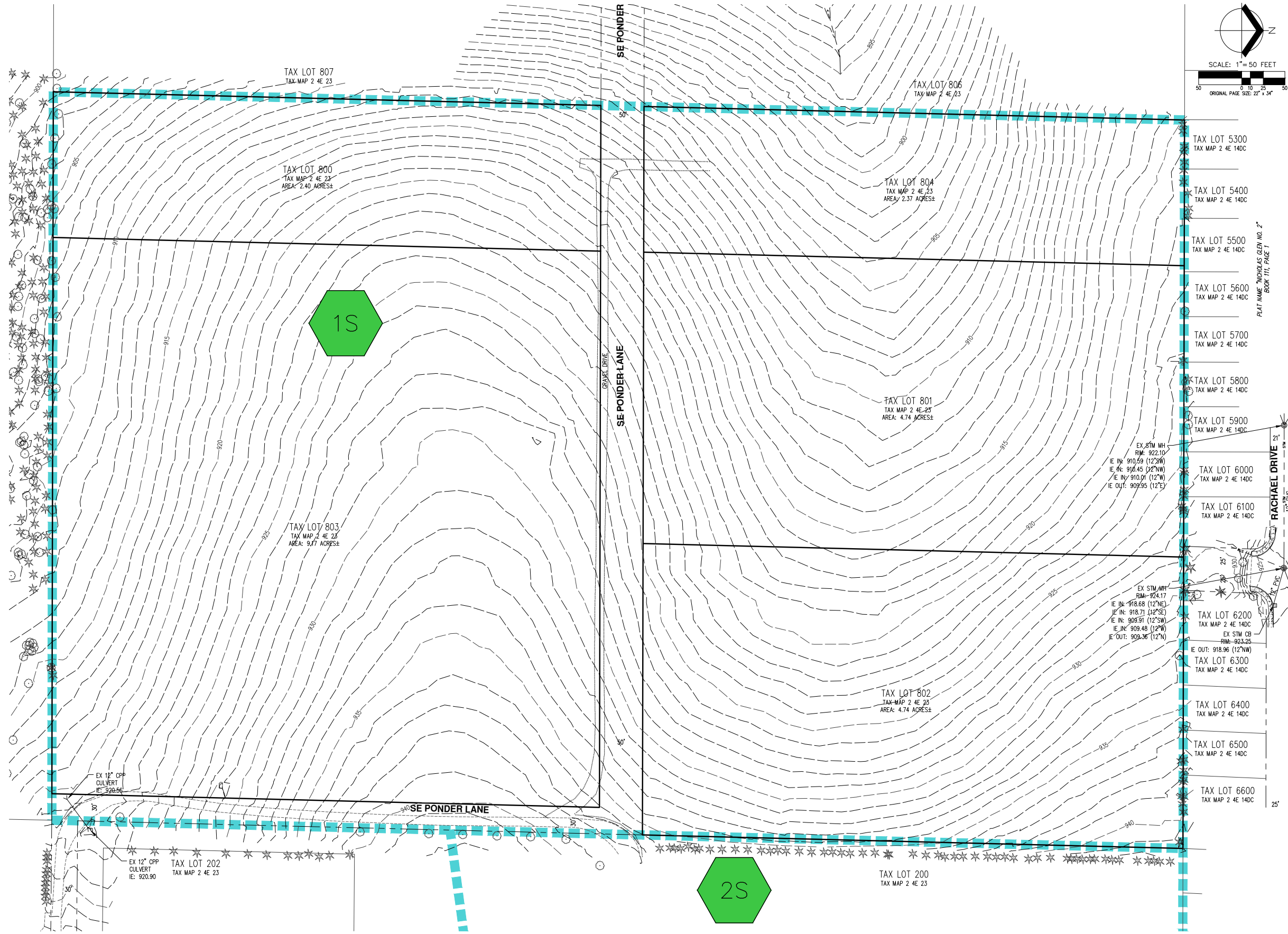


VICINITY MAP

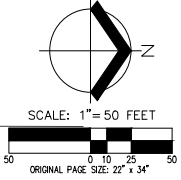
SCALE: 1" = N.T.S.



Appendix B.1: Pre-Developed Catchment Map and Detail



AKS DRAWING FILE: 7107 PRE-DEVELOPED BASIN MAPS | LAYOUT: 1



PLAT NAME: NICHOLAS GLEN NO. 2
BOOK 111, PAGE 1

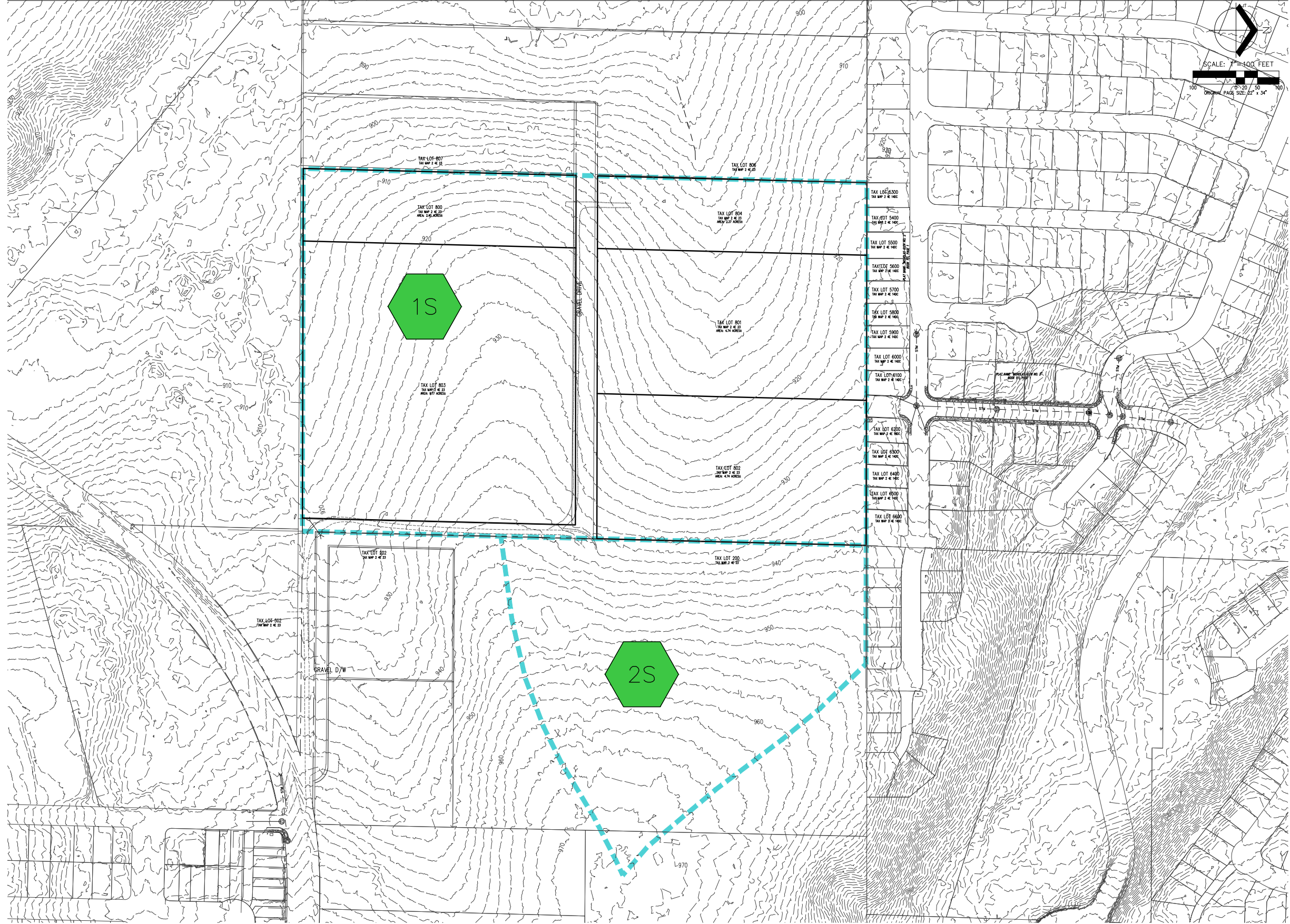
PRE-DEVELOPED BASIN MAP

**BAILEY MEADOWS
SANDY, OREGON**

| | |
|--------------|------------|
| JOB NUMBER: | 7107 |
| DATE: | 06/12/2019 |
| DESIGNED BY: | VN |
| DRAWN BY: | CL |
| CHECKED BY: | RSW |

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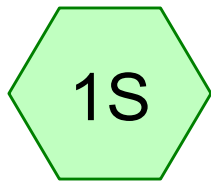
PRE-DEVELOPED BASIN MAP

**BAILEY MEADOWS
SANDY, OREGON**

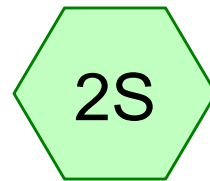


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Pre-Developed



Existing Upstream



Routing Diagram for 7107 HydroCAD Pre
Prepared by AKS Engineering & Forestry, LLC, Printed 5/28/2019
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7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC

Printed 5/28/2019

HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|------------------|-----------|---------------------------------------|
| 1,497,050 | 80 | Row Crops (C + CR) (1S, 2S) |
| 1,497,050 | 80 | TOTAL AREA |



**Appendix B.2:
Pre-Developed Hydrograph and Flow
Information 2-Year Storm Event**

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/28/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre-Developed

Runoff Area=1,061,450 sf 0.00% Impervious Runoff Depth>1.62"
Flow Length=900' Tc=23.8 min CN=80/0 Runoff=6.60 cfs 142,858 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10,000 ac 0.00% Impervious Runoff Depth>1.61"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=2.41 cfs 58,339 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 201,197 cf Average Runoff Depth = 1.61"
100.00% Pervious = 1,497,050 sf 0.00% Impervious = 0 sf

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/28/2019

Summary for Subcatchment 1S: Pre-Developed

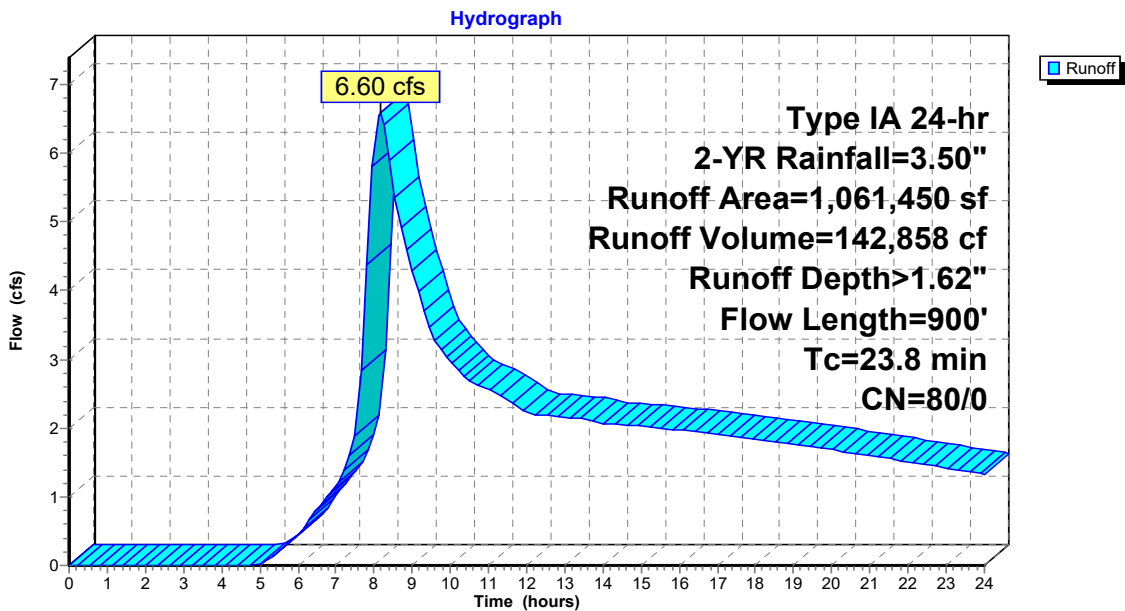
Runoff = 6.60 cfs @ 8.15 hrs, Volume= 142,858 cf, Depth> 1.62"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 2-YR Rainfall=3.50"

| Area (sf) | CN | Description |
|-------------|----|-----------------------|
| * 1,061,450 | 80 | Row Crops (C + CR) |
| 1,061,450 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 18.6 | 300 | 0.0600 | 0.27 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 5.2 | 600 | 0.0450 | 1.91 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 23.8 | 900 | Total | | | |

Subcatchment 1S: Pre-Developed



7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/28/2019

Summary for Subcatchment 2S: Existing Upstream

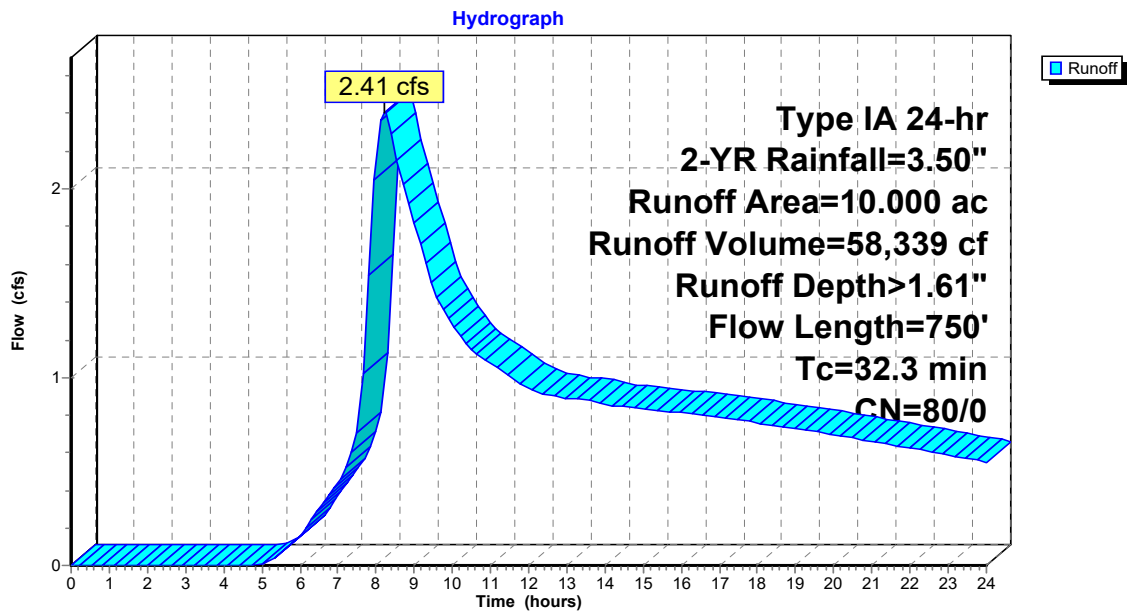
Runoff = 2.41 cfs @ 8.21 hrs, Volume= 58,339 cf, Depth> 1.61"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 2-YR Rainfall=3.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream





Appendix B.3: Pre-Developed Hydrograph and Flow Information 5-Year Storm Event

7107 HydroCAD Pre

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HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/28/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre-Developed

Runoff Area=1,061,450 sf 0.00% Impervious Runoff Depth>2.43"
Flow Length=900' Tc=23.8 min CN=80/0 Runoff=10.67 cfs 215,128 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10,000 ac 0.00% Impervious Runoff Depth>2.42"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=3.91 cfs 87,888 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 303,016 cf Average Runoff Depth = 2.43"
100.00% Pervious = 1,497,050 sf 0.00% Impervious = 0 sf

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/28/2019

Summary for Subcatchment 1S: Pre-Developed

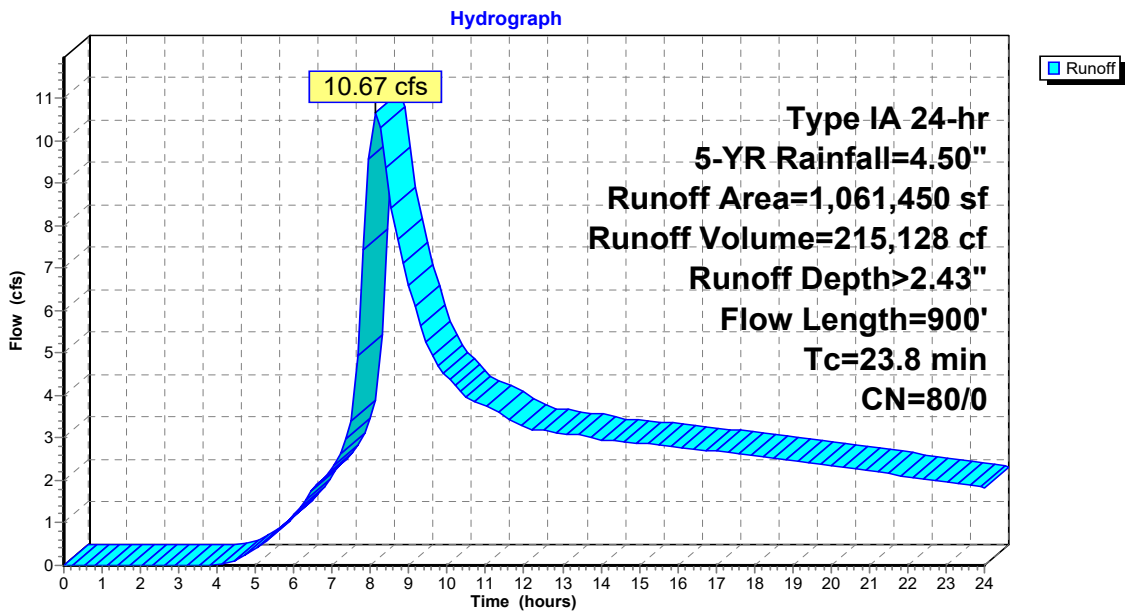
Runoff = 10.67 cfs @ 8.14 hrs, Volume= 215,128 cf, Depth > 2.43"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 5-YR Rainfall=4.50"

| Area (sf) | CN | Description |
|-------------|----|-----------------------|
| * 1,061,450 | 80 | Row Crops (C + CR) |
| 1,061,450 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 18.6 | 300 | 0.0600 | 0.27 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 5.2 | 600 | 0.0450 | 1.91 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 23.8 | 900 | Total | | | |

Subcatchment 1S: Pre-Developed



7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/28/2019

Summary for Subcatchment 2S: Existing Upstream

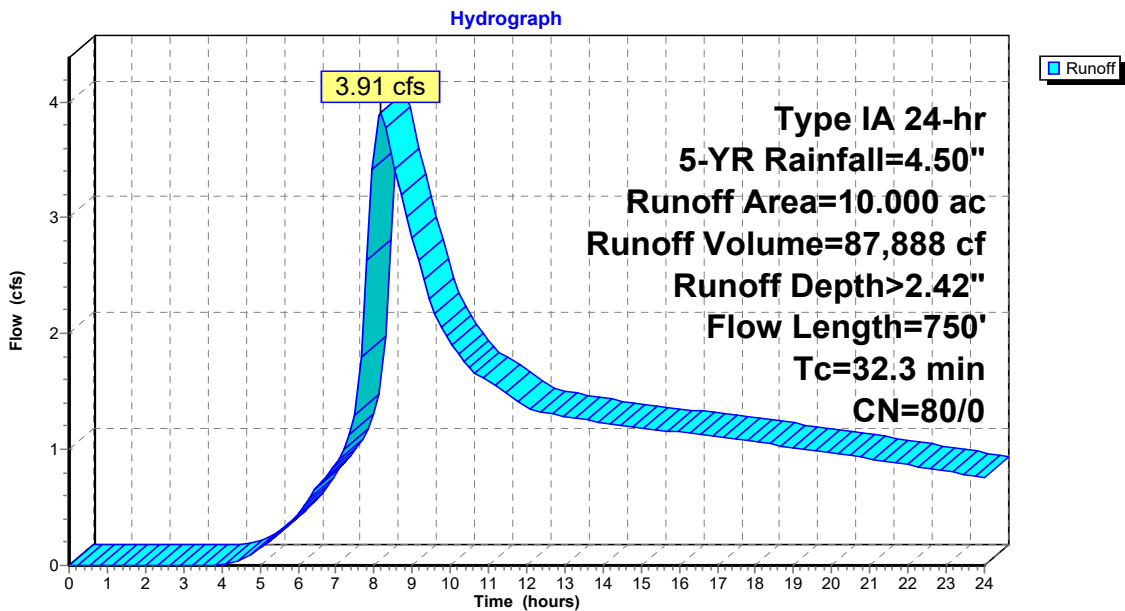
Runoff = 3.91 cfs @ 8.18 hrs, Volume= 87,888 cf, Depth> 2.42"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 5-YR Rainfall=4.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream





**Appendix B.4:
Pre-Developed Hydrograph and Flow
Information 10-Year Storm Event**

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC

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Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/28/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre-Developed

Runoff Area=1,061,450 sf 0.00% Impervious Runoff Depth>2.69"
Flow Length=900' Tc=23.8 min CN=80/0 Runoff=11.96 cfs 237,696 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10,000 ac 0.00% Impervious Runoff Depth>2.68"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=4.38 cfs 97,116 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 334,813 cf Average Runoff Depth = 2.68"
100.00% Pervious = 1,497,050 sf 0.00% Impervious = 0 sf

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/28/2019

Summary for Subcatchment 1S: Pre-Developed

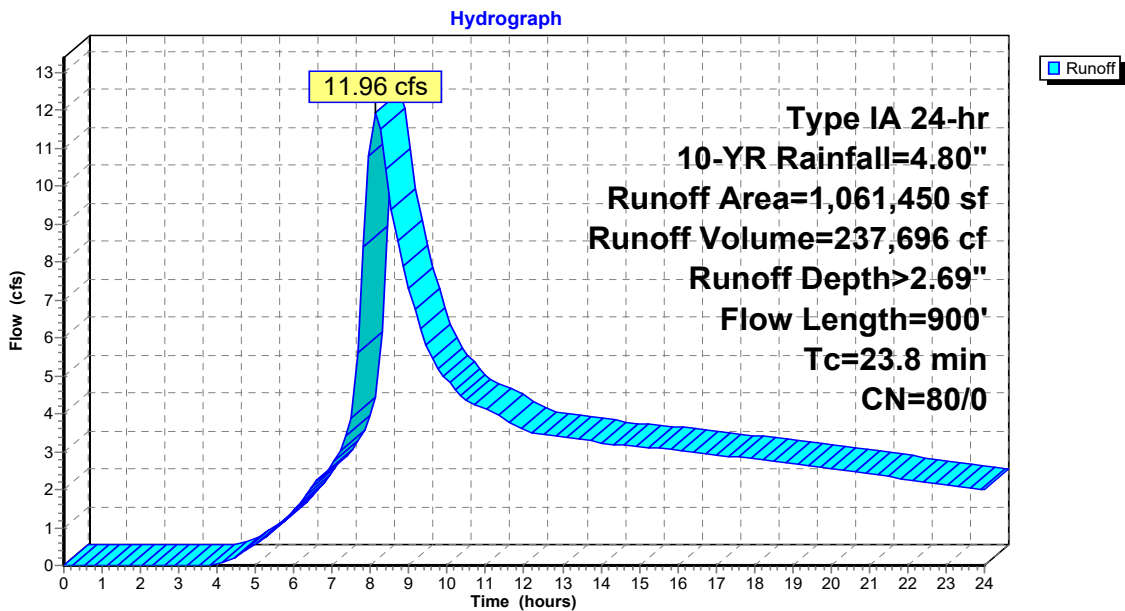
Runoff = 11.96 cfs @ 8.14 hrs, Volume= 237,696 cf, Depth> 2.69"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 10-YR Rainfall=4.80"

| Area (sf) | CN | Description |
|-------------|----|-----------------------|
| * 1,061,450 | 80 | Row Crops (C + CR) |
| 1,061,450 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 18.6 | 300 | 0.0600 | 0.27 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 5.2 | 600 | 0.0450 | 1.91 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 23.8 | 900 | Total | | | |

Subcatchment 1S: Pre-Developed



7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/28/2019

Summary for Subcatchment 2S: Existing Upstream

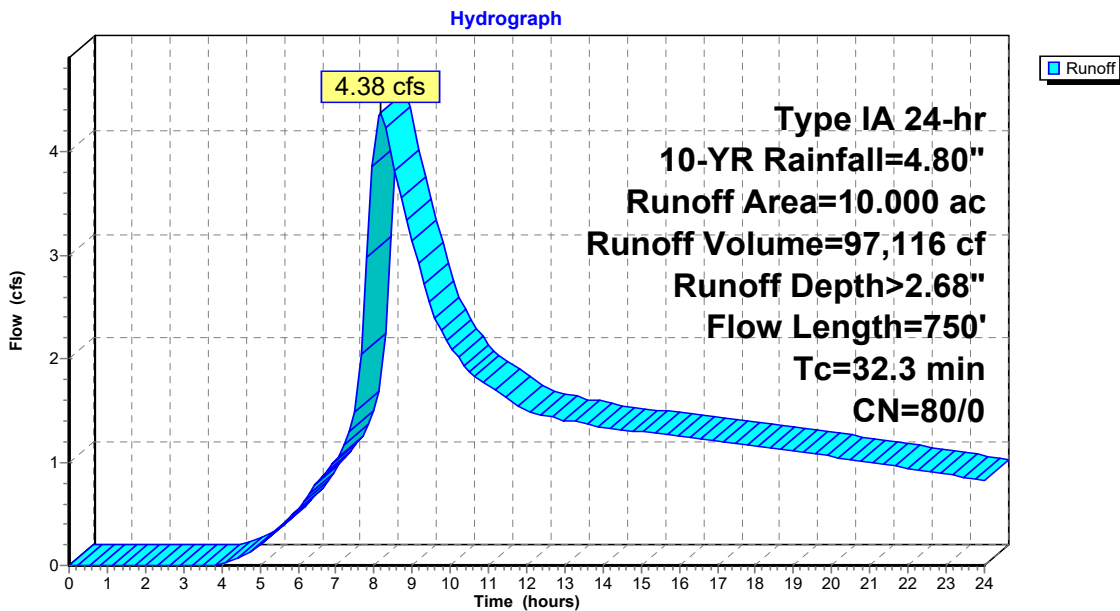
Runoff = 4.38 cfs @ 8.18 hrs, Volume= 97,116 cf, Depth> 2.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 10-YR Rainfall=4.80"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream





**Appendix B.5:
Pre-Developed Hydrograph and Flow
Information 25-Year Storm Event**

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/28/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Pre-Developed

Runoff Area=1,061,450 sf 0.00% Impervious Runoff Depth>3.30"
Flow Length=900' Tc=23.8 min CN=80/0 Runoff=15.03 cfs 291,524 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10,000 ac 0.00% Impervious Runoff Depth>3.28"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=5.56 cfs 119,130 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 410,653 cf Average Runoff Depth = 3.29"
100.00% Pervious = 1,497,050 sf 0.00% Impervious = 0 sf

7107 HydroCAD Pre

Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/28/2019

Summary for Subcatchment 1S: Pre-Developed

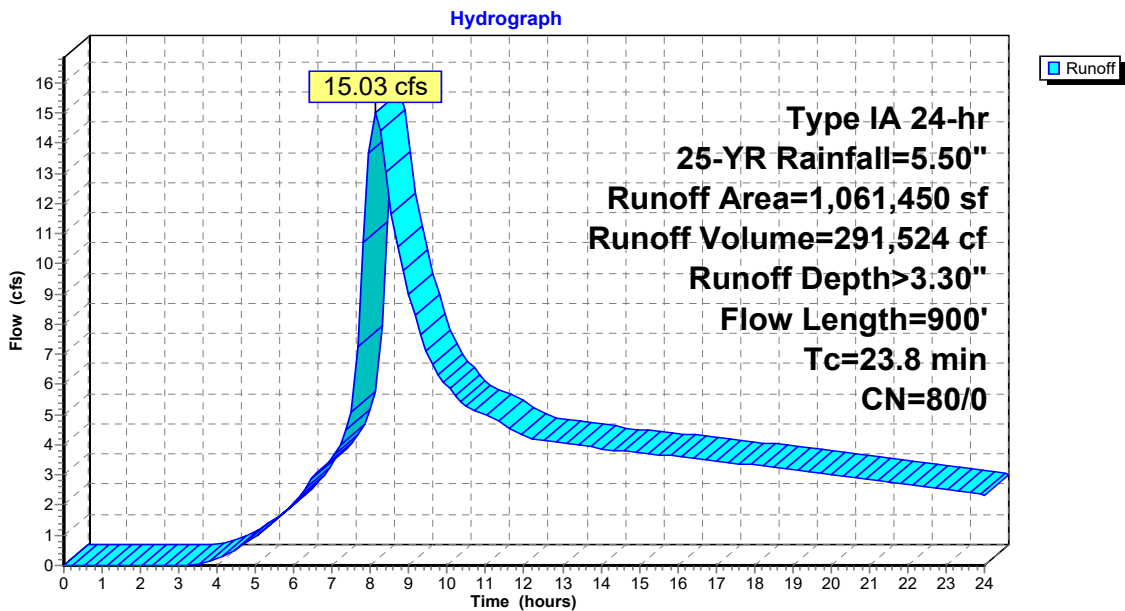
Runoff = 15.03 cfs @ 8.13 hrs, Volume= 291,524 cf, Depth> 3.30"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 25-YR Rainfall=5.50"

| Area (sf) | CN | Description |
|-------------|----|-----------------------|
| * 1,061,450 | 80 | Row Crops (C + CR) |
| 1,061,450 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 18.6 | 300 | 0.0600 | 0.27 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 5.2 | 600 | 0.0450 | 1.91 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 23.8 | 900 | Total | | | |

Subcatchment 1S: Pre-Developed



7107 HydroCAD Pre

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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/28/2019

Summary for Subcatchment 2S: Existing Upstream

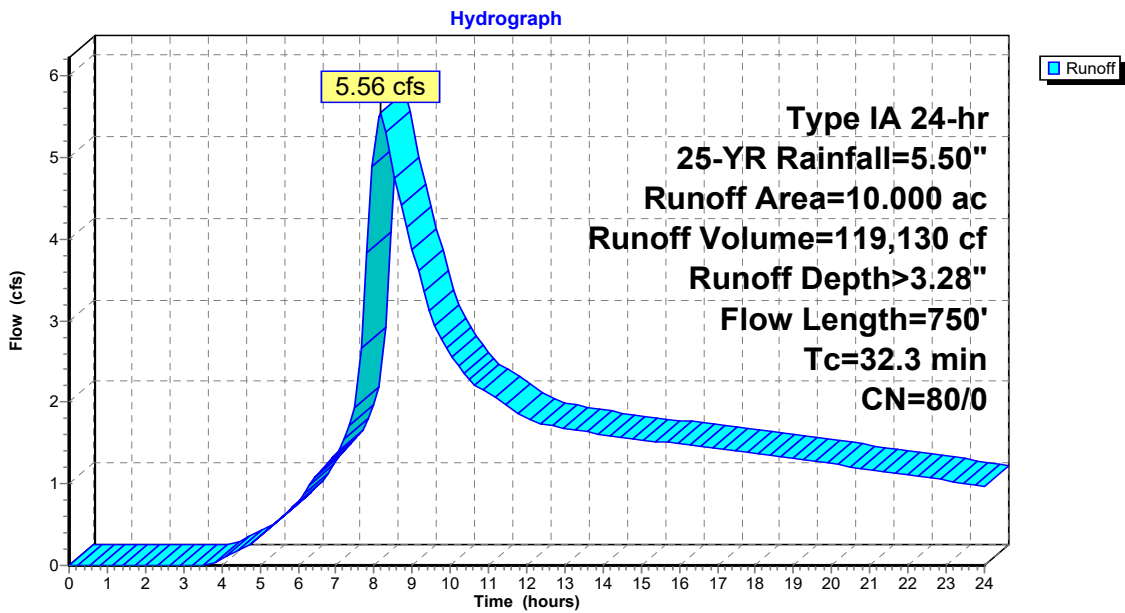
Runoff = 5.56 cfs @ 8.17 hrs, Volume= 119,130 cf, Depth> 3.28"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 25-YR Rainfall=5.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

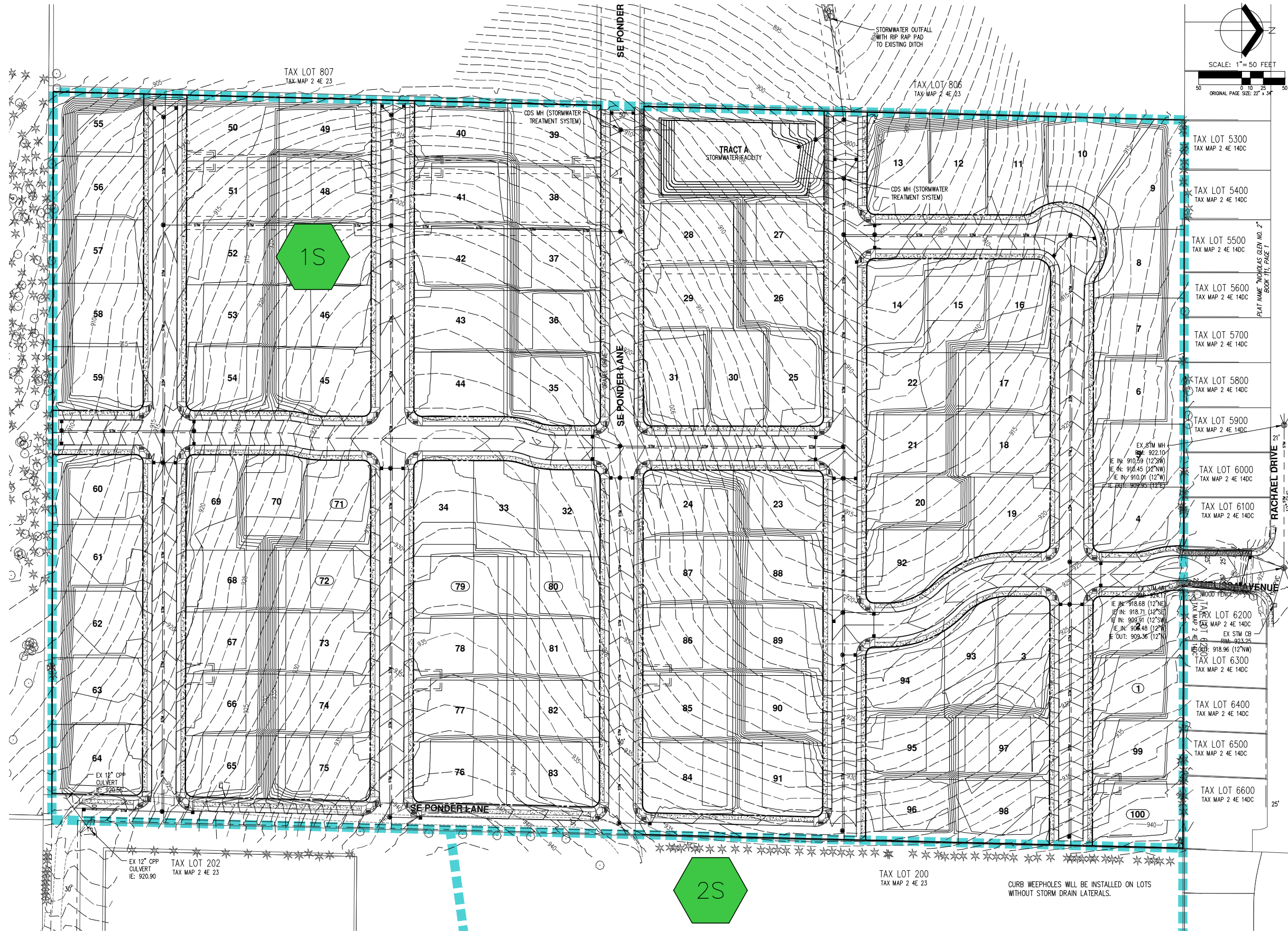
| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream





Appendix C.1: Post-Developed Catchment Map and Detail

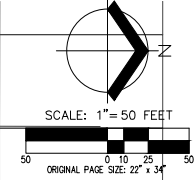


AKS DRAWING FILE: 7107 POST-DEVELOPED BASIN MAP.DWG | LAYOUT: 1

EX 12" CPP CULVERT IE: 920.90
 TAX LOT 202 TAX MAP 2 4E 23

TAX LOT 200 TAX MAP 2 4E 23

CURB WEEPHOLES WILL BE INSTALLED ON LOTS WITHOUT STORM DRAIN LATERALS.



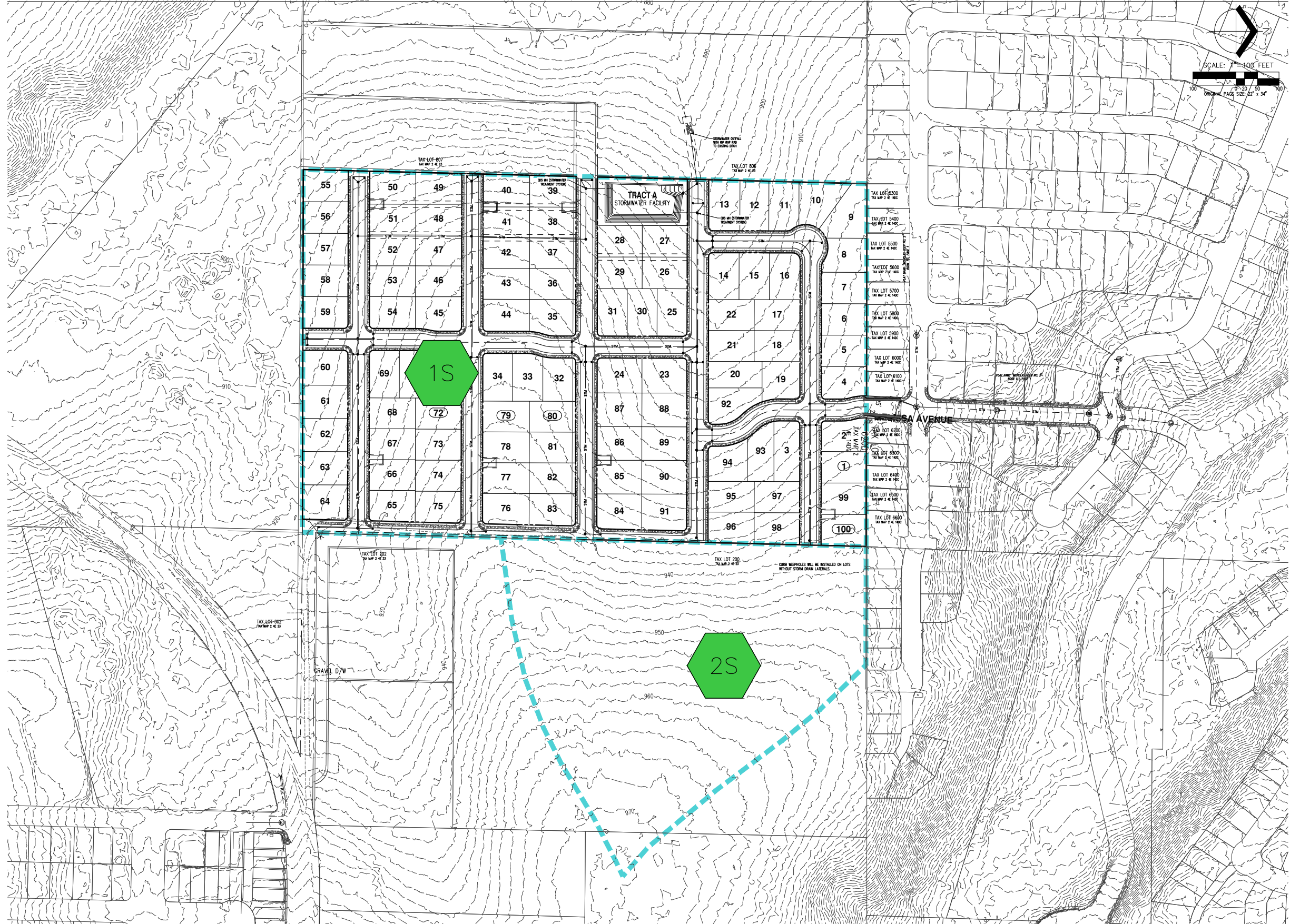
JOB NUMBER: 7107
 DATE: 06/12/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

POST-DEVELOPED BASIN MAP

BAILEY MEADOWS SANDY, OREGON

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 FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

AKS DRAWING FILE: 7107 POST-DEVELOPED MAP.DWG | LAYOUT: 2



POST-DEVELOPED BASIN MAP

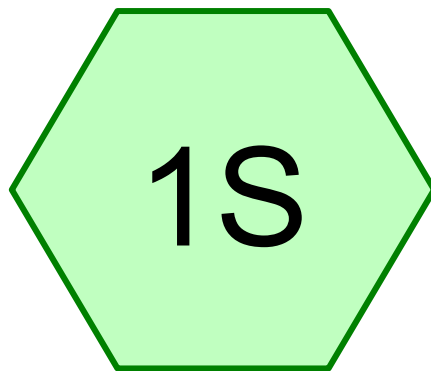
BAILEY MEADOWS SANDY, OREGON

JOB NUMBER: 7107
 DATE: 06/12/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

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**Appendix C.2:
Post-Developed Hydrograph and Flow
Information Water Quality Storm Event**



Post-Developed



Routing Diagram for 7107 HydroCAD WQ
Prepared by AKS Engineering & Forestry, LLC, Printed 5/28/2019
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7107 HydroCAD WQ

Prepared by AKS Engineering & Forestry, LLC

Printed 5/28/2019

HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

| Area (sq-ft) | C | Description (subcatchment-numbers) |
|-----------------|------|---------------------------------------|
| 272,250 | 0.90 | 99 Lots - 2750 sf per lot (1S) |
| 218,400 | 0.90 | Pavement and sidewalk (1S) |
| 490,650 | 0.90 | TOTAL AREA |

7107 HydroCAD WQ

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Rainfall Duration=5 min, Inten=0.20 in/hr

Printed 5/28/2019

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Post-Developed

Runoff Area=490,650 sf 0.00% Impervious Runoff Depth=0.01"

Tc=5.0 min C=0.90 Runoff=1.97 cfs 612 cf

Total Runoff Area = 490,650 sf Runoff Volume = 612 cf Average Runoff Depth = 0.01"

100.00% Pervious = 490,650 sf 0.00% Impervious = 0 sf

7107 HydroCAD WQ

Prepared by AKS Engineering & Forestry, LLC
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Rainfall Duration=5 min, Inten=0.20 in/hr

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Summary for Subcatchment 1S: Post-Developed

Runoff = 1.97 cfs @ 0.08 hrs, Volume= 612 cf, Depth= 0.01"

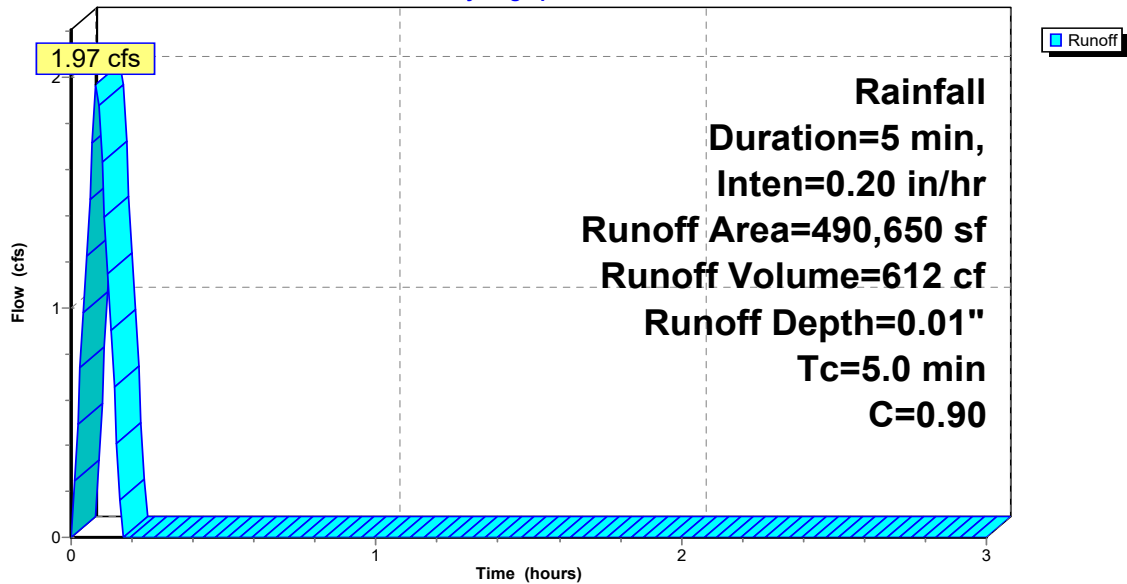
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
 Rainfall Duration=5 min, Inten=0.20 in/hr

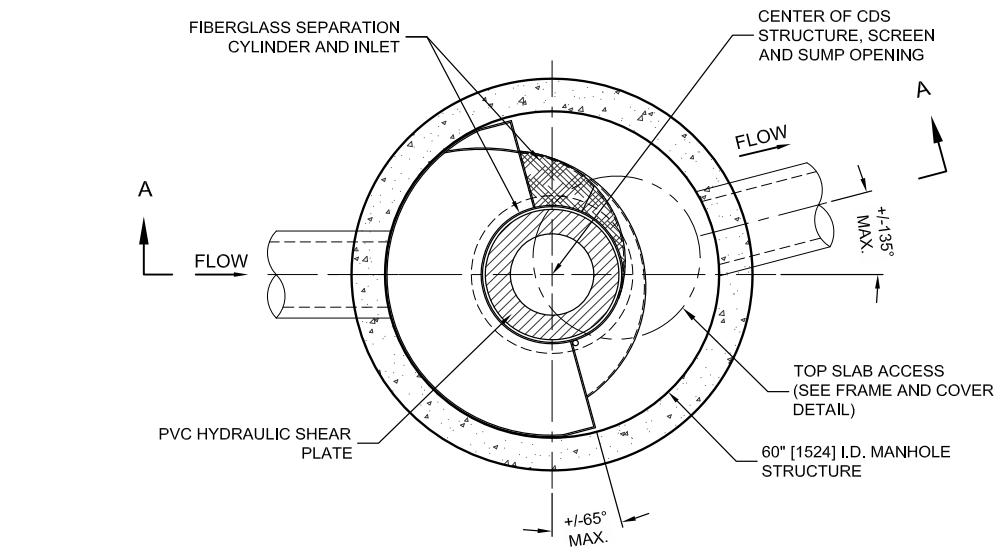
| Area (sf) | C | Description |
|-----------|------|---------------------------|
| 272,250 | 0.90 | 99 Lots - 2750 sf per lot |
| 218,400 | 0.90 | Pavement and sidewalk |
| 490,650 | 0.90 | Weighted Average |
| 490,650 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

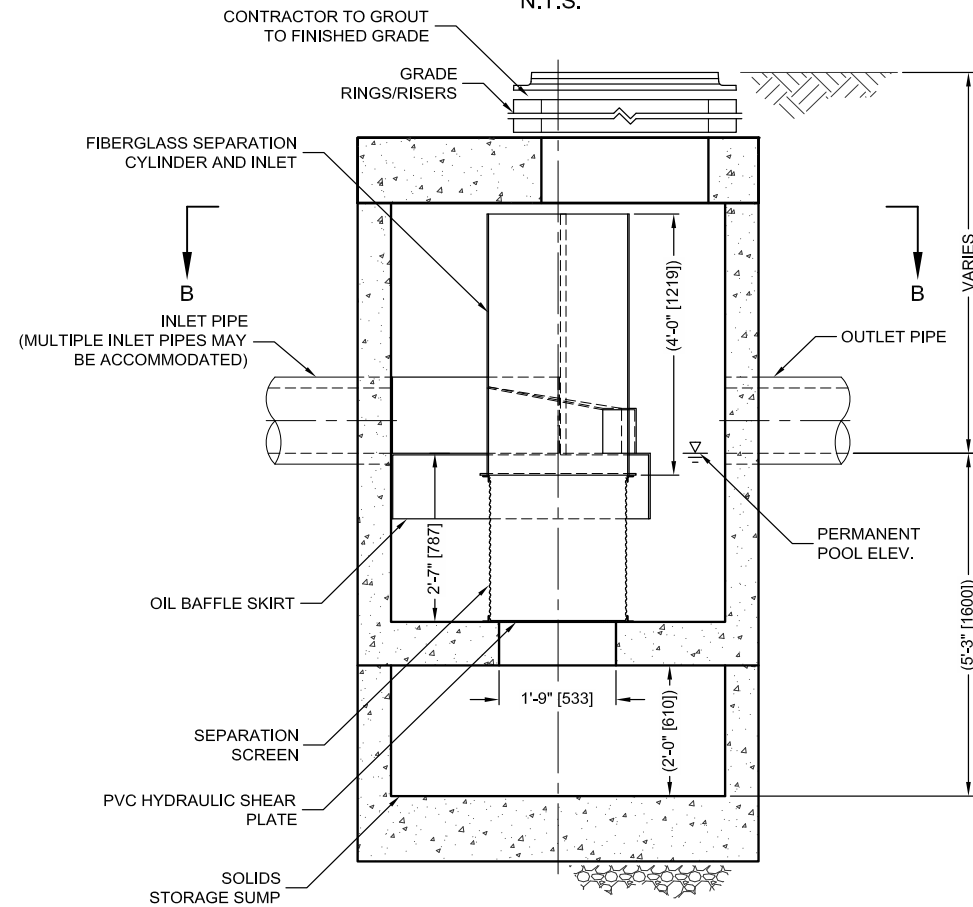
Subcatchment 1S: Post-Developed

Hydrograph

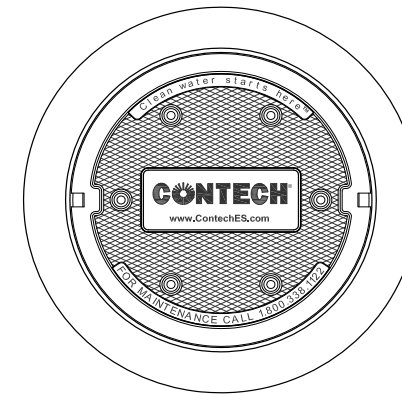




PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS2020-5-C DESIGN NOTES

CDS2020-5-C RATED TREATMENT CAPACITY IS 1.1 CFS [31.2 L/s], OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 14.0 CFS [396 L/s]. IF THE SITE CONDITIONS EXCEED 14.0 CFS [396 L/s], AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS2020-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

- GRATED INLET ONLY (NO INLET PIPE)
- GRATED INLET WITH INLET PIPE OR PIPES
- CURB INLET ONLY (NO INLET PIPE)
- CURB INLET WITH INLET PIPE OR PIPES
- SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
- SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DATA REQUIREMENTS

| | | | |
|--------------------------------------|-------|----------|----------|
| STRUCTURE ID | | | |
| WATER QUALITY FLOW RATE (CFS OR L/s) | | * | |
| PEAK FLOW RATE (CFS OR L/s) | | * | |
| RETURN PERIOD OF PEAK FLOW (YRS) | | * | |
| SCREEN APERTURE (2400 OR 4700) | | * | |
| PIPE DATA: | I.E. | MATERIAL | DIAMETER |
| INLET PIPE 1 | * | * | * |
| INLET PIPE 2 | * | * | * |
| OUTLET PIPE | * | * | * |
| RIM ELEVATION | | | * |
| ANTI-FLOTATION BALLAST | WIDTH | HEIGHT | |
| | * | * | |
| NOTES/SPECIAL REQUIREMENTS: | | | |
| * PER ENGINEER OF RECORD | | | |

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
- C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

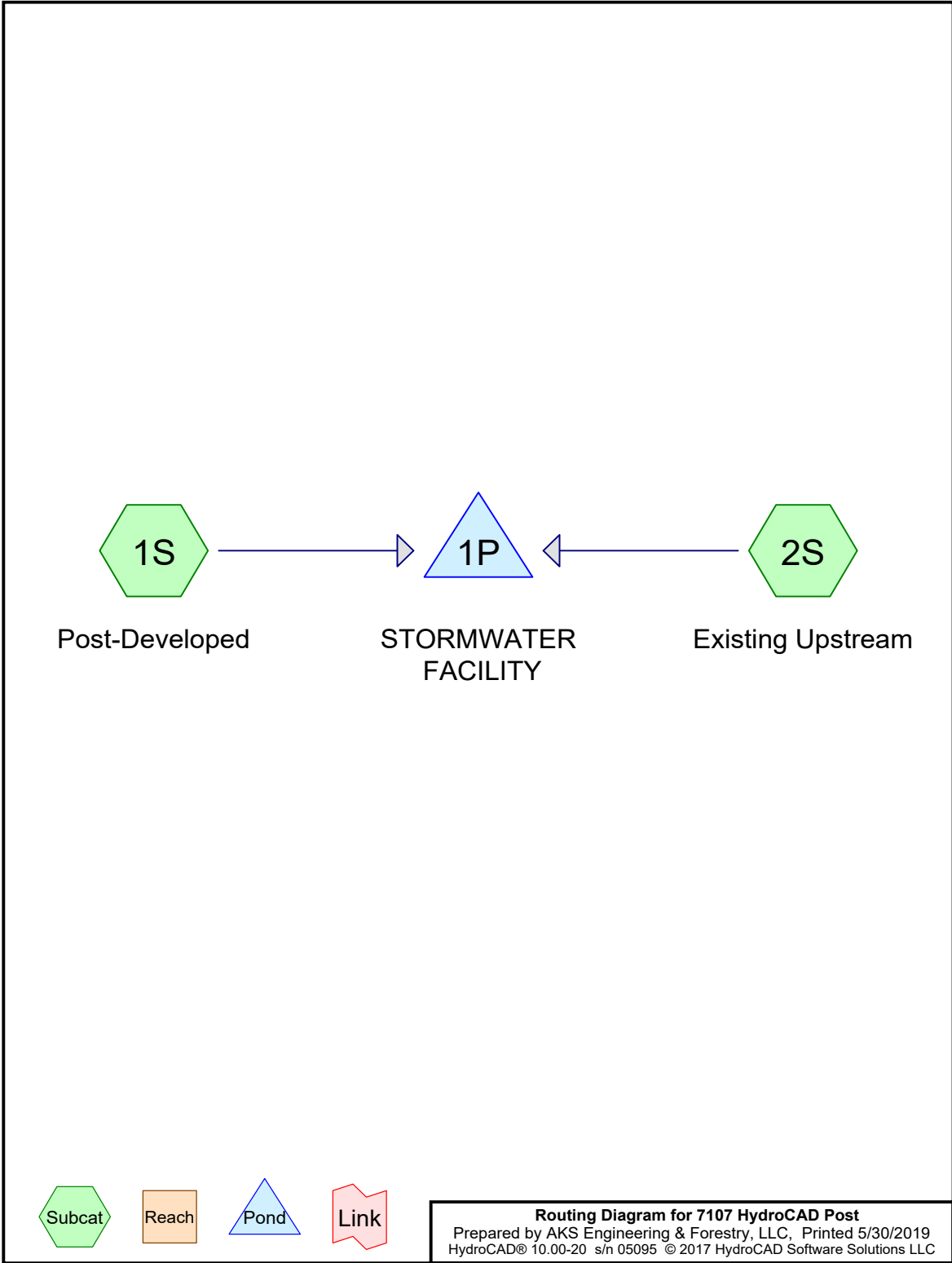
CDS2020-5-C
INLINE CDS
STANDARD DETAIL

I:\STORMWATER\COMMISSIONS\22_CDS\40_STANDARD_DRAWINGS\INLINE (CDS-C)\DWG\CDS2020-5-C-DTL.DWG 5/13/2014 5:55 PM

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 2,788,848; 6,841,232; 6,511,095; 6,981,782. RELATED FOREIGN PATENTS OR OTHER PATENT NUMBERS.



Appendix C.3: Post-Developed Hydrograph and Flow Information 2-Year Storm Event



7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC

Printed 5/30/2019

HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|------------------|-----------|---------------------------------------|
| 272,250 | 98 | 99 Lots - 2750 sf per lot (1S) |
| 570,800 | 74 | Lawns (1S) |
| 218,400 | 98 | Pavement and sidewalk (1S) |
| 435,600 | 80 | Row Crops (C + CR) (2S) |
| 1,497,050 | 84 | TOTAL AREA |

7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/30/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Post-Developed

Runoff Area=1,061,450 sf 46.22% Impervious Runoff Depth>2.17"
Tc=5.0 min CN=74/98 Runoff=12.23 cfs 192,130 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>1.61"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=2.41 cfs 58,339 cf

Pond 1P: STORMWATER FACILITY

Peak Elev=896.67' Storage=16,658 cf Inflow=14.30 cfs 250,470 cf
Outflow=8.68 cfs 249,710 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 250,470 cf Average Runoff Depth = 2.01"
67.23% Pervious = 1,006,400 sf 32.77% Impervious = 490,650 sf

7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/30/2019

Summary for Subcatchment 1S: Post-Developed

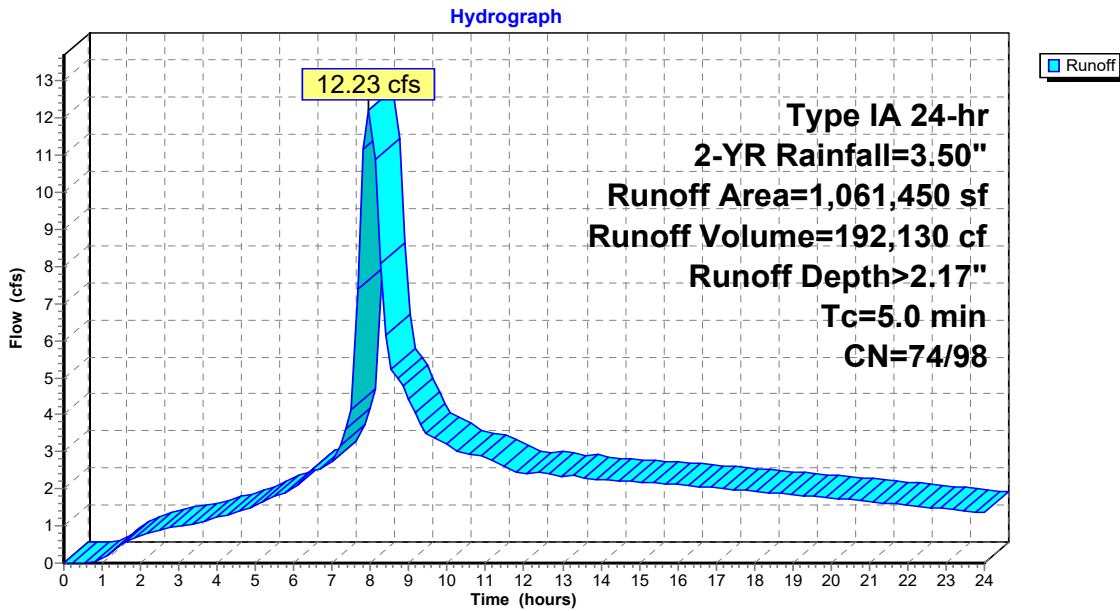
Runoff = 12.23 cfs @ 7.94 hrs, Volume= 192,130 cf, Depth > 2.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 2-YR Rainfall=3.50"

| Area (sf) | CN | Description |
|-----------|----|---------------------------|
| * 272,250 | 98 | 99 Lots - 2750 sf per lot |
| * 218,400 | 98 | Pavement and sidewalk |
| * 570,800 | 74 | Lawns |
| 1,061,450 | 85 | Weighted Average |
| 570,800 | | 53.78% Pervious Area |
| 490,650 | | 46.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Post-Developed



7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/30/2019

Summary for Subcatchment 2S: Existing Upstream

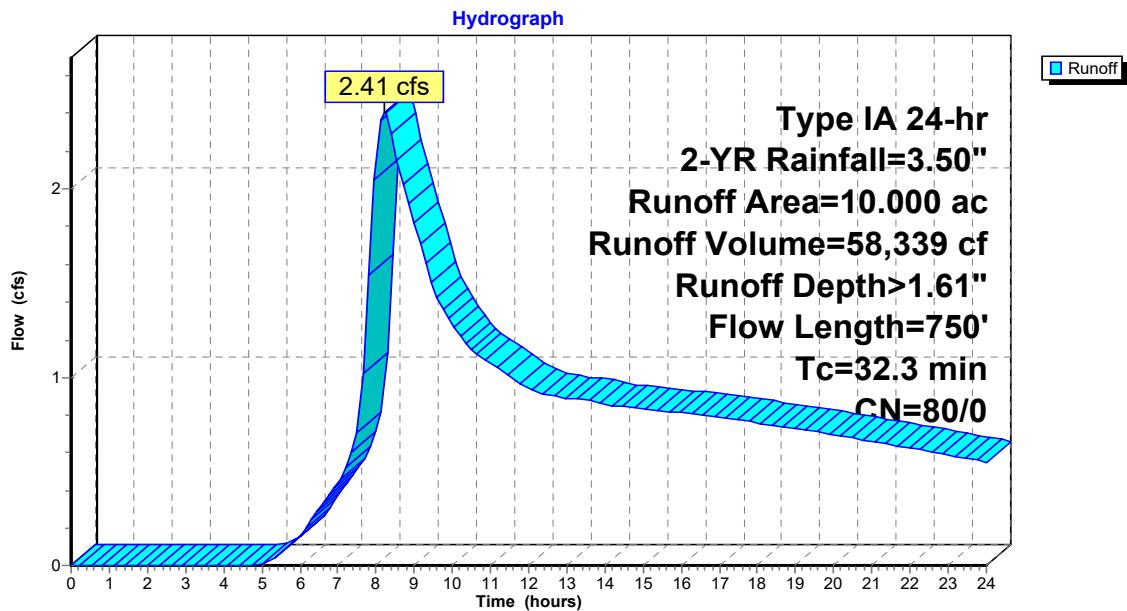
Runoff = 2.41 cfs @ 8.21 hrs, Volume= 58,339 cf, Depth> 1.61"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 2-YR Rainfall=3.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream



7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 2-YR Rainfall=3.50"

Printed 5/30/2019

Summary for Pond 1P: STORMWATER FACILITY

Inflow Area = 1,497,050 sf, 32.77% Impervious, Inflow Depth > 2.01" for 2-YR event
 Inflow = 14.30 cfs @ 7.97 hrs, Volume= 250,470 cf
 Outflow = 8.68 cfs @ 8.41 hrs, Volume= 249,710 cf, Atten= 39%, Lag= 26.4 min
 Primary = 8.68 cfs @ 8.41 hrs, Volume= 249,710 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Peak Elev= 896.67' @ 8.41 hrs Surf.Area= 10,853 sf Storage= 16,658 cf

Plug-Flow detention time= 14.5 min calculated for 249,710 cf (100% of inflow)
 Center-of-Mass det. time= 12.3 min (760.6 - 748.3)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 895.00' | 58,640 cf | Custom Stage Data (Pyramidal) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|------------------|-------------------|------------------------|------------------------|------------------|
| 895.00 | 9,160 | 0 | 0 | 9,160 |
| 896.00 | 10,180 | 9,666 | 9,666 | 10,253 |
| 897.00 | 11,200 | 10,686 | 20,351 | 11,354 |
| 898.00 | 12,200 | 11,696 | 32,048 | 12,443 |
| 899.00 | 13,300 | 12,746 | 44,794 | 13,632 |
| 900.00 | 14,400 | 13,846 | 58,640 | 14,829 |

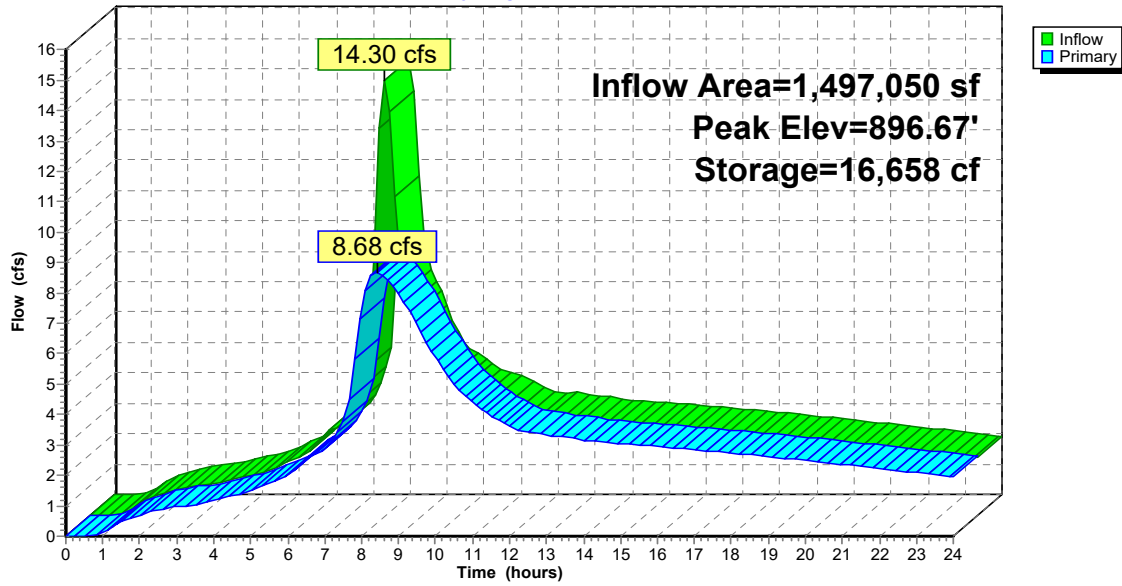
| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 895.00' | 16.0" Horiz. Orifice/Grate C= 0.600 |
| #2 | Primary | 896.70' | 13.0" Horiz. Orifice/Grate C= 0.600 |
| #3 | Primary | 898.50' | 24.0" Horiz. Riser Overflow Inside of Control MH C= 0.600 |

Primary OutFlow Max=8.67 cfs @ 8.41 hrs HW=896.66' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 8.67 cfs @ 6.21 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Riser Overflow Inside of Control MH (Controls 0.00 cfs)

Pond 1P: STORMWATER FACILITY

Hydrograph





**Appendix C.4:
Post-Developed Hydrograph and Flow
Information 5-Year Storm Event**

7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/30/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Post-Developed

Runoff Area=1,061,450 sf 46.22% Impervious Runoff Depth>3.03"
Tc=5.0 min CN=74/98 Runoff=17.45 cfs 267,615 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>2.42"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=3.91 cfs 87,888 cf

Pond 1P: STORMWATER FACILITY

Peak Elev=897.41' Storage=25,071 cf Inflow=20.88 cfs 355,502 cf
Outflow=14.20 cfs 354,070 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 355,502 cf Average Runoff Depth = 2.85"
67.23% Pervious = 1,006,400 sf 32.77% Impervious = 490,650 sf

7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/30/2019

Summary for Subcatchment 1S: Post-Developed

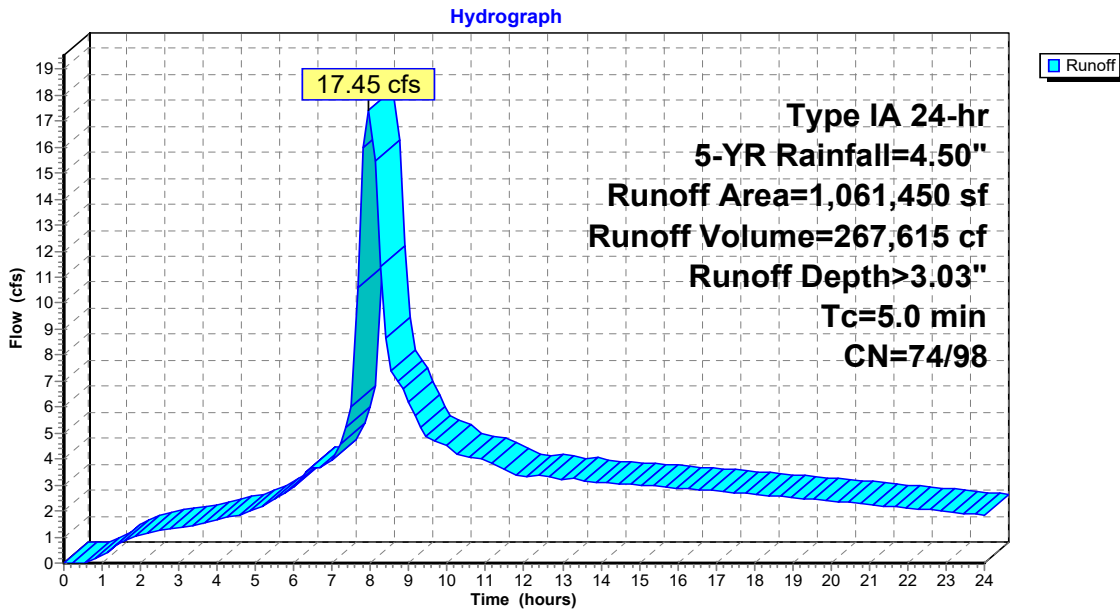
Runoff = 17.45 cfs @ 7.94 hrs, Volume= 267,615 cf, Depth> 3.03"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 5-YR Rainfall=4.50"

| Area (sf) | CN | Description |
|-----------|----|---------------------------|
| * 272,250 | 98 | 99 Lots - 2750 sf per lot |
| * 218,400 | 98 | Pavement and sidewalk |
| * 570,800 | 74 | Lawns |
| 1,061,450 | 85 | Weighted Average |
| 570,800 | | 53.78% Pervious Area |
| 490,650 | | 46.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Post-Developed



7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/30/2019

Summary for Subcatchment 2S: Existing Upstream

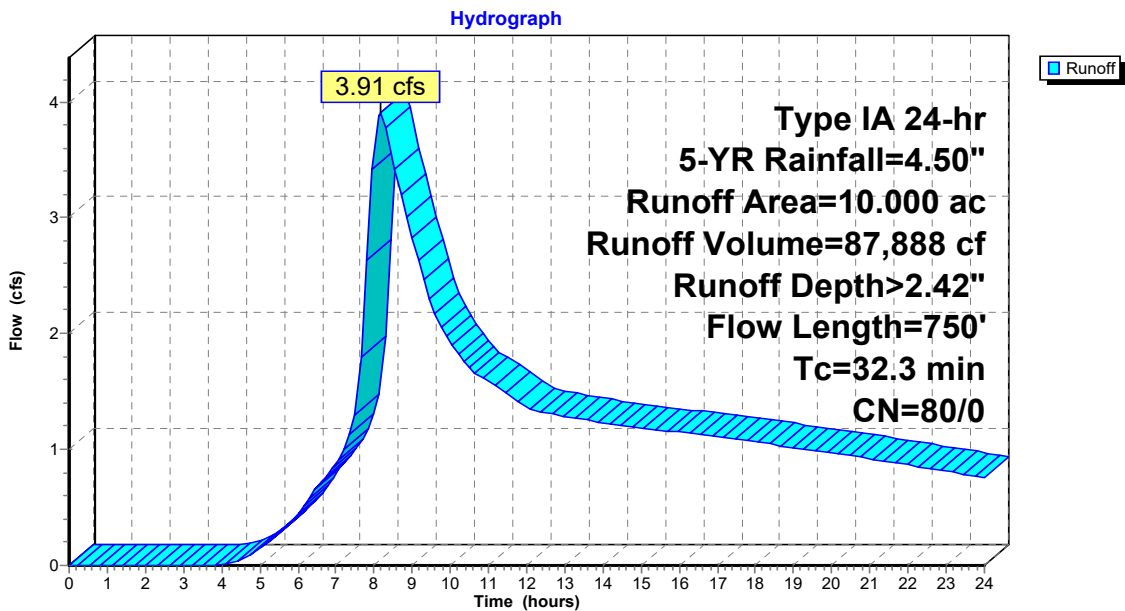
Runoff = 3.91 cfs @ 8.18 hrs, Volume= 87,888 cf, Depth> 2.42"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 5-YR Rainfall=4.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream



7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 5-YR Rainfall=4.50"

Printed 5/30/2019

Summary for Pond 1P: STORMWATER FACILITY

Inflow Area = 1,497,050 sf, 32.77% Impervious, Inflow Depth > 2.85" for 5-YR event
 Inflow = 20.88 cfs @ 7.96 hrs, Volume= 355,502 cf
 Outflow = 14.20 cfs @ 8.32 hrs, Volume= 354,070 cf, Atten= 32%, Lag= 21.1 min
 Primary = 14.20 cfs @ 8.32 hrs, Volume= 354,070 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Peak Elev= 897.41' @ 8.32 hrs Surf.Area= 11,609 sf Storage= 25,071 cf

Plug-Flow detention time= 18.3 min calculated for 354,070 cf (100% of inflow)
 Center-of-Mass det. time= 15.4 min (754.5 - 739.1)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 895.00' | 58,640 cf | Custom Stage Data (Pyramidal) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|------------------|-------------------|------------------------|------------------------|------------------|
| 895.00 | 9,160 | 0 | 0 | 9,160 |
| 896.00 | 10,180 | 9,666 | 9,666 | 10,253 |
| 897.00 | 11,200 | 10,686 | 20,351 | 11,354 |
| 898.00 | 12,200 | 11,696 | 32,048 | 12,443 |
| 899.00 | 13,300 | 12,746 | 44,794 | 13,632 |
| 900.00 | 14,400 | 13,846 | 58,640 | 14,829 |

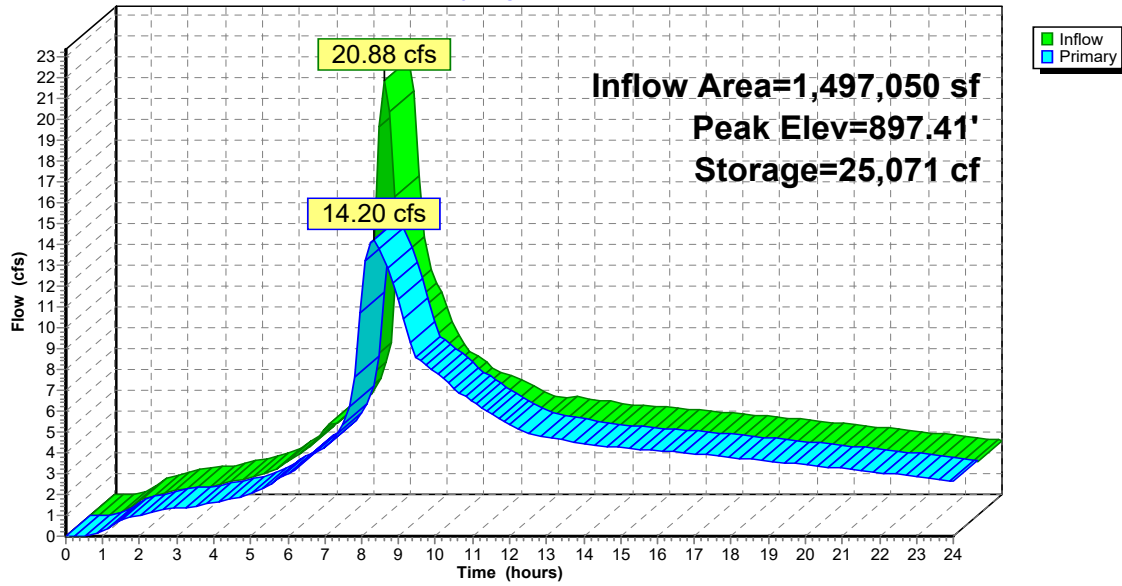
| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 895.00' | 16.0" Horiz. Orifice/Grate C= 0.600 |
| #2 | Primary | 896.70' | 13.0" Horiz. Orifice/Grate C= 0.600 |
| #3 | Primary | 898.50' | 24.0" Horiz. Riser Overflow Inside of Control MH C= 0.600 |

Primary OutFlow Max=14.09 cfs @ 8.32 hrs HW=897.39' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 10.40 cfs @ 7.45 fps)
- 2=Orifice/Grate (Orifice Controls 3.69 cfs @ 4.00 fps)
- 3=Riser Overflow Inside of Control MH (Controls 0.00 cfs)

Pond 1P: STORMWATER FACILITY

Hydrograph





**Appendix C.5:
Post-Developed Hydrograph and Flow
Information 10-Year Storm Event**

7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC

HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/30/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Post-Developed

Runoff Area=1,061,450 sf 46.22% Impervious Runoff Depth>3.29"
Tc=5.0 min CN=74/98 Runoff=19.07 cfs 290,920 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>2.68"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=4.38 cfs 97,116 cf

Pond 1P: STORMWATER FACILITY

Peak Elev=897.68' Storage=28,208 cf Inflow=22.93 cfs 388,036 cf
Outflow=15.41 cfs 386,357 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 388,036 cf Average Runoff Depth = 3.11"
67.23% Pervious = 1,006,400 sf 32.77% Impervious = 490,650 sf

7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/30/2019

Summary for Subcatchment 1S: Post-Developed

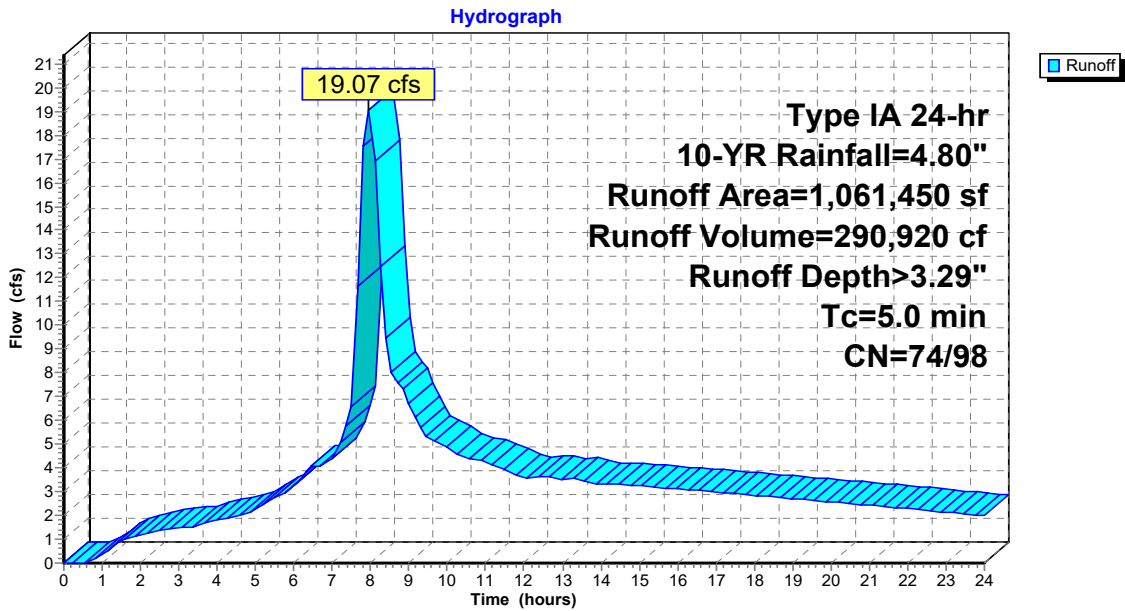
Runoff = 19.07 cfs @ 7.94 hrs, Volume= 290,920 cf, Depth> 3.29"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 10-YR Rainfall=4.80"

| Area (sf) | CN | Description |
|-----------|----|---------------------------|
| * 272,250 | 98 | 99 Lots - 2750 sf per lot |
| * 218,400 | 98 | Pavement and sidewalk |
| * 570,800 | 74 | Lawns |
| 1,061,450 | 85 | Weighted Average |
| 570,800 | | 53.78% Pervious Area |
| 490,650 | | 46.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Post-Developed



7107 HydroCAD Post

Prepared by AKS Engineering & Forestry, LLC
 HydroCAD® 10.00-20 s/n 05095 © 2017 HydroCAD Software Solutions LLC

Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/30/2019

Summary for Subcatchment 2S: Existing Upstream

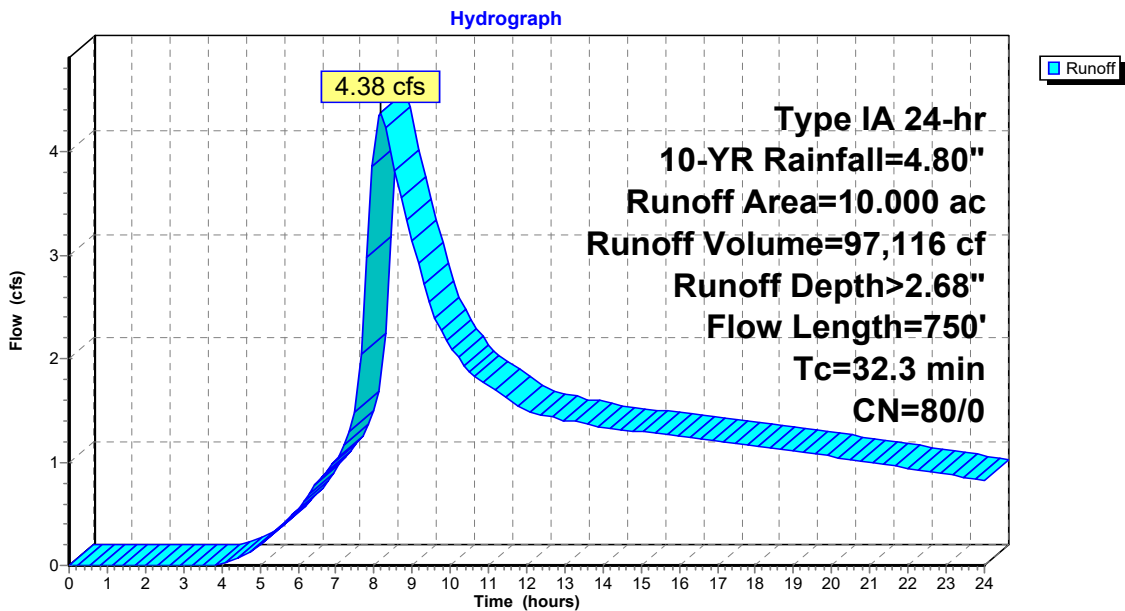
Runoff = 4.38 cfs @ 8.18 hrs, Volume= 97,116 cf, Depth> 2.68"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 10-YR Rainfall=4.80"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream



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Type IA 24-hr 10-YR Rainfall=4.80"

Printed 5/30/2019

Summary for Pond 1P: STORMWATER FACILITY

Inflow Area = 1,497,050 sf, 32.77% Impervious, Inflow Depth > 3.11" for 10-YR event
 Inflow = 22.93 cfs @ 7.96 hrs, Volume= 388,036 cf
 Outflow = 15.41 cfs @ 8.32 hrs, Volume= 386,357 cf, Atten= 33%, Lag= 21.5 min
 Primary = 15.41 cfs @ 8.32 hrs, Volume= 386,357 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Peak Elev= 897.68' @ 8.32 hrs Surf.Area= 11,876 sf Storage= 28,208 cf

Plug-Flow detention time= 19.5 min calculated for 383,957 cf (99% of inflow)
 Center-of-Mass det. time= 16.3 min (752.9 - 736.6)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 895.00' | 58,640 cf | Custom Stage Data (Pyramidal) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|------------------|-------------------|------------------------|------------------------|------------------|
| 895.00 | 9,160 | 0 | 0 | 9,160 |
| 896.00 | 10,180 | 9,666 | 9,666 | 10,253 |
| 897.00 | 11,200 | 10,686 | 20,351 | 11,354 |
| 898.00 | 12,200 | 11,696 | 32,048 | 12,443 |
| 899.00 | 13,300 | 12,746 | 44,794 | 13,632 |
| 900.00 | 14,400 | 13,846 | 58,640 | 14,829 |

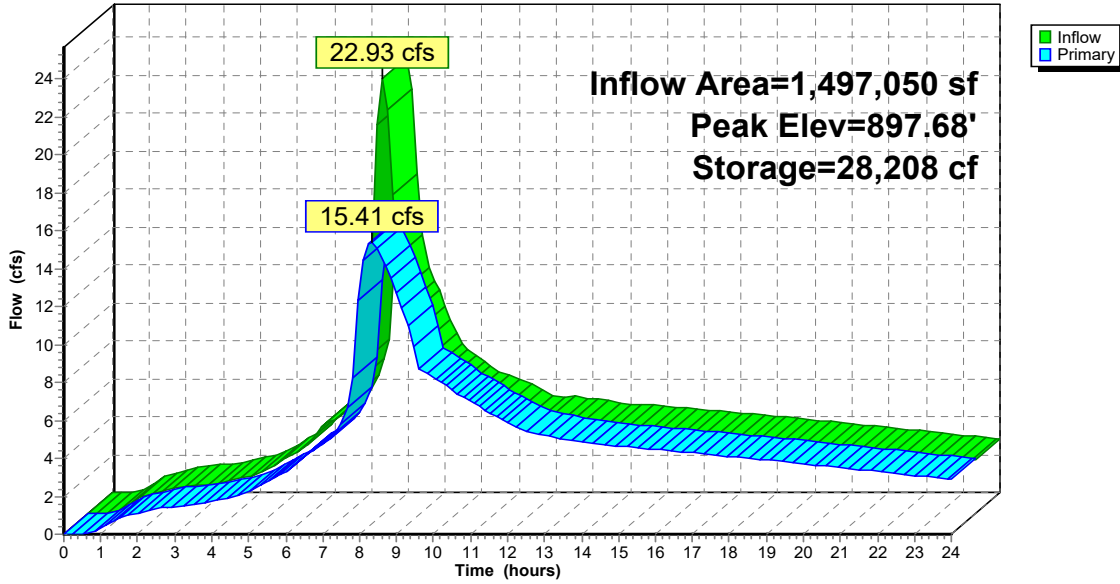
| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 895.00' | 16.0" Horiz. Orifice/Grate C= 0.600 |
| #2 | Primary | 896.70' | 13.0" Horiz. Orifice/Grate C= 0.600 |
| #3 | Primary | 898.50' | 24.0" Horiz. Riser Overflow Inside of Control MH C= 0.600 |

Primary OutFlow Max=15.30 cfs @ 8.32 hrs HW=897.66' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 10.96 cfs @ 7.85 fps)
- 2=Orifice/Grate (Orifice Controls 4.34 cfs @ 4.71 fps)
- 3=Riser Overflow Inside of Control MH (Controls 0.00 cfs)

Pond 1P: STORMWATER FACILITY

Hydrograph





**Appendix C.6:
Post-Developed Hydrograph and Flow
Information 25-Year Storm Event**

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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/30/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Post-Developed

Runoff Area=1,061,450 sf 46.22% Impervious Runoff Depth>3.91"
Tc=5.0 min CN=74/98 Runoff=22.94 cfs 346,196 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>3.28"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=5.56 cfs 119,130 cf

Pond 1P: STORMWATER FACILITY

Peak Elev=898.32' Storage=36,051 cf Inflow=27.83 cfs 465,326 cf
Outflow=17.91 cfs 462,985 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 465,326 cf Average Runoff Depth = 3.73"
67.23% Pervious = 1,006,400 sf 32.77% Impervious = 490,650 sf

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Prepared by AKS Engineering & Forestry, LLC
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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/30/2019

Summary for Subcatchment 1S: Post-Developed

Runoff = 22.94 cfs @ 7.94 hrs, Volume= 346,196 cf, Depth > 3.91"

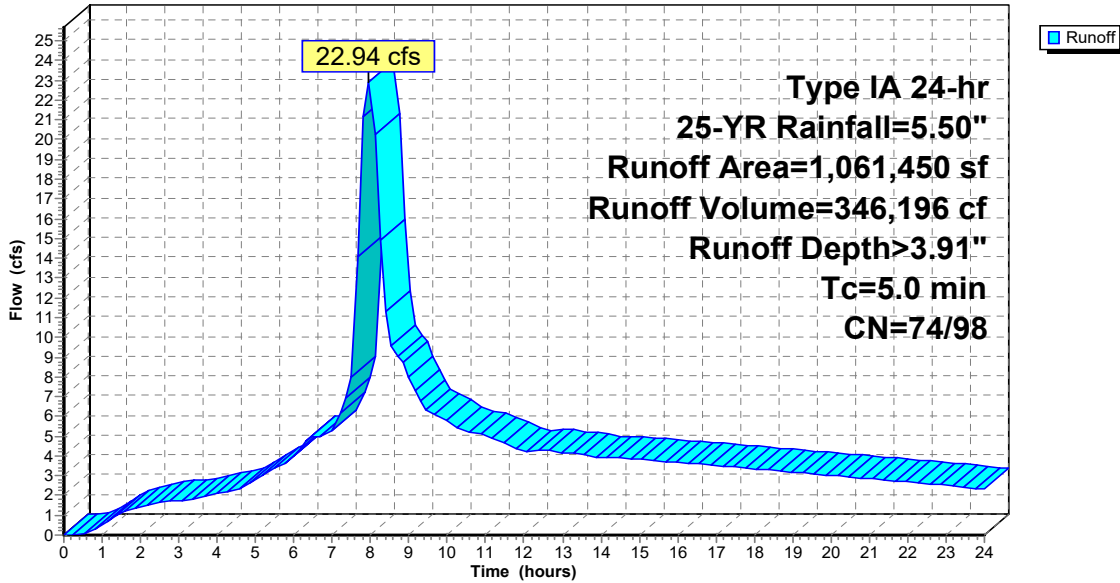
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 25-YR Rainfall=5.50"

| Area (sf) | CN | Description |
|-----------|----|---------------------------|
| * 272,250 | 98 | 99 Lots - 2750 sf per lot |
| * 218,400 | 98 | Pavement and sidewalk |
| * 570,800 | 74 | Lawns |
| 1,061,450 | 85 | Weighted Average |
| 570,800 | | 53.78% Pervious Area |
| 490,650 | | 46.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Post-Developed

Hydrograph



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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/30/2019

Summary for Subcatchment 2S: Existing Upstream

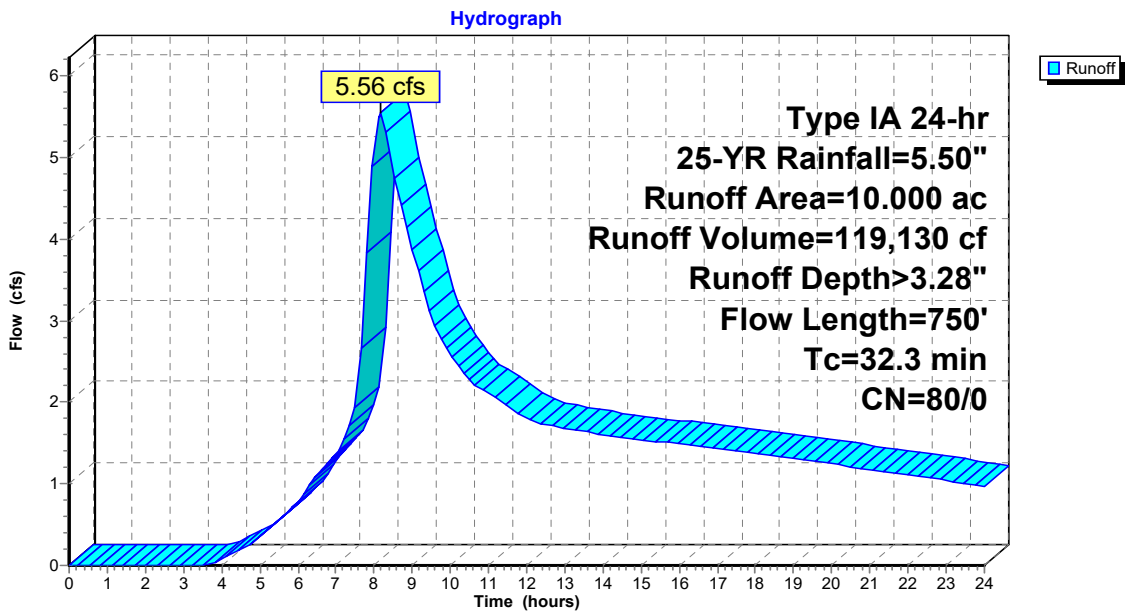
Runoff = 5.56 cfs @ 8.17 hrs, Volume= 119,130 cf, Depth> 3.28"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 25-YR Rainfall=5.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream



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Type IA 24-hr 25-YR Rainfall=5.50"

Printed 5/30/2019

Summary for Pond 1P: STORMWATER FACILITY

Inflow Area = 1,497,050 sf, 32.77% Impervious, Inflow Depth > 3.73" for 25-YR event
 Inflow = 27.83 cfs @ 7.96 hrs, Volume= 465,326 cf
 Outflow = 17.91 cfs @ 8.35 hrs, Volume= 462,985 cf, Atten= 36%, Lag= 23.5 min
 Primary = 17.91 cfs @ 8.35 hrs, Volume= 462,985 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Peak Elev= 898.32' @ 8.35 hrs Surf.Area= 12,551 sf Storage= 36,051 cf

Plug-Flow detention time= 22.0 min calculated for 460,109 cf (99% of inflow)
 Center-of-Mass det. time= 18.4 min (749.7 - 731.2)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 895.00' | 58,640 cf | Custom Stage Data (Pyramidal) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|------------------|-------------------|------------------------|------------------------|------------------|
| 895.00 | 9,160 | 0 | 0 | 9,160 |
| 896.00 | 10,180 | 9,666 | 9,666 | 10,253 |
| 897.00 | 11,200 | 10,686 | 20,351 | 11,354 |
| 898.00 | 12,200 | 11,696 | 32,048 | 12,443 |
| 899.00 | 13,300 | 12,746 | 44,794 | 13,632 |
| 900.00 | 14,400 | 13,846 | 58,640 | 14,829 |

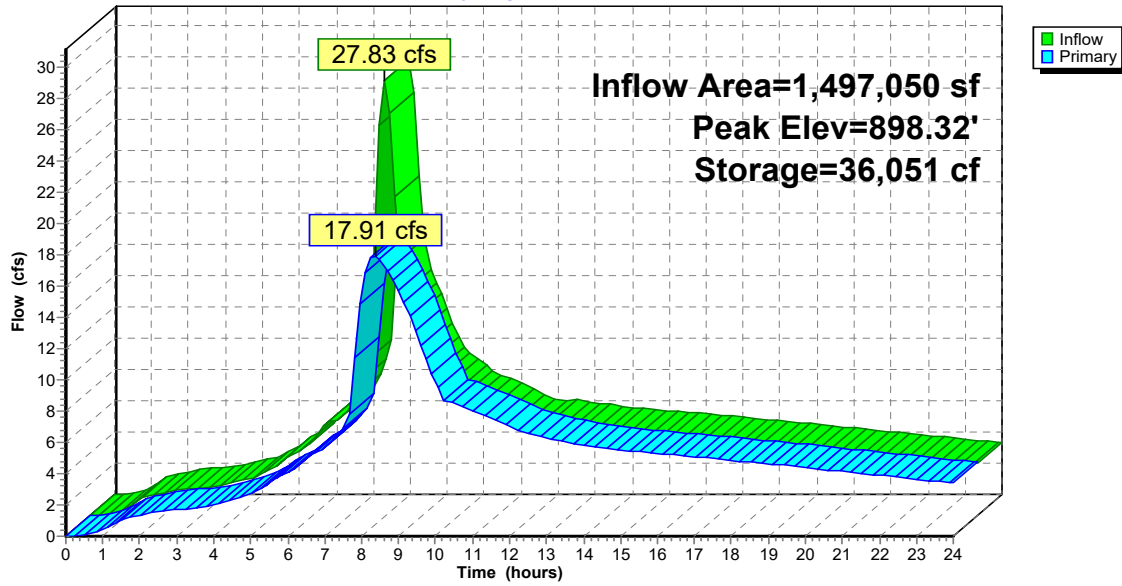
| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 895.00' | 16.0" Horiz. Orifice/Grate C= 0.600 |
| #2 | Primary | 896.70' | 13.0" Horiz. Orifice/Grate C= 0.600 |
| #3 | Primary | 898.50' | 24.0" Horiz. Riser Overflow Inside of Control MH C= 0.600 |

Primary OutFlow Max=17.86 cfs @ 8.35 hrs HW=898.31' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 12.23 cfs @ 8.76 fps)
- 2=Orifice/Grate (Orifice Controls 5.63 cfs @ 6.11 fps)
- 3=Riser Overflow Inside of Control MH (Controls 0.00 cfs)

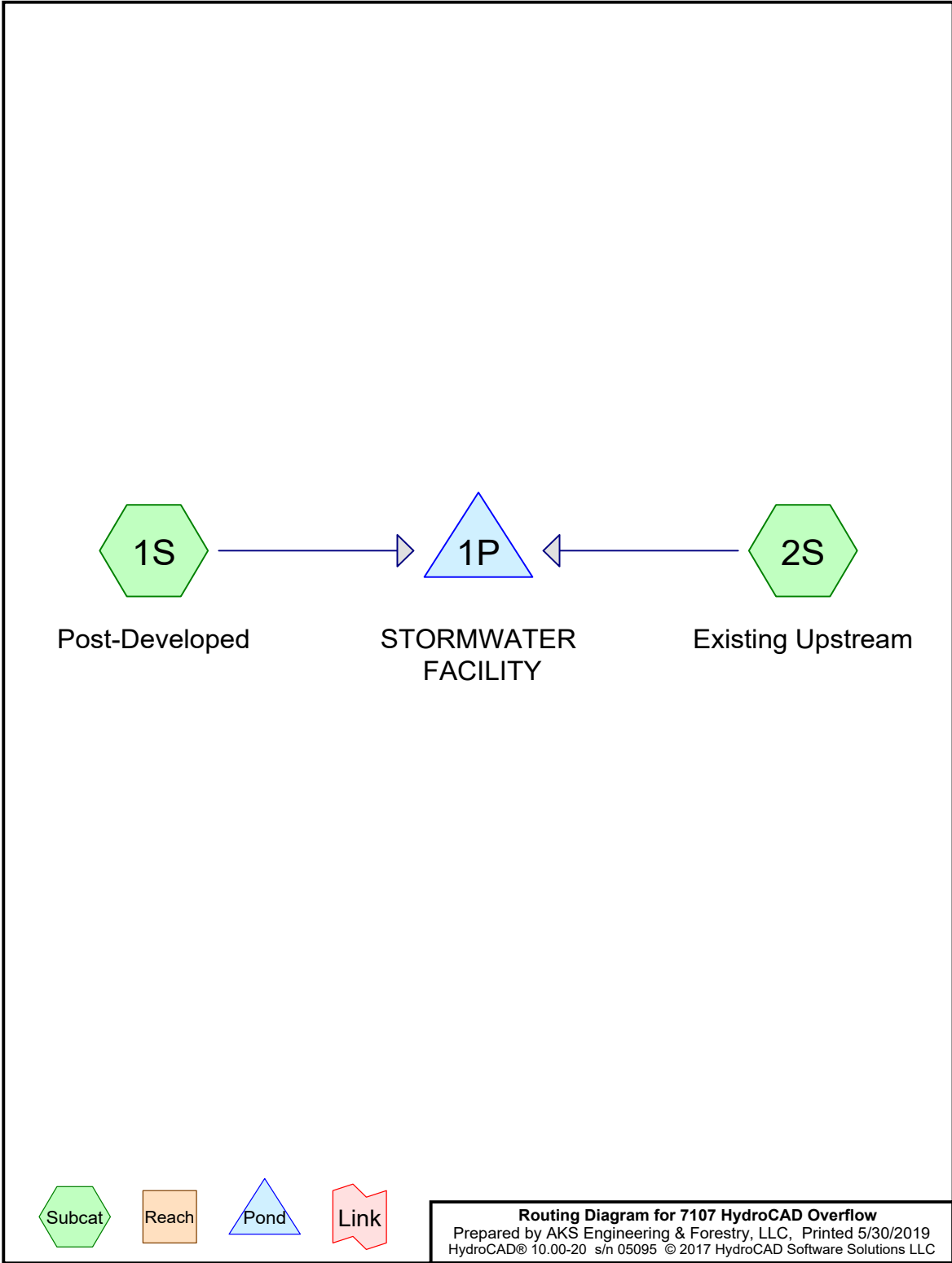
Pond 1P: STORMWATER FACILITY

Hydrograph





Appendix D: Emergency Overflow Calculations



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Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|------------------|-----------|---------------------------------------|
| 272,250 | 98 | 99 Lots - 2750 sf per lot (1S) |
| 570,800 | 74 | Lawns (1S) |
| 218,400 | 98 | Pavement and sidewalk (1S) |
| 435,600 | 80 | Row Crops (C + CR) (2S) |
| 1,497,050 | 84 | TOTAL AREA |

7107 HydroCAD Overflow

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Type IA 24-hr 100-YR Rainfall=6.50"

Printed 5/30/2019

Time span=0.00-24.00 hrs, dt=0.15 hrs, 161 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Post-Developed

Runoff Area=1,061,450 sf 46.22% Impervious Runoff Depth>4.83"
Tc=5.0 min CN=74/98 Runoff=28.61 cfs 426,873 cf

Subcatchment 2S: Existing Upstream

Runoff Area=10.000 ac 0.00% Impervious Runoff Depth>4.17"
Flow Length=750' Tc=32.3 min CN=80/0 Runoff=7.24 cfs 151,469 cf

Pond 1P: STORMWATER FACILITY

Peak Elev=899.58' Storage=52,646 cf Inflow=35.03 cfs 578,341 cf
Outflow=35.15 cfs 531,569 cf

Total Runoff Area = 1,497,050 sf Runoff Volume = 578,341 cf Average Runoff Depth = 4.64"
67.23% Pervious = 1,006,400 sf 32.77% Impervious = 490,650 sf

7107 HydroCAD Overflow

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Type IA 24-hr 100-YR Rainfall=6.50"

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Summary for Subcatchment 1S: Post-Developed

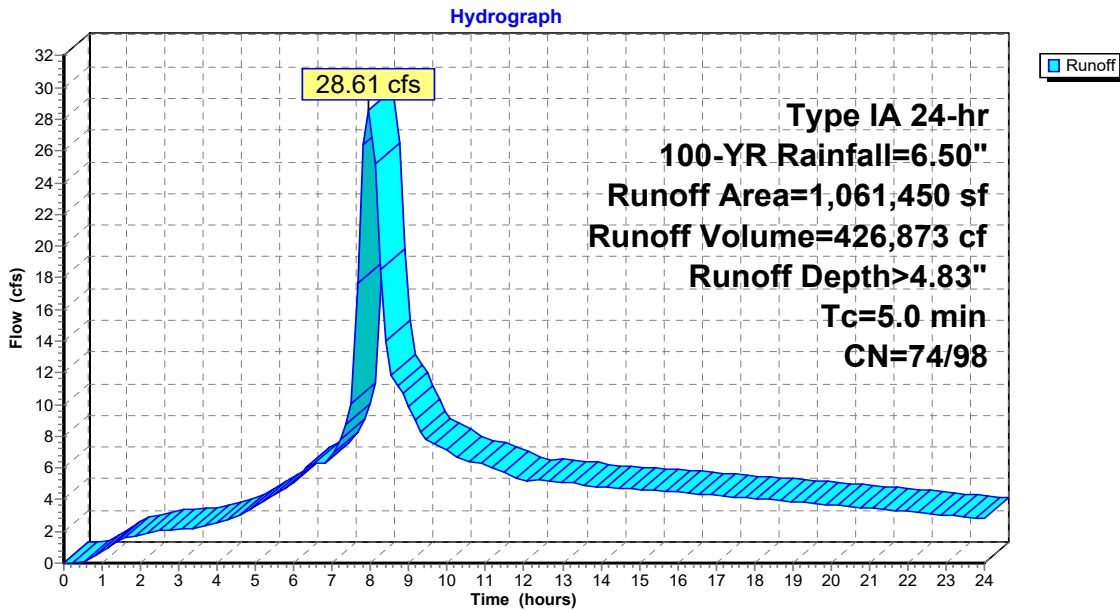
Runoff = 28.61 cfs @ 7.93 hrs, Volume= 426,873 cf, Depth > 4.83"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 100-YR Rainfall=6.50"

| Area (sf) | CN | Description |
|-----------|----|---------------------------|
| * 272,250 | 98 | 99 Lots - 2750 sf per lot |
| * 218,400 | 98 | Pavement and sidewalk |
| * 570,800 | 74 | Lawns |
| 1,061,450 | 85 | Weighted Average |
| 570,800 | | 53.78% Pervious Area |
| 490,650 | | 46.22% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment 1S: Post-Developed



7107 HydroCAD Overflow

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Type IA 24-hr 100-YR Rainfall=6.50"

Printed 5/30/2019

Summary for Subcatchment 2S: Existing Upstream

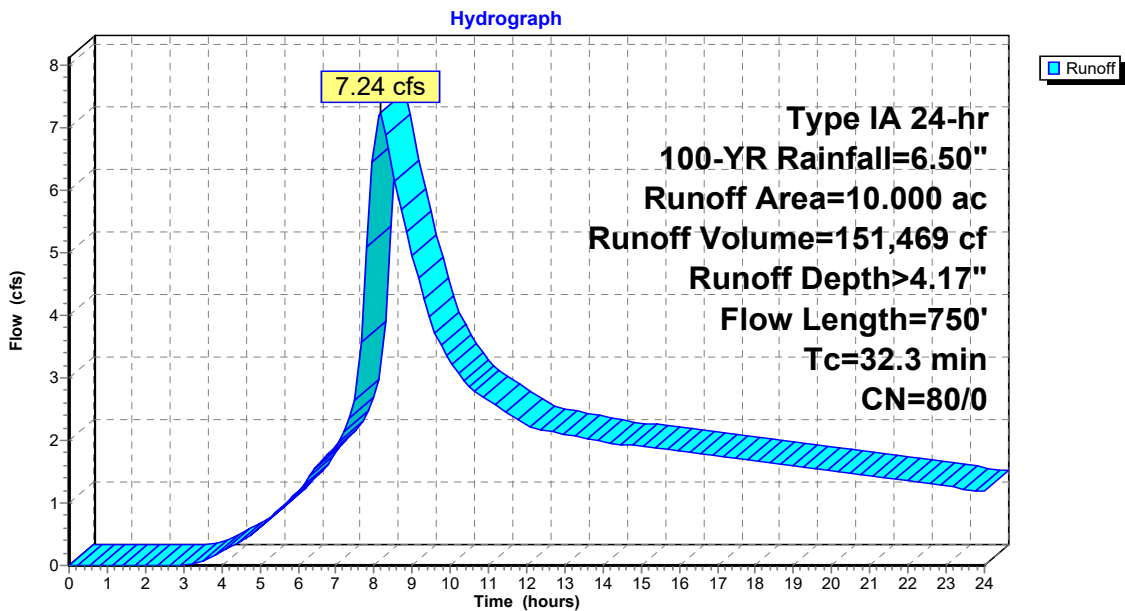
Runoff = 7.24 cfs @ 8.16 hrs, Volume= 151,469 cf, Depth> 4.17"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Type IA 24-hr 100-YR Rainfall=6.50"

| Area (ac) | CN | Description |
|-----------|----|-----------------------|
| * 10.000 | 80 | Row Crops (C + CR) |
| 10.000 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|--|
| 28.9 | 300 | 0.0200 | 0.17 | | Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.60" |
| 3.4 | 450 | 0.0600 | 2.20 | | Shallow Concentrated Flow, Cultivated Straight Rows Kv= 9.0 fps |
| 32.3 | 750 | Total | | | |

Subcatchment 2S: Existing Upstream



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Type IA 24-hr 100-YR Rainfall=6.50"

Printed 5/30/2019

Summary for Pond 1P: STORMWATER FACILITY

Inflow Area = 1,497,050 sf, 32.77% Impervious, Inflow Depth > 4.64" for 100-YR event
 Inflow = 35.03 cfs @ 7.96 hrs, Volume= 578,341 cf
 Outflow = 35.15 cfs @ 8.00 hrs, Volume= 531,569 cf, Atten= 0%, Lag= 2.2 min
 Primary = 35.15 cfs @ 8.00 hrs, Volume= 531,569 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.15 hrs
 Peak Elev= 899.58' @ 8.00 hrs Surf.Area= 13,929 sf Storage= 52,646 cf

Plug-Flow detention time= 99.8 min calculated for 531,569 cf (92% of inflow)
 Center-of-Mass det. time= 45.4 min (769.9 - 724.6)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 895.00' | 58,640 cf | Custom Stage Data (Pyramidal) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|------------------|-------------------|------------------------|------------------------|------------------|
| 895.00 | 9,160 | 0 | 0 | 9,160 |
| 896.00 | 10,180 | 9,666 | 9,666 | 10,253 |
| 897.00 | 11,200 | 10,686 | 20,351 | 11,354 |
| 898.00 | 12,200 | 11,696 | 32,048 | 12,443 |
| 899.00 | 13,300 | 12,746 | 44,794 | 13,632 |
| 900.00 | 14,400 | 13,846 | 58,640 | 14,829 |

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|--|
| #1 | Primary | 899.00' | 30.0' long x 5.0' breadth Broad-Crested Rectangular Weir - Driveway Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Primary OutFlow Max=34.32 cfs @ 8.00 hrs HW=899.57' (Free Discharge)
 ↳1=Broad-Crested Rectangular Weir - Driveway (Weir Controls 34.32 cfs @ 2.01 fps)

7107 HydroCAD Overflow

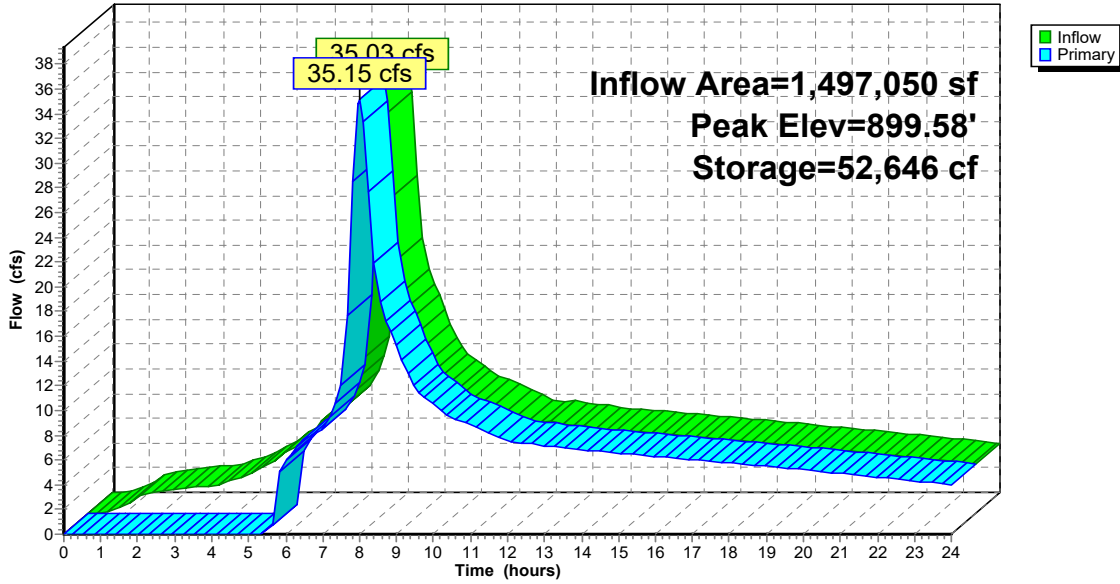
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Type IA 24-hr 100-YR Rainfall=6.50"

Printed 5/30/2019

Pond 1P: STORMWATER FACILITY

Hydrograph



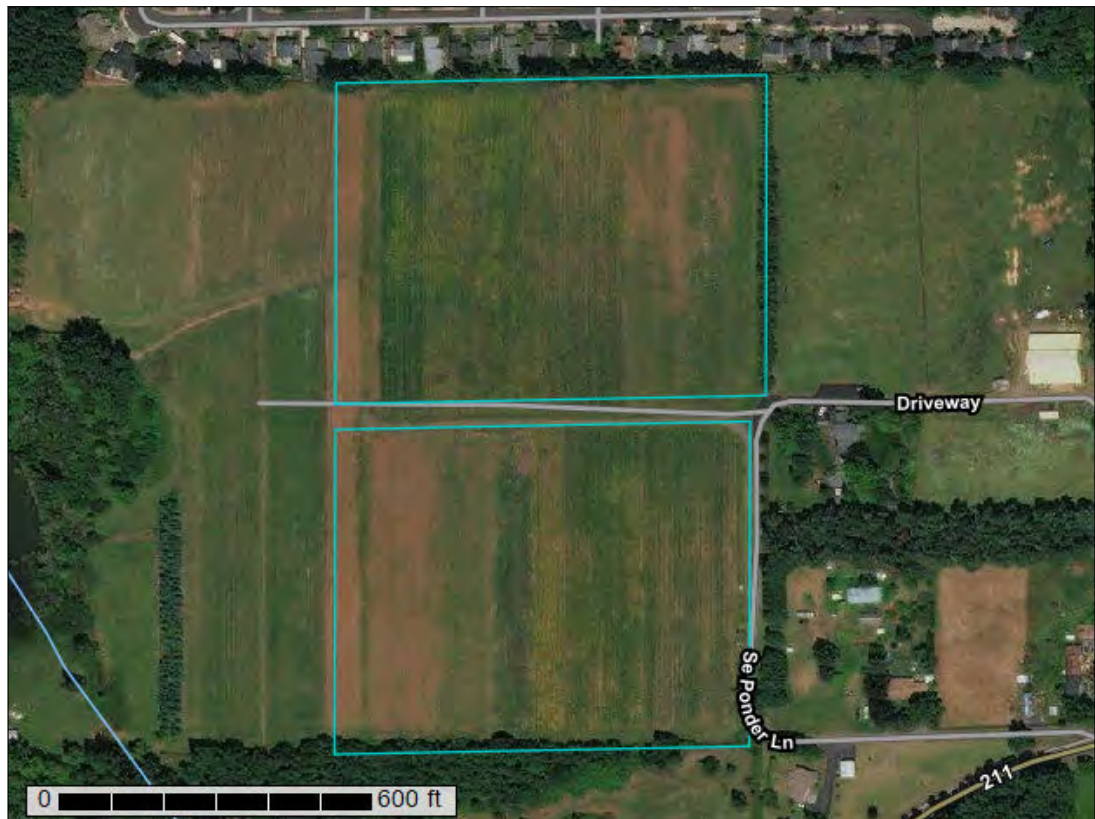


**Appendix E:
Soils Information from the USDA Soil Survey
of Clackamas County, Oregon**



A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clackamas County Area, Oregon



May 22, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

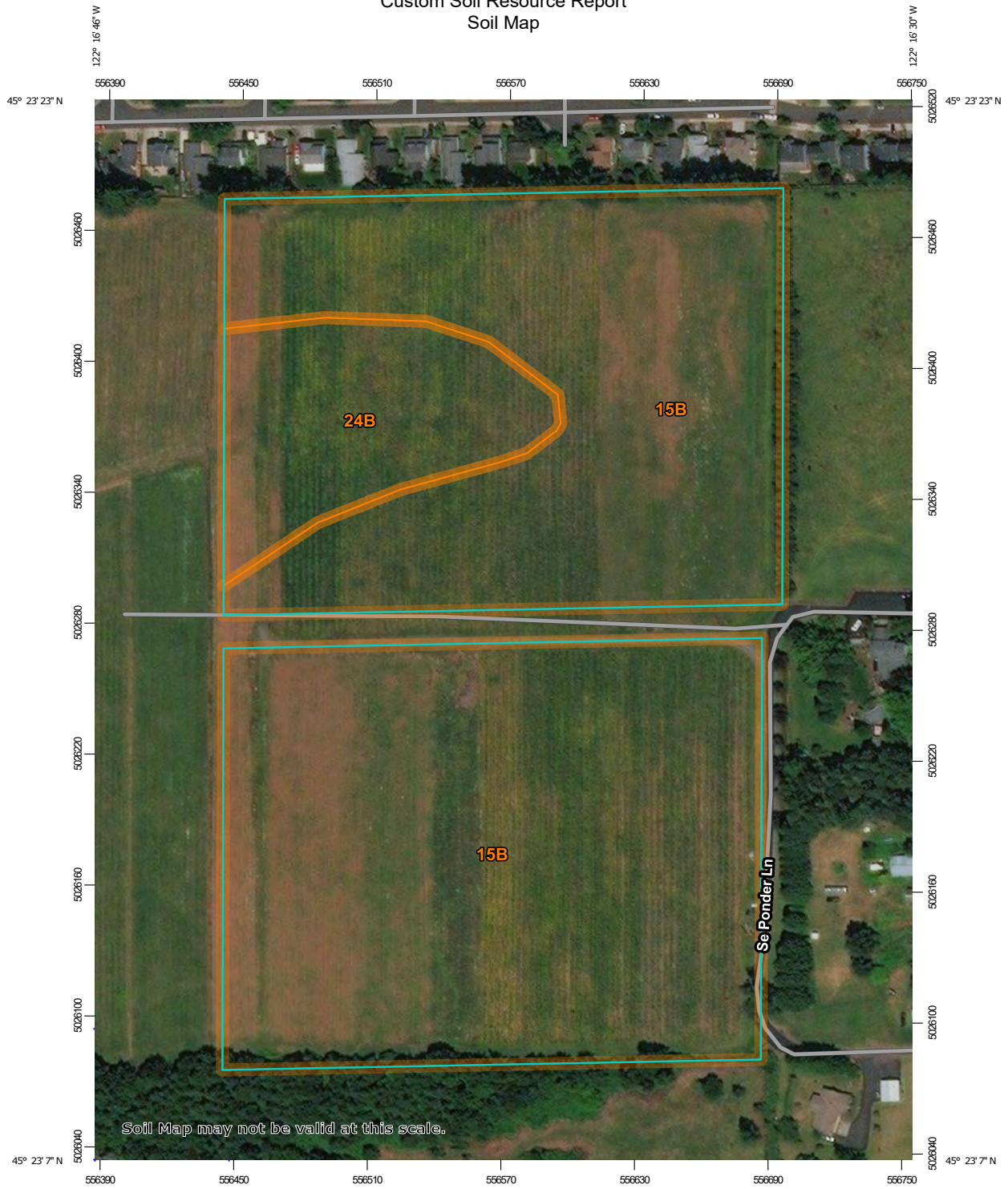
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

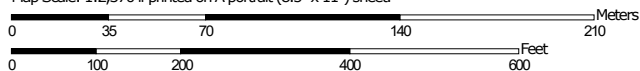
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Soil Map







































Map Scale: 1:2,370 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

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MAP LEGEND

- | | | | | |
|-------------------------------|---|------------------------|---|-----------------------|
| Area of Interest (AOI) |  | Area of Interest (AOI) |  | Spoil Area |
| Soils |  | Soil Map Unit Polygons |  | Stony Spot |
| |  | Soil Map Unit Lines |  | Very Stony Spot |
| |  | Soil Map Unit Points |  | Wet Spot |
| Special Point Features |  | Blowout |  | Other |
| |  | Borrow Pit |  | Special Line Features |
| |  | Clay Spot | Water Features | |
| |  | Closed Depression |  | Streams and Canals |
| |  | Gravel Pit | Transportation | |
| |  | Gravelly Spot |  | Rails |
| |  | Landfill |  | Interstate Highways |
| |  | Lava Flow |  | US Routes |
| |  | Marsh or swamp |  | Major Roads |
| |  | Mine or Quarry |  | Local Roads |
| |  | Miscellaneous Water | Background | |
| |  | Perennial Water |  | Aerial Photography |
| |  | Rock Outcrop | | |
| |  | Saline Spot | | |
| |  | Sandy Spot | | |
| |  | Severely Eroded Spot | | |
| |  | Sinkhole | | |
| |  | Slide or Slip | | |
| |  | Sodic Spot | | |

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
 Survey Area Data: Version 14, Sep 18, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2015—Sep 21, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|------------------------------------|---|--------------|----------------|
| 15B | Cazadero silty clay loam, 0 to 7 percent slopes | 20.6 | 87.8% |
| 24B | Cottrell silty clay loam, 2 to 8 percent slopes | 2.9 | 12.2% |
| Totals for Area of Interest | | 23.5 | 100.0% |

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

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onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clackamas County Area, Oregon

15B—Cazadero silty clay loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 223c
Elevation: 300 to 900 feet
Mean annual precipitation: 48 to 85 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cazadero and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cazadero

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old mixed alluvium

Typical profile

H1 - 0 to 21 inches: silty clay loam
H2 - 21 to 75 inches: clay

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Borges

Percent of map unit: 2 percent
Landform: Depressions on terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear

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Across-slope shape: Linear
Hydric soil rating: Yes

24B—Cottrell silty clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 223v
Elevation: 300 to 900 feet
Mean annual precipitation: 45 to 80 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cottrell and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cottrell

Setting

Landform: Terraces, hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, interfluve, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old alluvium

Typical profile

H1 - 0 to 24 inches: silty clay loam
H2 - 24 to 55 inches: silty clay
H3 - 55 to 86 inches: silty clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

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Minor Components

Borges

Percent of map unit: 4 percent

Landform: Depressions on terraces, hillslopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope, tread

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: Yes

Aquults

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

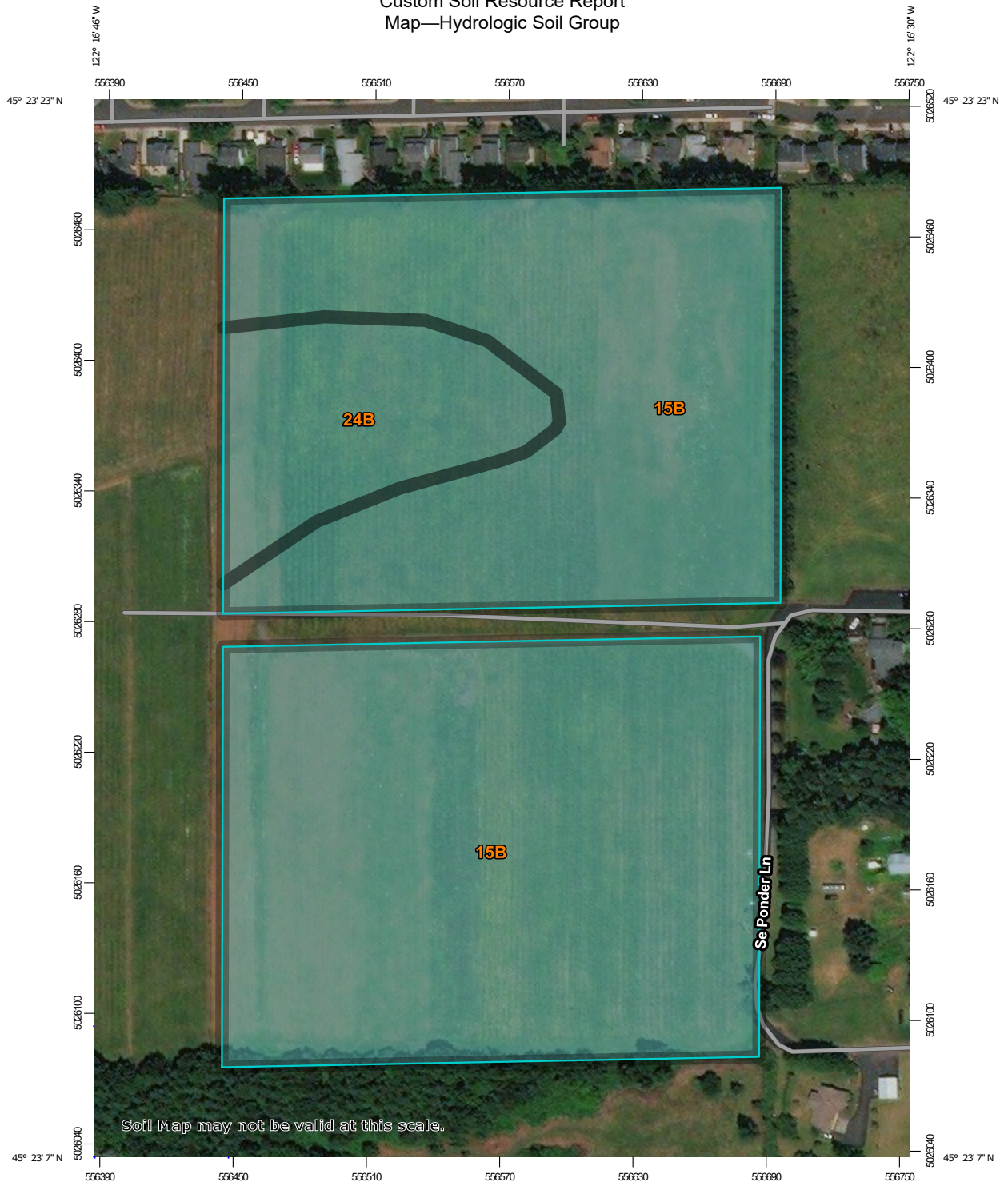
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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

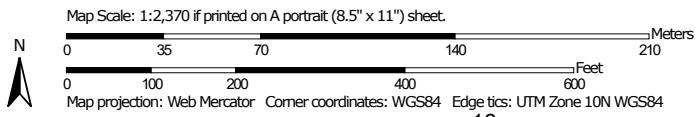
Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

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Map—Hydrologic Soil Group



































Soil Map may not be valid at this scale.



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MAP LEGEND

- Area of Interest (AOI)**
 -  Area of Interest (AOI)
- Soils**
 - Soil Rating Polygons**
 -  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
 - Soil Rating Lines**
 -  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
 - Soil Rating Points**
 -  A
 -  A/D
 -  B
 -  B/D
- Soil Rating Polygons**
 -  C
 -  C/D
 -  D
 -  Not rated or not available
- Water Features**
 -  Streams and Canals
- Transportation**
 -  Rails
 -  Interstate Highways
 -  US Routes
 -  Major Roads
 -  Local Roads
- Background**
 -  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
 Survey Area Data: Version 14, Sep 18, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2015—Sep 21, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Table—Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|---|--------|--------------|----------------|
| 15B | Cazadero silty clay loam, 0 to 7 percent slopes | C | 20.6 | 87.8% |
| 24B | Cottrell silty clay loam, 2 to 8 percent slopes | C | 2.9 | 12.2% |
| Totals for Area of Interest | | | 23.5 | 100.0% |

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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**Appendix F:
Relevant Information from Technical Release
55 Urban Hydrology for Small Watersheds by
Natural Resource Conservation Service**

Table 2-2a Runoff curve numbers for urban areas ^{1/}

| Cover description | Average percent impervious area ^{2/} | Curve numbers for hydrologic soil group | | | |
|--|--|--|----|----|----|
| | | A | B | C | D |
| Fully developed urban areas (vegetation established) | | | | | |
| Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} : | | | | | |
| Poor condition (grass cover < 50%) | | 68 | 79 | 86 | 89 |
| Fair condition (grass cover 50% to 75%) | | 49 | 69 | 79 | 84 |
| Good condition (grass cover > 75%) | | 39 | 61 | 74 | 80 |
| Impervious areas: | | | | | |
| Paved parking lots, roofs, driveways, etc. (excluding right-of-way) | | 98 | 98 | 98 | 98 |
| Streets and roads: | | | | | |
| Paved; curbs and storm sewers (excluding right-of-way) | | 98 | 98 | 98 | 98 |
| Paved; open ditches (including right-of-way) | | 83 | 89 | 92 | 93 |
| Gravel (including right-of-way) | | 76 | 85 | 89 | 91 |
| Dirt (including right-of-way) | | 72 | 82 | 87 | 89 |
| Western desert urban areas: | | | | | |
| Natural desert landscaping (pervious areas only) ^{4/} | | 63 | 77 | 85 | 88 |
| Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders) | | 96 | 96 | 96 | 96 |
| Urban districts: | | | | | |
| Commercial and business | 85 | 89 | 92 | 94 | 95 |
| Industrial | 72 | 81 | 88 | 91 | 93 |
| Residential districts by average lot size: | | | | | |
| 1/8 acre or less (town houses) | 65 | 77 | 85 | 90 | 92 |
| 1/4 acre | 38 | 61 | 75 | 83 | 87 |
| 1/3 acre | 30 | 57 | 72 | 81 | 86 |
| 1/2 acre | 25 | 54 | 70 | 80 | 85 |
| 1 acre | 20 | 51 | 68 | 79 | 84 |
| 2 acres | 12 | 46 | 65 | 77 | 82 |

Developing urban areas

Newly graded areas
(pervious areas only, no vegetation) ^{5/}

| | | | | |
|--|----|----|----|----|
| | 77 | 86 | 91 | 94 |
|--|----|----|----|----|

Idle lands (CN's are determined using cover types
similar to those in table 2-2c).

¹ Average runoff condition, and $I_a = 0.2S$.

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

| Cover description | | | Curve numbers for hydrologic soil group | | | |
|--|----------------------------|------------------------------------|---|----|----|----|
| Cover type | Treatment ^{2/} | Hydrologic condition ^{3/} | A | B | C | D |
| Fallow | Bare soil | — | 77 | 86 | 91 | 94 |
| | Crop residue cover (CR) | Poor | 76 | 85 | 90 | 93 |
| | | Good | 74 | 83 | 88 | 90 |
| Row crops | Straight row (SR) | Poor | 72 | 81 | 88 | 91 |
| | | Good | 67 | 78 | 85 | 89 |
| | SR + CR | Poor | 71 | 80 | 87 | 90 |
| | | Good | 64 | 75 | 82 | 85 |
| | Contoured (C) | Poor | 70 | 79 | 84 | 88 |
| | | Good | 65 | 75 | 82 | 86 |
| | C + CR | Poor | 69 | 78 | 83 | 87 |
| | | Good | 64 | 74 | 81 | 85 |
| | Contoured & terraced (C&T) | Poor | 66 | 74 | 80 | 82 |
| | | Good | 62 | 71 | 78 | 81 |
| C&T+ CR | Poor | 65 | 73 | 79 | 81 | |
| | Good | 61 | 70 | 77 | 80 | |
| Small grain | SR | Poor | 65 | 76 | 84 | 88 |
| | | Good | 63 | 75 | 83 | 87 |
| | SR + CR | Poor | 64 | 75 | 83 | 86 |
| | | Good | 60 | 72 | 80 | 84 |
| | C | Poor | 63 | 74 | 82 | 85 |
| | | Good | 61 | 73 | 81 | 84 |
| | C + CR | Poor | 62 | 73 | 81 | 84 |
| | | Good | 60 | 72 | 80 | 83 |
| | C&T | Poor | 61 | 72 | 79 | 82 |
| | | Good | 59 | 70 | 78 | 81 |
| | C&T+ CR | Poor | 60 | 71 | 78 | 81 |
| | | Good | 58 | 69 | 77 | 80 |
| Close-seeded or broadcast legumes or rotation meadow | SR | Poor | 66 | 77 | 85 | 89 |
| | | Good | 58 | 72 | 81 | 85 |
| | C | Poor | 64 | 75 | 83 | 85 |
| | | Good | 55 | 69 | 78 | 83 |
| | C&T | Poor | 63 | 73 | 80 | 83 |
| | | Good | 51 | 67 | 76 | 80 |

¹ Average runoff condition, and $I_a=0.2S$

² Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

³ Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

| Cover description Cover type | Hydrologic condition | Curve numbers for hydrologic soil group | | | |
|---|-------------------------|--|----|----|----|
| | | A | B | C | D |
| Pasture, grassland, or range—continuous forage for grazing. ^{2/} | Poor | 68 | 79 | 86 | 89 |
| | Fair | 49 | 69 | 79 | 84 |
| | Good | 39 | 61 | 74 | 80 |
| Meadow—continuous grass, protected from grazing and generally mowed for hay. | — | 30 | 58 | 71 | 78 |
| Brush—brush-weed-grass mixture with brush the major element. ^{3/} | Poor | 48 | 67 | 77 | 83 |
| | Fair | 35 | 56 | 70 | 77 |
| | Good | 30 ^{4/} | 48 | 65 | 73 |
| Woods—grass combination (orchard or tree farm). ^{5/} | Poor | 57 | 73 | 82 | 86 |
| | Fair | 43 | 65 | 76 | 82 |
| | Good | 32 | 58 | 72 | 79 |
| Woods. ^{6/} | Poor | 45 | 66 | 77 | 83 |
| | Fair | 36 | 60 | 73 | 79 |
| | Good | 30 ^{4/} | 55 | 70 | 77 |
| Farmsteads—buildings, lanes, driveways, and surrounding lots. | — | 59 | 74 | 82 | 86 |

¹ Average runoff condition, and $I_a = 0.2S$.

² **Poor:** <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

³ **Poor:** <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

⁴ Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵ CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

⁶ **Poor:** Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

| Cover description Cover type | Hydrologic condition ^{2/} | Curve numbers for hydrologic soil group | | | |
|--|---------------------------------------|--|----|----|----|
| | | A ^{3/} | B | C | D |
| Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element. | Poor | | 80 | 87 | 93 |
| | Fair | | 71 | 81 | 89 |
| | Good | | 62 | 74 | 85 |
| Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush. | Poor | | 66 | 74 | 79 |
| | Fair | | 48 | 57 | 63 |
| | Good | | 30 | 41 | 48 |
| Pinyon-juniper—pinyon, juniper, or both; grass understory. | Poor | | 75 | 85 | 89 |
| | Fair | | 58 | 73 | 80 |
| | Good | | 41 | 61 | 71 |
| Sagebrush with grass understory. | Poor | | 67 | 80 | 85 |
| | Fair | | 51 | 63 | 70 |
| | Good | | 35 | 47 | 55 |
| Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus. | Poor | 63 | 77 | 85 | 88 |
| | Fair | 55 | 72 | 81 | 86 |
| | Good | 49 | 68 | 79 | 84 |

¹ Average runoff condition, and $I_{ar} = 0.2S$. For range in humid regions, use table 2-2c.

² Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

³ Curve numbers for group A have been developed only for desert shrub.

EXHIBIT H

**Bailey Meadows Subdivision
Sandy, Oregon
Flood & Slope Hazard (FSH)
Analysis**

Date: June 6, 2019

Prepared for: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Sandy, OR 97015

Prepared By: AKS Engineering & Forestry, LLC
Stacey Reed, PWS, Senior Wetland Scientist
Haley Smith, MS, Natural Resource Specialist

Site Information: Tax Map 2 4E 23, Tax Lots 800, 801, 802, 803,
and 804
Clackamas County
Sandy, Oregon



12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

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| Landscape Setting, Land Use, and Background Mapping | 2 |
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| Precipitation Data Analysis | 3 |
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| List of Preparers | 4 |
| Literature Cited and Referenced | 5 |

Appendices

A. Maps

- i. Figure 1. USGS Vicinity Map
- ii. Figure 2. Clackamas County Assessor's Map
- iii. Figure 3. NRCS Soil Survey Map
- iv. Figure 4. National Wetland Inventory Map
- v. Figure 5. FEMA Floodplain Map
- vi. Figure 6. Wetland Determination Map

B. Precipitation Data

C. Wetland Determination Data Form

D. Representative Site Photographs

Introduction

AKS Engineering & Forestry, LLC (AKS) has prepared this report in accordance with Chapter 17.60 Flood & Slope Hazard (FSH) Overlay District from the City of Sandy Development Code.

The project is a residential subdivision consisting of Tax Lots 800, 801, 802, 803, and 804 of Assessor's Tax Map 2 4E 23, located off SE Ponder Lane in Sandy, Clackamas County, Oregon (Figures 1-2 in Appendix A).

The site is located within the Urban Growth Boundary (UGB), outside of City of Sandy (City) limits. The project site was not included on the City's Goal 5 Inventory to determine whether wetlands, streams, or the FSH Overlay applies to the site, because that inventory was created prior to the site's inclusion within the UGB and annexation into the City.

This report documents that wetlands and/or waters are not present within the project site. The site is not located within a Federal Emergency Management Agency (FEMA) mapped Special Flood Hazard Area, nor is it located on a steep (greater than 25%) slope. It is our conclusion the project will not have an impact on flooding, erosion, or degradation of water quality resources; therefore, the FSH Overlay District does not apply to the project site.

Landscape Setting, Land Use, and Background Mapping

The project site consists of an undeveloped Christmas tree and blueberry farm. Ponder Lane, a gravel farm road, extends through the central portion of the site. According to a review of Google Earth imagery, the site appears to have been used for agricultural purposes since as early as 1995.

Residential development abuts the study area to the north with rural residential development to the east, south, and west. Topography within the study area has a gentle westerly slope (less than 5% overall slope; see Figure 6, Appendix A). Bull Frog Reservoir is located approximately 500 feet off-site to the west of the project site.

According to the Natural Resources Conservation Service (NRCS) Clackamas County, Oregon Area Soil Survey Map, the following non-hydric soil units are mapped within the project site (Figure 3, Appendix A):

- (Unit 15B) Cazadero silty clay loam, 0% to 7% slopes– Non-hydric, with 2% hydric Borges inclusions in depressions
- (Unit 24B) Cottrell silty clay loam, 2% to 8% slopes– Non-hydric, with 4% hydric Borges and 1% hydric Aqualts inclusions in depressions

The project site is located outside of the City of Sandy's Oregon Department of State Lands (DSL) approved Local Wetland Inventory (LWI). According to the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) map, wetland and/or water features are not mapped within the study area (Figure 4, Appendix A).

According to FEMA mapping, Special Flood Hazard areas are not mapped within the project site (Figure 5, Appendix A).



Results of Site Visit

Methodology

A site visit was conducted by AKS Senior Wetland Scientist Stacey Reed, PWS, and AKS Natural Resource Specialist Sonya Templeton on December 4, 2018 to determine whether any potentially jurisdictional wetlands or waters were present on the project site or immediately off-site. Soils, vegetation, and indicators of hydrology were recorded at one sample plot (Plot 1, data sheet included in Appendix C) to document site conditions. The plot location was recorded during the site visit using a hand-held Trimble Geo7x by AKS, with submeter accuracy (as shown on attached Figure 6).

The methodology used to determine the presence of wetlands followed the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (Wakeley et al. 2010). *The National Wetland Plant List 2016* (Lichvar 2016) was used to assign wetland indicator status for the appropriate region.

Representative ground level site photographs are included in Appendix D. References cited and literature used are listed at the end of this report.

Precipitation Data Analysis

Observed precipitation data from the day of the December 4, 2018 site visit was obtained from the Estacada 2 SE, Oregon weather station via the National Oceanic and Atmospheric Administration (NOAA) Applied Climate Information System (AgACIS). This was the closest official weather station to the project site. The closest NRCS Wetlands Climate Tables (WETS) Station is the Estacada 2 SE Station.

According to the Estacada 2 SE station, no rainfall was received on the day of the December 4, 2018 site visit and ± 2.02 inches of rainfall were received in the two weeks prior to the site visit. According to the WETS table, monthly observed precipitation was below normal for the three months preceding the December 4, 2018 site visit.

Because the site visit was conducted during a drier-than-normal period, a lack of hydrology indicators was not relied upon to determine upland conditions. Instead, the presence of hydric soil indicators were more strongly relied upon to determine if wetland conditions were present. Raw precipitation data and the antecedent rainfall according to the WETS Estacada 2 SE station for the three months prior to the December 4, 2018 site visit is included in Appendix B.

Results

No wetland or waters were documented in the project site. Plot 1 documents conditions in the lowest elevation portion of the site. This area was dominated by colonial bent (*Agrostis capillaris*, FAC) and lacked hydric soil and wetland hydrology indicators. Therefore, Plot 1 was determined to be upland.

There were no defined channels (i.e. no defined bed and bank) observed within the project site. A narrow (less than 2-foot-wide) ditch was observed off-site to the west, parallel to an unimproved farm road. The ditch was located at least 50 feet from the western project site boundary. Plot 1 was located in-line with the off-site ditch.

No evidence of previous ponding, flow, or hydrophytic (wetland) vegetation was observed on the project site. The study area is not located within a FEMA Floodplain. According to LIDAR data, the slopes on the site are less than 10%. Therefore, FHS overlay does not apply to this site.



List of Preparers



Haley Smith, MS
Natural Resource Specialist
Report Preparation



Stacey Reed, PWS
Senior Wetland Scientist
Fieldwork and Report QA/QC



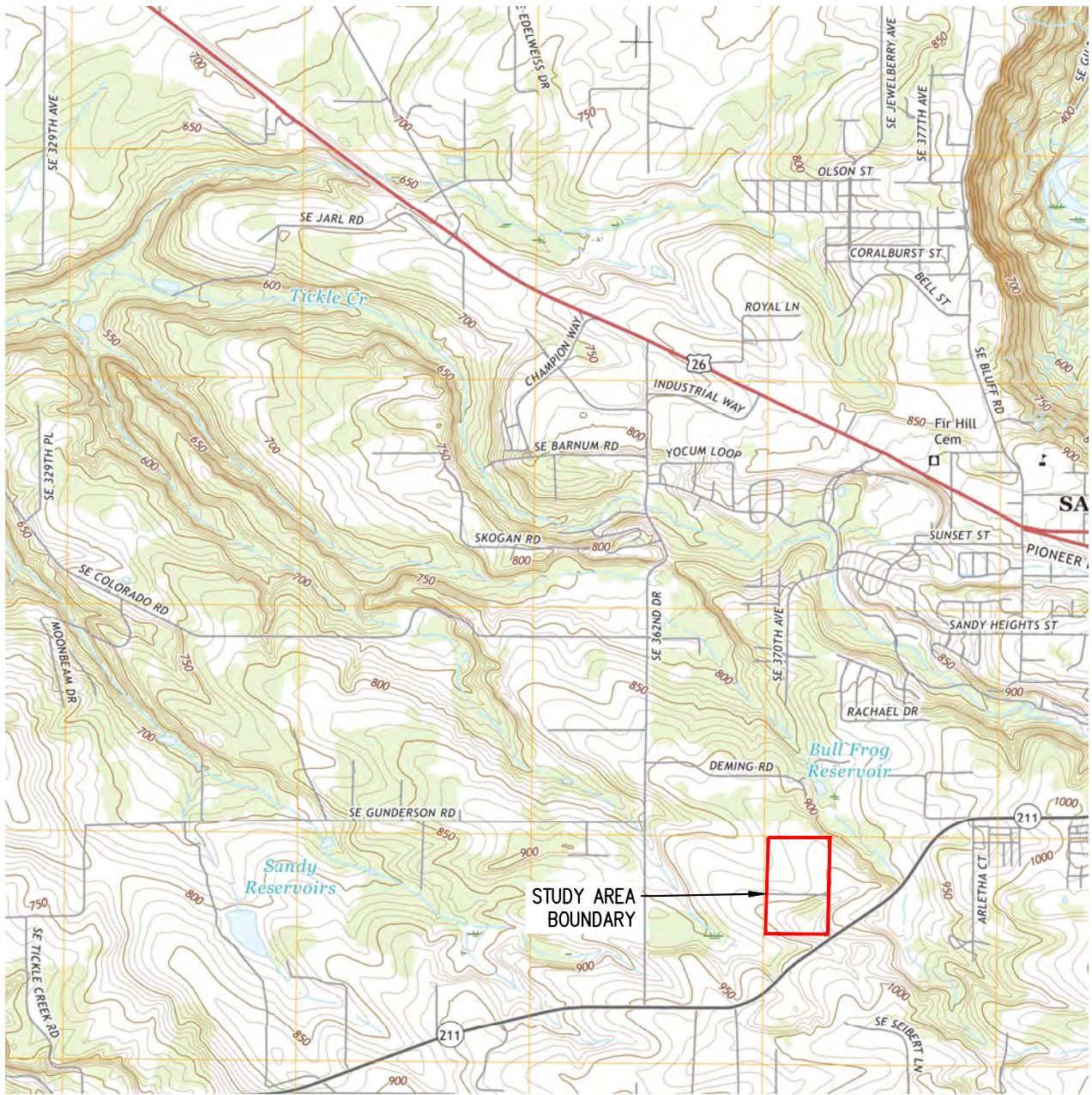
Literature Cited and Referenced

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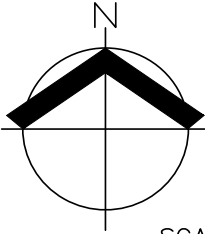




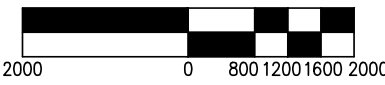
Appendix A: Maps



USGS 7.5' TOPOGRAPHIC SERIES
 QUADRANGLE: SANDY, OR (2017)



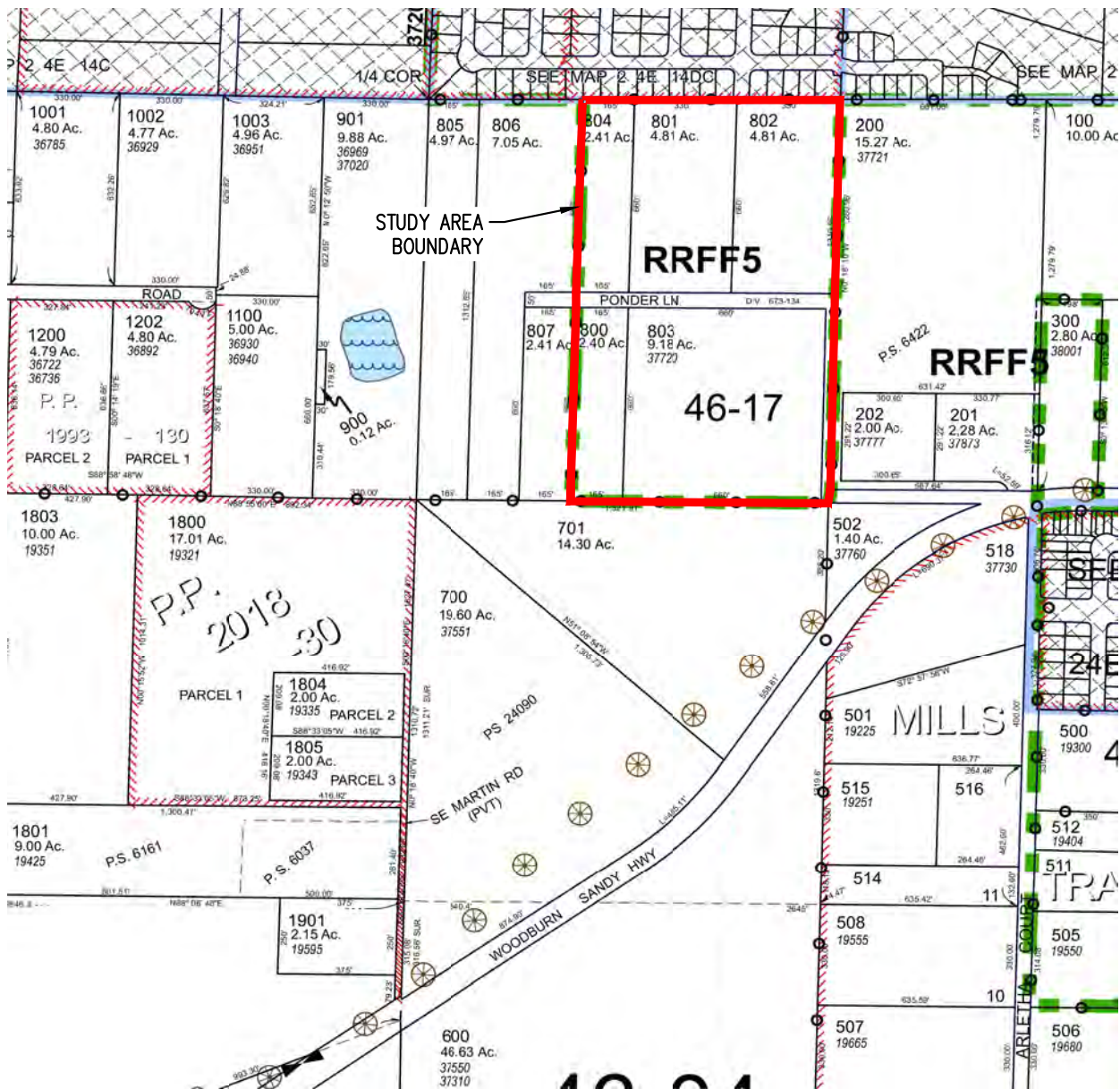
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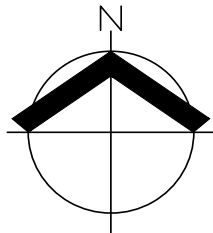
DATE: 06/06/2019

| | | |
|--|--|-----------|
| USGS VICINITY MAP | | FIGURE |
| BAILEY MEADOWS SUBDIVISION - SANDY FLOOD & SLOPE HAZARD ANALYSIS | | 1 |
| AKS ENGINEERING & FORESTRY, LLC | | DRWN: SAS |
| 12965 SW HERMAN RD SUITE 100 | | CHKD: SAR |
| TUALATIN, OR 97062 www.aks-eng.com | | AKS JOB: |
| PHONE: 503.563.6151 FAX: 503.563.6152 | | 7107 |





CLACKAMAS COUNTY
 TAX LOTS 800, 801, 802,
 803, AND 804
 TAX MAP 2 4E 23



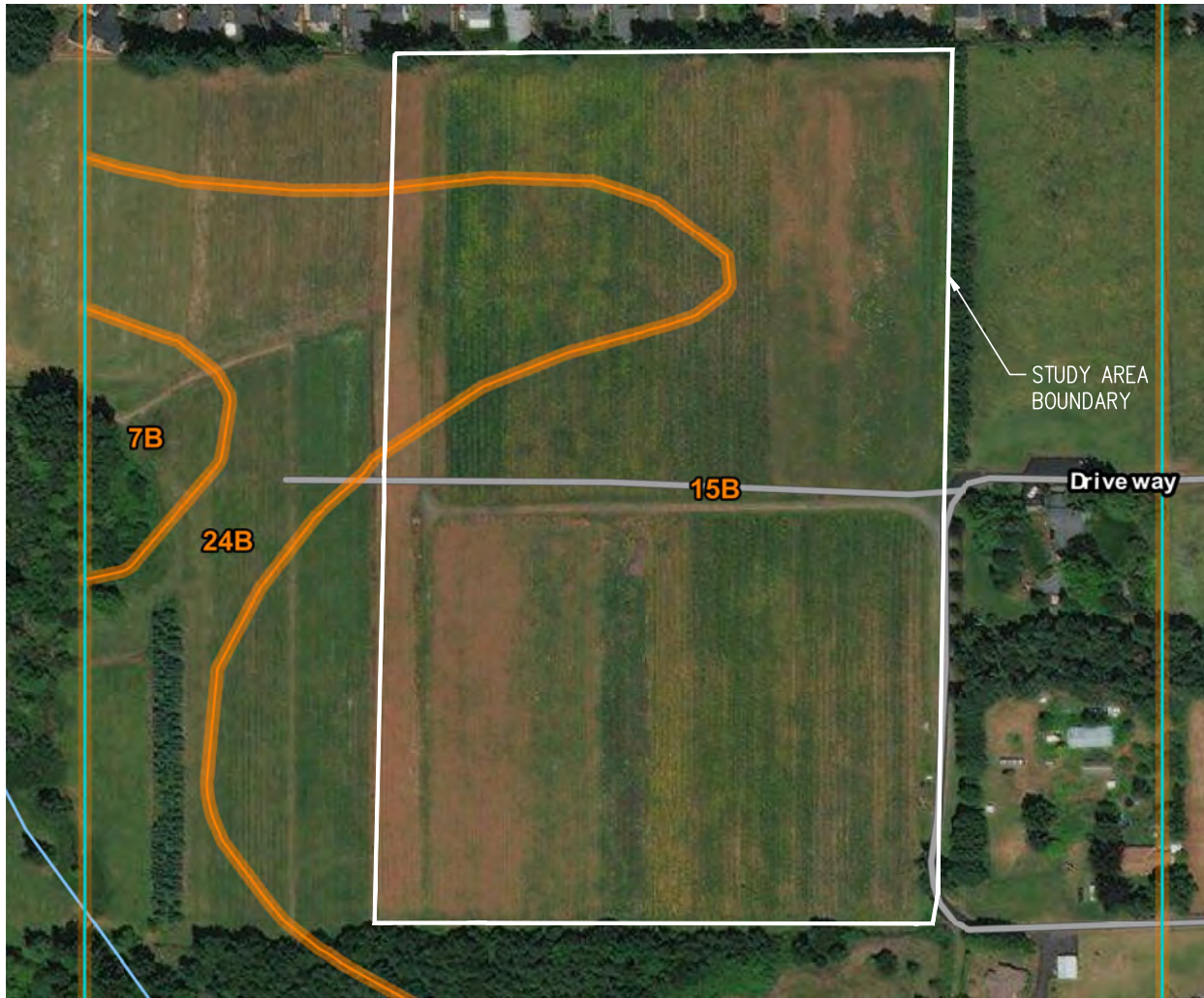
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DATE: 06/06/2019

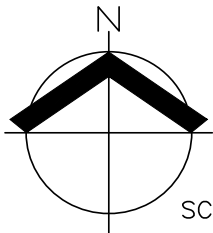
| | | |
|--|--|--|
| CLACKAMAS COUNTY ASSESSOR'S MAP (MAP 2 4E 23) BAILEY MEADOWS SUBDIVISION- SANDY FLOOD & SLOPE HAZARD ANALYSIS | | FIGURE 2 |
| AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152 | | DRWN: SAS CHKD: SAR AKS JOB: 7107 |



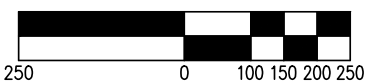


| MAP UNIT SYMBOL | MAP UNIT NAME |
|-----------------|---|
| 15B | CAZADERO SILTY CLAY LOAM, 0% TO 7% SLOPES; NON-HYDRIC |
| 24B | COTTRELL SILTY CLAY LOAM, 2% TO 8% SLOPES; NON-HYDRIC |

NRCS WEB SOIL SURVEY FOR
CLACKAMAS COUNTY



SCALE: 1" = 250 FEET



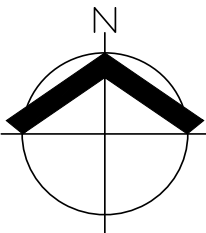
DATE: 06/06/2019

| | | |
|--|--|--|
| NRCS SOIL SURVEY MAP BAILEY MEADOWS SUBDIVISION - SANDY FLOOD & SLOPE HAZARD ANALYSIS | | FIGURE 3 |
| AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152 | | DRWN: SAS CHKD: SAR AKS JOB: 7107 |

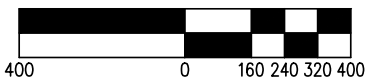




US FISH & WILDLIFE SERVICE
NATIONAL WETLAND INVENTORY (2018)



SCALE: 1" = 400 FEET



DATE: 06/06/2019

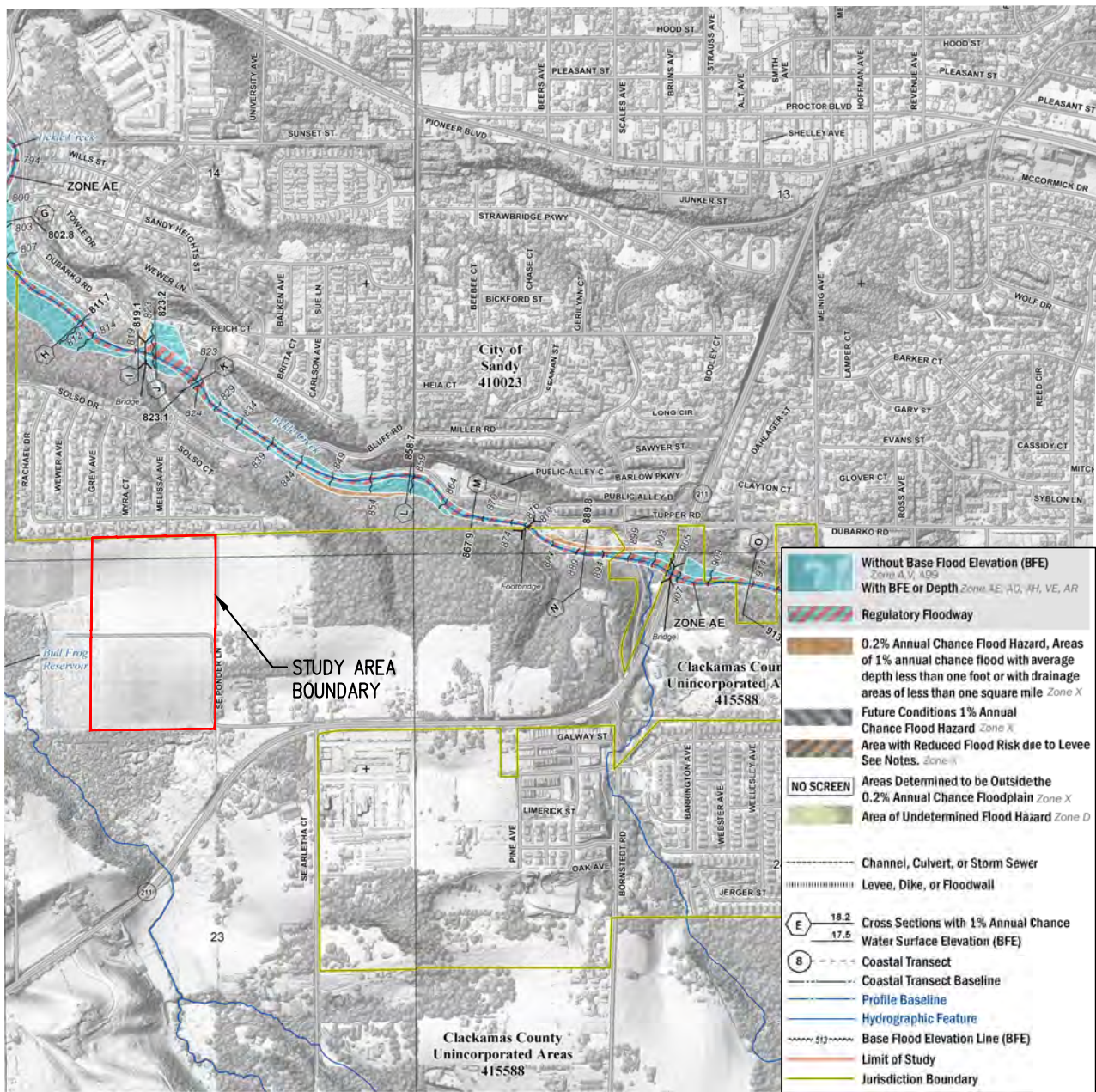
NATIONAL WETLAND INVENTORY MAP
BAILEY MEADOWS SUBDIVISION - SANDY FLOOD & SLOPE HAZARD ANALYSIS

FIGURE
4

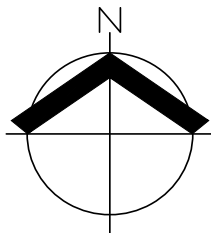
AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD SUITE 100
TUALATIN, OR 97062 www.aks-eng.com
PHONE: 503.563.6151 FAX: 503.563.6152



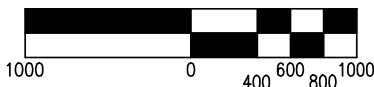
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CHKD: SAR
AKS JOB:
7107



FEMA FIRM PANEL MAP (2018)



SCALE: 1" = 1000 FEET



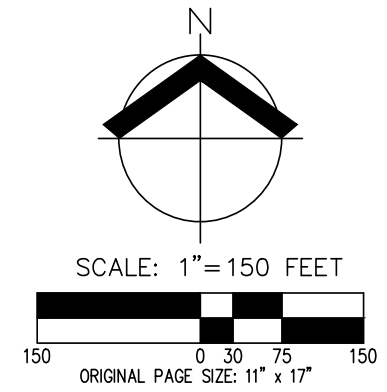
DATE: 06/06/2019

| | | |
|--|--|---|
| FEMA FLOODPLAIN MAP | | FIGURE 5 |
| BAILEY MEADOWS SUBDIVISION - SANDY FLOOD & SLOPE HAZARD ANALYSIS | | |
| AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD SUITE 100 TUALATIN, OR 97062 www.aks-eng.com PHONE: 503.563.6151 FAX: 503.563.6152 | | DRWN: SAS CHKD: SAR AKS JOB: 7107 |





USGS HIGH RESOLUTION ORTHOIMAGERY
APRIL 2012



SAMPLE PLOT SHOWN WAS RECORDED BY AKS ENGINEERING & FORESTRY, LLC ON DECEMBER 4, 2018 AND WAS LOCATED USING A TRIMBLE GEO 7X HANDHELD GPS RECEIVER WITH SUB-METER ACCURACY.

1-FOOT INTERVAL GROUND CONTOURS DERIVED FROM NOAA LIDAR DATA.

DATE: 06/06/2019

| | | |
|---|--|--|
| WETLAND DETERMINATION MAP | | FIGURE |
| BAILEY MEADOWS SUBDIVISION - SANDY FLOOD & SLOPE HAZARD ANALYSIS | | 6 |
| AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 P: 503.563.6151 F: 503.563.6152 aks-eng.com | | DRWN: JRI CHKD: SAR AKS JOB: 7107 |



DWG: 7107 WDR EXCOND | FIGURE 6



Appendix B: Precipitation Data

Climatological Data for ESTACADA 2 SE, OR - December 2018

| Date | Max Temperature | Min Temperature | Avg Temperature | GDD Base 40 | GDD Base 50 | Precipitation | Snowfall | Snow Depth |
|-------------|-----------------|-----------------|-----------------|-------------|-------------|---------------|----------|------------|
| 2018-12-01 | M | M | M | M | M | M | M | M |
| 2018-12-02 | 57 | 36 | 46.5 | 7 | 0 | M | M | M |
| 2018-12-03 | 49 | 31 | 40.0 | 0 | 0 | 0.03 | M | M |
| 2018-12-04 | M | M | M | M | M | M | M | M |
| 2018-12-05 | M | M | M | M | M | M | M | M |
| 2018-12-06 | M | M | M | M | M | M | M | M |
| 2018-12-07 | M | M | M | M | M | M | M | M |
| 2018-12-08 | M | M | M | M | M | M | M | M |
| 2018-12-09 | M | M | M | M | M | M | M | M |
| 2018-12-10 | M | M | M | M | M | M | M | M |
| 2018-12-11 | M | M | M | M | M | M | M | M |
| 2018-12-12 | M | M | M | M | M | M | M | M |
| 2018-12-13 | M | M | M | M | M | M | M | M |
| 2018-12-14 | M | M | M | M | M | M | M | M |
| 2018-12-15 | M | M | M | M | M | M | M | M |
| 2018-12-16 | M | M | M | M | M | M | M | M |
| 2018-12-17 | M | M | M | M | M | M | M | M |
| 2018-12-18 | M | M | M | M | M | M | M | M |
| 2018-12-19 | M | M | M | M | M | M | M | M |
| 2018-12-20 | M | M | M | M | M | M | M | M |
| 2018-12-21 | M | M | M | M | M | M | M | M |
| 2018-12-22 | M | M | M | M | M | M | M | M |
| 2018-12-23 | M | M | M | M | M | M | M | M |
| 2018-12-24 | M | M | M | M | M | M | M | M |
| 2018-12-25 | M | M | M | M | M | M | M | M |
| 2018-12-26 | M | M | M | M | M | M | M | M |
| 2018-12-27 | M | M | M | M | M | M | M | M |
| 2018-12-28 | M | M | M | M | M | M | M | M |
| 2018-12-29 | M | M | M | M | M | M | M | M |
| 2018-12-30 | M | M | M | M | M | M | M | M |
| 2018-12-31 | M | M | M | M | M | M | M | M |
| Average Sum | 53.0 | 33.5 | 43.3 | 7 | 0 | 0.03 | M | M |

Climatological Data for ESTACADA 2 SE, OR - November 2018

| Date | Max Temperature | Min Temperature | Avg Temperature | GDD Base 40 | GDD Base 50 | Precipitation | Snowfall | Snow Depth |
|-------------|-----------------|-----------------|-----------------|-------------|-------------|---------------|----------|------------|
| 2018-11-01 | M | M | M | M | M | M | M | M |
| 2018-11-02 | 63 | 44 | 53.5 | 14 | 4 | M | M | M |
| 2018-11-03 | 65 | 44 | 54.5 | 15 | 5 | 0.01 | M | M |
| 2018-11-04 | 57 | 46 | 51.5 | 12 | 2 | 0.24 | M | M |
| 2018-11-05 | 64 | 48 | 56.0 | 16 | 6 | 0.07 | M | M |
| 2018-11-06 | 57 | 46 | 51.5 | 12 | 2 | 0.34 | M | M |
| 2018-11-07 | M | M | M | M | M | M | M | M |
| 2018-11-08 | M | M | M | M | M | M | M | M |
| 2018-11-09 | M | M | M | M | M | M | M | M |
| 2018-11-10 | 57 | 29 | 43.0 | 3 | 0 | 0.00 | M | M |
| 2018-11-11 | 53 | 29 | 41.0 | 1 | 0 | 0.00 | M | M |
| 2018-11-12 | 63 | 29 | 46.0 | 6 | 0 | 0.00 | M | M |
| 2018-11-13 | 66 | 33 | 49.5 | 10 | 0 | 0.00 | M | M |
| 2018-11-14 | 49 | 33 | 41.0 | 1 | 0 | 0.00 | M | M |
| 2018-11-15 | 53 | 40 | 46.5 | 7 | 0 | 0.09 | M | M |
| 2018-11-16 | 61 | 40 | 50.5 | 11 | 1 | 0.01 | M | M |
| 2018-11-17 | 60 | 42 | 51.0 | 11 | 1 | 0.00 | M | M |
| 2018-11-18 | 62 | 45 | 53.5 | 14 | 4 | 0.00 | M | M |
| 2018-11-19 | 63 | 35 | 49.0 | 9 | 0 | 0.00 | M | M |
| 2018-11-20 | 66 | 33 | 49.5 | 10 | 0 | 0.00 | M | M |
| 2018-11-21 | 59 | 33 | 46.0 | 6 | 0 | 0.00 | M | M |
| 2018-11-22 | 51 | 44 | 47.5 | 8 | 0 | 0.10 | M | M |
| 2018-11-23 | M | M | M | M | M | M | M | M |
| 2018-11-24 | 51 | 38 | 44.5 | 5 | 0 | 0.66 | M | M |
| 2018-11-25 | 54 | 31 | 42.5 | 3 | 0 | 0.01 | M | M |
| 2018-11-26 | 49 | 37 | 43.0 | 3 | 0 | 0.02 | M | M |
| 2018-11-27 | 56 | 44 | 50.0 | 10 | 0 | 0.71 | M | M |
| 2018-11-28 | 57 | 43 | 50.0 | 10 | 0 | 0.18 | M | M |
| 2018-11-29 | M | M | M | M | M | 0.31 | M | M |
| 2018-11-30 | M | M | M | M | M | M | M | M |
| Average Sum | 58.1 | 38.5 | 48.3 | 197 | 25 | 2.75 | M | M |

Climatological Data for ESTACADA 2 SE, OR - October 2018

| Date | Max Temperature | Min Temperature | Avg Temperature | GDD Base 40 | GDD Base 50 | Precipitation | Snowfall | Snow Depth |
|-------------|-----------------|-----------------|-----------------|-------------|-------------|---------------|----------|------------|
| 2018-10-01 | 69 | 55 | 62.0 | 22 | 12 | 0.00 | 0.0 | 0 |
| 2018-10-02 | 76 | 56 | 66.0 | 26 | 16 | 0.00 | 0.0 | 0 |
| 2018-10-03 | 74 | 40 | 57.0 | 17 | 7 | 0.00 | 0.0 | 0 |
| 2018-10-04 | 71 | 46 | 58.5 | 19 | 9 | 0.00 | 0.0 | 0 |
| 2018-10-05 | 66 | 42 | 54.0 | 14 | 4 | 0.00 | 0.0 | 0 |
| 2018-10-06 | 53 | 46 | 49.5 | 10 | 0 | 1.05 | 0.0 | 0 |
| 2018-10-07 | 54 | 43 | 48.5 | 9 | 0 | 0.02 | 0.0 | 0 |
| 2018-10-08 | 57 | 46 | 51.5 | 12 | 2 | 0.21 | 0.0 | 0 |
| 2018-10-09 | 60 | 52 | 56.0 | 16 | 6 | 0.60 | 0.0 | 0 |
| 2018-10-10 | 60 | 48 | 54.0 | 14 | 4 | 0.03 | 0.0 | 0 |
| 2018-10-11 | 65 | 39 | 52.0 | 12 | 2 | 0.00 | 0.0 | 0 |
| 2018-10-12 | 70 | 39 | 54.5 | 15 | 5 | 0.00 | 0.0 | 0 |
| 2018-10-13 | 70 | 40 | 55.0 | 15 | 5 | 0.00 | 0.0 | 0 |
| 2018-10-14 | 72 | 37 | 54.5 | 15 | 5 | 0.00 | 0.0 | 0 |
| 2018-10-15 | 72 | 40 | 56.0 | 16 | 6 | 0.00 | 0.0 | 0 |
| 2018-10-16 | 83 | 51 | 67.0 | 27 | 17 | 0.00 | 0.0 | 0 |
| 2018-10-17 | M | M | M | M | M | 0.00 | 0.0 | 0 |
| 2018-10-18 | 81 | 47 | 64.0 | 24 | 14 | 0.00 | 0.0 | 0 |
| 2018-10-19 | 74 | 39 | 56.5 | 17 | 7 | 0.00 | 0.0 | 0 |
| 2018-10-20 | 73 | 39 | 56.0 | 16 | 6 | 0.00 | 0.0 | 0 |
| 2018-10-21 | 68 | 39 | 53.5 | 14 | 4 | 0.00 | 0.0 | 0 |
| 2018-10-22 | M | M | M | M | M | 0.00 | 0.0 | 0 |
| 2018-10-23 | 71 | 39 | 55.0 | 15 | 5 | 0.00 | 0.0 | 0 |
| 2018-10-24 | M | M | M | M | M | M | 0.0 | 0 |
| 2018-10-25 | M | M | M | M | M | M | 0.0 | 0 |
| 2018-10-26 | M | M | M | M | M | M | 0.0 | 0 |
| 2018-10-27 | M | M | M | M | M | M | 0.0 | 0 |
| 2018-10-28 | 67 | 46 | 56.5 | 17 | 7 | M | M | 0 |
| 2018-10-29 | 63 | 46 | 54.5 | 15 | 5 | 0.89 | 0.0 | 0 |
| 2018-10-30 | 56 | 43 | 49.5 | 10 | 0 | 0.33 | 0.0 | 0 |
| 2018-10-31 | M | M | M | M | M | M | 0.0 | 0 |
| Average Sum | 67.7 | 44.1 | 55.9 | 387 | 148 | 3.13 | 0.0 | 0.0 |

Climatological Data for ESTACADA 2 SE, OR - September 2018

| Date | Max Temperature | Min Temperature | Avg Temperature | GDD Base 40 | GDD Base 50 | Precipitation | Snowfall | Snow Depth |
|-------------|-----------------|-----------------|-----------------|-------------|-------------|---------------|----------|------------|
| 2018-09-01 | 76 | 51 | 63.5 | 24 | 14 | 0.00 | 0.0 | 0 |
| 2018-09-02 | 74 | 46 | 60.0 | 20 | 10 | 0.00 | 0.0 | 0 |
| 2018-09-03 | 81 | 47 | 64.0 | 24 | 14 | 0.00 | 0.0 | 0 |
| 2018-09-04 | 79 | 44 | 61.5 | 22 | 12 | 0.00 | 0.0 | 0 |
| 2018-09-05 | 83 | 45 | 64.0 | 24 | 14 | 0.00 | 0.0 | 0 |
| 2018-09-06 | 91 | 54 | 72.5 | 33 | 23 | 0.00 | 0.0 | 0 |
| 2018-09-07 | 87 | 50 | 68.5 | 29 | 19 | 0.00 | 0.0 | 0 |
| 2018-09-08 | 86 | 55 | 70.5 | 31 | 21 | 0.00 | 0.0 | 0 |
| 2018-09-09 | 77 | 51 | 64.0 | 24 | 14 | 0.00 | 0.0 | 0 |
| 2018-09-10 | 81 | 51 | 66.0 | 26 | 16 | 0.08 | 0.0 | 0 |
| 2018-09-11 | 72 | 52 | 62.0 | 22 | 12 | 0.02 | 0.0 | 0 |
| 2018-09-12 | 64 | 52 | 58.0 | 18 | 8 | 0.20 | 0.0 | 0 |
| 2018-09-13 | 66 | 48 | 57.0 | 17 | 7 | 0.22 | 0.0 | 0 |
| 2018-09-14 | 69 | 48 | 58.5 | 19 | 9 | 0.00 | 0.0 | 0 |
| 2018-09-15 | 73 | 47 | 60.0 | 20 | 10 | 0.00 | 0.0 | 0 |
| 2018-09-16 | 70 | 47 | 58.5 | 19 | 9 | 0.11 | 0.0 | 0 |
| 2018-09-17 | 65 | 47 | 56.0 | 16 | 6 | 0.29 | 0.0 | 0 |
| 2018-09-18 | 69 | 44 | 56.5 | 17 | 7 | 0.00 | 0.0 | 0 |
| 2018-09-19 | M | M | M | M | M | 0.00 | 0.0 | 0 |
| 2018-09-20 | 72 | 44 | 58.0 | 18 | 8 | 0.00 | 0.0 | 0 |
| 2018-09-21 | 73 | 44 | 58.5 | 19 | 9 | 0.00 | 0.0 | 0 |
| 2018-09-22 | 77 | 54 | 65.5 | 26 | 16 | 0.24 | 0.0 | 0 |
| 2018-09-23 | 69 | 48 | 58.5 | 19 | 9 | 0.09 | 0.0 | 0 |
| 2018-09-24 | 67 | 45 | 56.0 | 16 | 6 | 0.01 | 0.0 | 0 |
| 2018-09-25 | 73 | 41 | 57.0 | 17 | 7 | 0.00 | 0.0 | 0 |
| 2018-09-26 | 82 | 43 | 62.5 | 23 | 13 | 0.00 | 0.0 | 0 |
| 2018-09-27 | 83 | 46 | 64.5 | 25 | 15 | 0.00 | 0.0 | 0 |
| 2018-09-28 | 85 | 46 | 65.5 | 26 | 16 | 0.00 | 0.0 | 0 |
| 2018-09-29 | 91 | 49 | 70.0 | 30 | 20 | 0.00 | 0.0 | 0 |
| 2018-09-30 | 65 | 50 | 57.5 | 18 | 8 | 0.01 | 0.0 | 0 |
| Average Sum | 75.9 | 47.9 | 61.9 | 642 | 352 | 1.27 | 0.0 | 0.0 |

WETS Table

| WETS Station: ESTACADA 2 SE, OR | | | | | | | | |
|------------------------------------|--------------|--------------|---------------|------------|-----------------------------|-----------------------------|-------------------------------------|--------------|
| Requested years: 1971 - 2000 | | | | | | | | |
| Month | Avg Max Temp | Avg Min Temp | Avg Mean Temp | Avg Precip | 30% chance precip less than | 30% chance precip more than | Avg number days precip 0.10 or more | Avg Snowfall |
| Jan | 45.9 | 34.4 | 40.2 | 8.04 | 5.26 | 9.66 | 14 | 0.8 |
| Feb | 49.9 | 36.0 | 43.0 | 6.95 | 4.93 | 8.24 | 13 | 0.9 |
| Mar | 55.2 | 37.9 | 46.5 | 6.22 | 4.79 | 7.22 | 14 | 0.1 |
| Apr | 60.4 | 40.5 | 50.4 | 5.11 | 4.08 | 5.86 | 12 | 0.0 |
| May | 66.5 | 45.1 | 55.8 | 4.03 | 2.88 | 4.77 | 10 | 0.0 |
| Jun | 71.9 | 49.4 | 60.7 | 2.68 | 1.64 | 3.24 | 6 | 0.0 |
| Jul | 78.4 | 53.0 | 65.7 | 1.07 | 0.57 | 1.29 | 3 | 0.0 |
| Aug | 78.6 | 52.9 | 65.7 | 1.28 | 0.41 | 1.52 | 3 | 0.0 |
| Sep | 73.2 | 49.2 | 61.2 | 2.46 | 1.18 | 2.96 | 5 | 0.0 |
| Oct | 61.3 | 43.5 | 52.4 | 4.77 | 2.66 | 5.81 | 9 | 0.0 |
| Nov | 51.0 | 38.8 | 44.9 | 8.45 | 6.07 | 9.98 | 15 | 0.3 |
| Dec | 45.6 | 34.5 | 40.0 | 8.47 | 6.11 | 10.00 | 15 | 0.6 |
| Annual: | | | | | 53.70 | 64.03 | | |
| Average | 61.5 | 42.9 | 52.2 | - | - | - | - | - |
| Total | - | - | - | 59.55 | | | 120 | 2.6 |

GROWING SEASON DATES

| | | | |
|---------------------------|-----------------------|------------------------|-------------------------|
| Years with missing data: | 24 deg = 4 | 28 deg = 2 | 32 deg = 1 |
| Years with no occurrence: | 24 deg = 6 | 28 deg = 0 | 32 deg = 0 |
| Data years used: | 24 deg = 26 | 28 deg = 28 | 32 deg = 29 |
| Probability | 24 F or higher | 28 F or higher | 32 F or higher |
| 50 percent * | 1/25 to 1/6: 346 days | 2/18 to 12/4: 289 days | 4/4 to 11/13: 223 days |
| 70 percent * | 1/9 to 1/23: 379 days | 2/9 to 12/14: 308 days | 3/26 to 11/22: 241 days |

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)

| Yr | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annl |
|------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|-------|
| 1909 | 12.86 | 8.54 | 3.40 | 2.44 | 3.38 | 0.22 | 2.53 | 1.03 | 2.24 | 4.16 | 19.72 | 5.09 | 65.61 |
| 1910 | 9.12 | 10.75 | 4.37 | 3.77 | 2.76 | 1.61 | T | 0.26 | 1.18 | 4.56 | 10.15 | 5.88 | 54.41 |
| 1911 | 11.03 | 4.55 | 2.03 | 3.00 | 5.27 | 2.40 | 0.34 | 0.24 | 6.50 | 1.57 | 5.15 | 7.01 | 49.09 |
| 1912 | 9.86 | 6.95 | 2.38 | 4.18 | 4.60 | 4.89 | 0.64 | 3.25 | 2.11 | 4.76 | 6.97 | 8.44 | 59.03 |
| 1913 | 7.52 | 1.92 | 9.21 | 4.11 | 3.10 | 4.90 | 0.74 | 0.83 | 3.63 | 6.35 | 6.81 | 3.21 | 52.33 |
| 1914 | 10.71 | 6.14 | 4.77 | 4.79 | 2.46 | 2.75 | 0.10 | 0.02 | 4.89 | 6.18 | 5.02 | 2.32 | 50.15 |
| 1915 | 6.40 | 4.02 | 3.23 | 3.82 | 6.70 | 3.02 | 1.86 | 0.01 | 0.78 | 4.33 | 12.24 | 11.07 | 57.48 |
| 1916 | 3.58 | 9.66 | 13.20 | 4.88 | 4.51 | 2.87 | 3.56 | 0.73 | 1.61 | 2.51 | 8.89 | 5.04 | 61.04 |



Appendix C: Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Bailey Meadows City/County: Sandy/Clackamas Sampling Date: 12/4/2018
 Applicant/Owner: Allied Homes & Development State: OR Sampling Point: 1
 Investigator(s): Stacey Reed and Sonya Templeton Section, Township, Range: Sec. 23, T.2S. R.4E. W.M.
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): <3%
 Subregion (LRR): A, Northwest Forests and Coast Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Cottrell silty clay loam (Unit 24B), 2% to 8% slopes; Non-hydric NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks)
 Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---------------------------------|--------------|-------------|--|-----------|-------------|
| Hydrophytic Vegetation Present? | Yes <u>X</u> | No _____ | Is the Sampled Area within a Wetland? | Yes _____ | No <u>X</u> |
| Hydric Soil Present? | Yes _____ | No <u>X</u> | | | |
| Wetland Hydrology Present? | Yes _____ | No <u>X</u> | | | |

Precipitation:
 According to the AgACIS Estacada 2 SE station, 0.00 inches of rainfall was received on the day of the site visit and 2.02 inches within the two weeks prior.

Remarks:
 Planted Christmas tree farm. Plot is located in lowest elevation area on-site.

VEGETATION

| Tree Stratum (Plot Size: 30' r or _____) | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet: | |
|--|---------------------|----------------------|---------------------|---|--|
| 1. _____ | _____ | _____ | _____ | Number of Dominant Species | |
| 2. _____ | _____ | _____ | _____ | That Are OBL, FACW, or FAC: <u>1</u> (A) | |
| 3. _____ | _____ | _____ | _____ | Total Number of Dominant | |
| 4. _____ | _____ | _____ | _____ | Species Across All Strata: <u>1</u> (B) | |
| | 0% = Total Cover | | | Percent of Dominant Species | |
| Sapling/Shrub Stratum (Plot Size: 10' r or _____) | | | | That Are OBL, FACW, or FAC: <u>100%</u> (A/B) | |
| 1. _____ | _____ | _____ | _____ | Prevalence Index worksheet: | |
| 2. _____ | _____ | _____ | _____ | Total % Cover of: <u>_____</u> Multiply by: _____ | |
| 3. _____ | _____ | _____ | _____ | OBL species <u>0</u> x 1 = <u>0</u> | |
| 4. _____ | _____ | _____ | _____ | FACW species <u>0</u> x 2 = <u>0</u> | |
| 5. _____ | _____ | _____ | _____ | FAC species <u>20</u> x 3 = <u>60</u> | |
| | 0% = Total Cover | | | FACU species <u>0</u> x 4 = <u>0</u> | |
| Herb Stratum (Plot Size: 5' r or _____) | | | | UPL species <u>0</u> x 5 = <u>0</u> | |
| 1. <u>Agrostis capillaris</u> | <u>20%</u> | <u>Yes</u> | <u>FAC</u> | Column Totals: <u>20</u> (A) <u>60</u> (B) | |
| 2. _____ | _____ | _____ | _____ | Prevalence Index = B/A = <u>3.00</u> | |
| 3. _____ | _____ | _____ | _____ | Hydrophytic Vegetation Indicators: | |
| 4. _____ | _____ | _____ | _____ | <u>1</u> - Rapid Test for Hydrophytic Vegetation | |
| 5. _____ | _____ | _____ | _____ | <u>X</u> <u>2</u> - Dominance Test is >50% | |
| 6. _____ | _____ | _____ | _____ | <u>X</u> <u>3</u> - Prevalence Index is ≤3.0 ¹ | |
| 7. _____ | _____ | _____ | _____ | <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) | |
| 8. _____ | _____ | _____ | _____ | <u>5</u> - Wetland Non-Vascular Plants ¹ | |
| 9. _____ | _____ | _____ | _____ | Problematic Hydrophytic Vegetation (Explain) ¹ | |
| 10. _____ | _____ | _____ | _____ | ¹ Indicators of hydric soil and wetland hydrology must be present. | |
| 11. _____ | _____ | _____ | _____ | | |
| | 20% = Total Cover | | | Hydrophytic Vegetation Present? Yes <u>X</u> No _____ | |
| Woody Vine Stratum (Plot Size: 10' r or _____) | | | | | |
| 1. _____ | _____ | _____ | _____ | | |
| 2. _____ | _____ | _____ | _____ | | |
| | 0% = Total Cover | | | | |
| % Bare Ground in Herb Stratum <u>80%</u> | | | | | |

Remarks:
 Vegetation in between tree plantings is maintained.

| | | | | | | | | |
|--|---------------|--|---|---|---|---|-----------------|---------|
| SOIL | | | | | | | Sampling Point: | 1 |
| Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators): | | | | | | | | |
| Depth | Matrix | | Redox Features | | | | | |
| (inches) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | Texture | Remarks |
| 0-16 | 10YR 3/2+ | 100 | | | | | SiL | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix. | | | | | | | | |
| Hydric Soil Indicators (Applicable to all LRRs, unless otherwise noted): | | | | | Indicators for Problematic Hydric Soils³: | | | |
| <input type="checkbox"/> Histosol (A1) | | | <input type="checkbox"/> Sandy Redox (S5) | | | <input type="checkbox"/> 2 cm Muck (A10) | | |
| <input type="checkbox"/> Histic Epipedon (A2) | | | <input type="checkbox"/> Stripped Matrix (S6) | | | <input type="checkbox"/> Red Parent Material (TF2) | | |
| <input type="checkbox"/> Black Histic (A3) | | | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) | | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | | | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | | | <input type="checkbox"/> Other (Explain in Remarks) | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | | | <input type="checkbox"/> Depleted Matrix (F3) | | | ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | | | <input type="checkbox"/> Redox Dark Surface (F6) | | | | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | | | <input type="checkbox"/> Depleted Dark Surface (F7) | | | | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | <input type="checkbox"/> Redox Depressions (F8) | | | | | |
| Restrictive Layer (if present): | | | | | | Hydric Soil Present? | | |
| Type: _____ | | | | | | Yes _____ No <input checked="" type="checkbox"/> X | | |
| Depth (inches): _____ | | | | | | | | |
| Remarks: | | | | | | | | |
| HYDROLOGY | | | | | | | | |
| Wetland Hydrology Indicators: | | | | | | | | |
| <u>Primary Indicators (minimum of one required; check all that apply)</u> | | | | | <u>Secondary Indicators (2 or more required)</u> | | | |
| <input type="checkbox"/> Surface Water (A1) | | | <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) | | | <input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) | | |
| <input type="checkbox"/> High Water Table (A2) | | | <input type="checkbox"/> Salt Crust (B11) | | | <input type="checkbox"/> Drainage Patterns (B10) | | |
| <input type="checkbox"/> Saturation (A3) | | | <input type="checkbox"/> Aquatic Invertebrates (B13) | | | <input type="checkbox"/> Dry-Season Water Table (C2) | | |
| <input type="checkbox"/> Water Marks (B1) | | | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | | | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) | | |
| <input type="checkbox"/> Sediment Deposits (B2) | | | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | | | <input type="checkbox"/> Geomorphic Position (D2) | | |
| <input type="checkbox"/> Drift Deposits (B3) | | | <input type="checkbox"/> Presence of Reduced Iron (C4) | | | <input type="checkbox"/> Shallow Aquitard (D3) | | |
| <input type="checkbox"/> Algal Mat or Crust (B4) | | | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | | | <input type="checkbox"/> FAC-Neutral Test (D5) | | |
| <input type="checkbox"/> Iron Deposits (B5) | | | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) | | | <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) | | |
| <input type="checkbox"/> Surface Soil Cracks (B6) | | | <input type="checkbox"/> Other (Explain in Remarks) | | | <input type="checkbox"/> Frost-Heave Hummocks (D7) | | |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | | | | | | | | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | | | | | | | |
| Field Observations: | | | | | | Wetland Hydrology Present? | | |
| Surface Water Present? | Yes _____ | No <input checked="" type="checkbox"/> X | Depth (inches): _____ | | | Yes _____ No <input checked="" type="checkbox"/> X | | |
| Water Table Present? | Yes _____ | No <input checked="" type="checkbox"/> X | Depth (inches): >16" | | | | | |
| Saturation Present? (includes capillary fringe) | Yes _____ | No <input checked="" type="checkbox"/> X | Depth (inches): >16" | | | | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | | | | | | |
| Remarks: | | | | | | | | |
| Soil is dry throughout. | | | | | | | | |



Appendix D: Representative Site Photographs



Photo A. View facing east from Plot 1.



Photo B. View facing west towards Bull Frog Reservoir.



Photo C. View facing east of project site upslope of Plot 1.



Photo D. View facing west of Plot 1 (location of shovel).

Photos taken by Sonya Templeton December 4, 2019



Geotechnical Engineering Report

Bailey Meadows
SE Ponder Lane
Sandy, Oregon

GeoPacific Engineering, Inc. Project No. 19-5205
June 18, 2019

14835 SW 72nd Avenue
Portland, Oregon 97224

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Real-World Geotechnical Solutions
Investigation • Design • Construction Support

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Real-World Geotechnical Solutions
Investigation • Design • Construction Support

Updated June 18, 2019
Project No. 19-5205

Cody Bjugan
Allied Homes and Development
12042 SE Sunnyside Road, Suite #706
Clackamas, Oregon 97015
Via email: cody@investpdx.com

SUBJECT: GEOTECHNICAL ENGINEERING REPORT
BAILEY MEADOWS
SE PONDER LANE
T2S R4E SECTION 23 TAX LOTS 800, 801, 802, 803, & 804
SANDY, OREGON

1.0 PROJECT INFORMATION

This report presents the results of a geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site, and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-6946, dated April 8, 2019, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*.

Site Location: SE Ponder Lane
T2S R4E Section 23 Tax Lots 800, 801, 802, 803, & 804
Sandy, Oregon
(Figures 1 and 2)

Developer: **Cody Bjugan**
Allied Homes and Development
12042 SE Sunnyside Road, Suite #706
Clackamas, Oregon 97015

Jurisdictional Agency: City of Sandy, Oregon

Civil Engineer: AKS Engineering & Forestry, LLC.
12965 SW Herman Road, Suite 100
Tualatin, Oregon 97062
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2.0 SITE AND PROJECT DESCRIPTION

The subject site is composed of five tax lots located on the southwest and north side of SE Ponder Lane, in Sandy, Clackamas County, Oregon (Figures 1 & 2). The property totals approximately 23.6 acres in size and is rectangular in shape. Topography is gently sloping to the west with grades of approximately 5 to 10 percent at elevations of 900 to 945 feet above mean sea level. The site is currently occupied by a gravel driveway and vegetation consists primarily of short grasses, tree stock, and rows of berries.

Based upon communication with the client and review of preliminary project plans (Figure 2), GeoPacific understands that site development will consist of a 100 lot subdivision for single-family homes, new public streets, stormwater facility, and associated underground utility installations. It is our understanding that the homes will be constructed with typical spread foundations and crawl spaces. We anticipate that maximum structural loading on column footings and continuous strip footings of the homes will be on the order of 10 to 35 kips, and 4 kips/ft respectively. The grading plan provided for our review indicates maximum cuts and fills will be on the order of 15 feet or less. Retaining walls up to 12 feet are planned for the stormwater facility.

3.0 REGIONAL GEOLOGIC SETTING

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins.

The subject site is underlain by the Pliocene to Pleistocene aged (about 2 million years ago) Gravel Deposits, which consist of highly weathered cobbles, mudflow deposits, and sand deposits analogous to the Springwater Formation (Schlicker and Finlayson, 1979). The Pliocene to Pleistocene Gravels Formation is typically composed of rounded volcanic rock that is poorly sorted in a matrix consisting of silt and clay. The consistency of the Pliocene to Pleistocene Gravels Formation is generally hard where decomposed to clayey silt and medium-dense to very dense where highly weathered.

Underlying the Pliocene to Pleistocene Gravels Formation is the Pliocene aged (3 to 4 million years old) Troutdale Formation (Schlicker and Finlayson, 1979). In the site vicinity, the Troutdale Formation consists primarily of massive mudstone, claystone, and siltstone with minor sandstone and water-laid tuff that has been highly weathered to silt, clay, and sand. Ripples, channels and cross bedding structures are common, indicating a fluvial origin of deposition. Locally, the Troutdale Formation may contain organic material including wood and logs.

4.0 REGIONAL SEISMIC SETTING

At least three major fault zones capable of generating damaging earthquakes are thought to exist in the vicinity of the subject site. These include the Portland Hills Fault Zone, the Grant Butte and Damascus-Trickle Creek Fault Zones, and the Cascadia Subduction Zone.

4.1 Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that include the central Portland Hills Fault, the western Oatfield Fault, and the eastern East Bank Fault. These faults occur in a northwest-trending zone that varies in width between 3.5 and 5.0 miles. The combined three faults reportedly vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years) sediment (Madin, 1990). The Portland Hills Fault occurs along the Willamette River at the base of the Portland Hills, and is located approximately 12.8 miles west of the site. The Oatfield Fault occurs along the western side of the Portland Hills, and is located approximately 14.9 miles west of the site. The East Bank Fault occurs along the eastern margin of the Willamette River, and is located approximately 13 miles northwest of the site. The accuracy of the fault mapping is stated to be within 500 meters (Wong, et al., 2000).

According to the USGS Earthquake Hazards Program, the fault was originally mapped as a down-to-the-northeast normal fault, but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene Columbia River Basalts, and Miocene to Pliocene sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene aged Missoula flood deposits. No historical seismicity is correlated with the mapped portion of the Portland Hills Fault Zone, but in 1991 a M3.5 earthquake occurred on a NW-trending shear plane located 1.3 miles east of the fault (Yelin, 1992). Although there is no definitive evidence of recent activity, the Portland Hills Fault Zone is assumed to be potentially active (Geomatrix Consultants, 1995).

4.2 Grant Butte and Damascus-Tickle Creek Fault Zones

The Grant Butte fault zone was mapped along the north side of Mt. Scott and Powell Butte by Madin (1990). It was also extended eastward to Grant Butte on the basis of mapping by CH2M Hill and others (1991) and informally named the Grant Butte fault (Cornforth and Geomatrix, 1992). The Damascus-Tickle Creek fault zone displaces Pliocene and possibly Pleistocene sediments in the vicinity of Boring, Oregon (Madin, 1992; Lite, 1992). Relatively short faults define a 17-km-long fault zone that is apparently linked to the Grant Butte fault on the basis of stratigraphic relationships showing middle and late Pleistocene activity. Geomatrix (1995) assigns a probability of 0.5 for activity on structures within these fault zones. The nearest portion of the Grant Butte and Damascus-Tickle Creek fault zone is mapped approximately 5.3 miles northwest of the subject site.

4.3 Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year (Goldfinger et al., 1996). A growing body of geologic evidence suggests that prehistoric subduction zone earthquakes have occurred (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). This evidence includes: (1) buried tidal marshes

recording episodic, sudden subsidence along the coast of northern California, Oregon, and Washington, (2) burial of subsided tidal marshes by tsunami wave deposits, (3) paleoliquefaction features, and (4) geodetic uplift patterns on the Oregon coast. Radiocarbon dates on buried tidal marshes indicate a recurrence interval for major subduction zone earthquakes of 250 to 650 years with the last event occurring 300 years ago (Atwater, 1992; Carver, 1992; Peterson et al., 1993; Geomatrix Consultants, 1995). The inferred seismogenic portion of the plate interface lies approximately along the Oregon Coast at depths of between 20 and 40 kilometers below the surface.

5.0 FIELD EXPLORATION AND SUBSURFACE CONDITIONS

Our site-specific exploration for this report was conducted on May 7, 2019. Sixteen exploratory test pits were excavated with a medium sized backhoe to depths ranging between 9 and 12.5 feet at the approximate locations shown on Figure 2. It should be noted that exploration locations were located in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

A GeoPacific Engineering Geologist continuously monitored the field exploration program and logged the borings. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System (USCS). During exploration, our geologist also noted geotechnical conditions such as soil consistency, moisture and groundwater conditions. Logs of test pits are attached to this report. The following report sections are based on the exploration program and summarize subsurface conditions encountered at the site.

5.1 Subsurface Conditions

Undocumented Fill: An approximately 2 feet thick stockpile of undocumented fill was encountered at the ground surface in test pit TP-10. The fill generally consisted of moderately to highly organic, gravelly silt (ML) that contained abundant woody debris/wood chips. We anticipate that other areas of undocumented fill may be present outside our test pit locations – especially in the vicinity of the existing driveway.

Topsoil Horizon: The ground surface in test pits TP-1 through TP-9 and TP-11 through TP-16 was directly underlain by a topsoil horizon generally consisting of dark brown, low to moderately organic silt (ML-OL). Generally, the topsoil horizon was loose, contained fine roots throughout, and extended to a depth of approximately 6 to 15 inches below the ground surface. A moderately organic, 6 inch thick buried topsoil horizon was encountered beneath the fill in test pit TP-10.

Residual Soil: Underlying the topsoil horizon in test pits TP-1 through TP-9 and TP-11 through TP-16 and the buried topsoil horizon in test pit TP-10 was residual soil derived from in place weathering of the underlying Pliocene-Pleistocene Gravels. These soils generally consisted of light reddish brown clayey silt (ML) to silty clay (CL) with varying quantities of weathered gravel. The residual soil typically had a stiff to very stiff consistency and extended to depths of 4 to 10 feet in test pits TP-2, TP-5, TP-9, and TP-11 through TP-16 and beyond the maximum depth of exploration in test pits TP-1, TP-3, TP-4, TP-6 through TP-8, and TP-10 (10 to 11 feet).

Pliocene-Pleistocene Gravels: In test pits TP-2, TP-5, TP-9, and TP-11 through TP-16, the residual soil was underlain by weathered Pliocene to Pleistocene aged Gravel Deposits. These deposits generally consisted of stiff to very stiff, clayey silt (ML) to silty clay (CL) with gravel or dense, gravel (GM) with a silty clay to clayey silt matrix. The weathered gravel deposits were light

reddish brown to gray in color and contained abundant black staining. The gravel deposits encountered in test pits TP-2, TP-5, TP-9, and TP-11 through TP-16 extended beyond the maximum depth of exploration in test pits (9 to 12.5 feet).

5.2 Groundwater and Soil Moisture

On May 7, 2019, observed soil moisture conditions were generally damp to moist. Minor perched groundwater seepage was encountered in test pit TP-4 at a depth of approximately 5 feet. Discharge was visually estimated at ½ gallon per minute. Regional geologic mapping indicates static groundwater is present and a depth of 60 and 80 feet below ground surface (Snyder, 2008). It is anticipated that groundwater conditions will vary depending on the season, local subsurface conditions, changes in site utilization, and other factors. Perched groundwater may be encountered in localized areas. Seeps and springs may exist in areas not explored, and may become evident during site grading. If the seasonal fluctuation of the static groundwater table underlying the subject site require detailed understanding, piezometers may be installed and periodically monitored.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Our site investigation indicates that the proposed construction appears to be geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. Our explorations indicate the native soils on site are stiff to very stiff and are suitable for development utilizing conventional spread footing foundations.

6.1 Site Preparation Recommendations

Areas of proposed construction and areas to receive fill should be cleared of any organic and inorganic debris. Inorganic debris and organic materials from clearing should be removed from the site. Organic-rich soils and root zones should then be stripped from construction areas of the site or where engineered fill is to be placed. Depth of stripping of existing topsoil is estimated to be approximately 6 to 9 inches across the majority of the site, however depth of organic soil layers may increase in areas where trees and dense vegetation is present. The final depth of soil removal will be determined because of a site inspection after the stripping/excavation has been performed. Stripped topsoil should be removed from areas proposed for placement of engineered fill. Any remaining topsoil should be stockpiled only in designated areas and stripping operations should be observed and documented by the geotechnical engineer or his representative.

If encountered, undocumented fills and any subsurface structures (dry wells, basements, driveway and landscaping fill, old utility lines, septic leach fields, etc.) should be completely removed and the excavations backfilled with engineered fill.

We recommend that areas proposed for placement of engineered fill are scarified to a minimum depth of 12 inches and recompacted prior to placement of structural fill. Prior to placement of engineered fill, the underlying soils be over-excavated, ripped, aerated to optimum moisture content, and recompacted to project specifications for engineered fill as determined by the Standard Proctor (ASTM D698).

Areas proposed to be left at grade may require additional over-excavation of foundation areas in order to reach soils which will provide adequate bearing support for the proposed foundations. Site earthwork may be impacted by shallow groundwater. Stabilization of subgrade soils will require aeration and recompaction. If subgrade soils are found to be difficult to stabilize, over-excavation,

placement of granular soils, or cement treatment of subgrade soils may be feasible options. GeoPacific should be onsite to observe preparation of subgrade soil conditions prior to placement of engineered fill.

6.2 Engineered Fill

All grading for the proposed construction should be performed as engineered grading in accordance with the applicable building code at the time of construction with the exceptions and additions noted herein. Site grading should be conducted in accordance with the requirements outlined in the 2015 International Building Code (IBC), Chapter 18 and Appendix J. Areas proposed for fill placement should be prepared as described in the *Site Preparation Recommendations* section. Surface soils should then be scarified and recompacted prior to placement of structural fill. Site preparation, soil stripping, and grading activities should be observed and documented by a geotechnical engineer or his representative. Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill.

Onsite native soils consisting of silt and clay appear to be suitable for use as engineered fill. Soils containing greater than 5 percent organic content should not be used as structural fill. Imported fill material must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 12 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 95 percent of the maximum dry density determined by ASTM D698 (Standard Proctor) or equivalent. Field density testing should conform to ASTM D2922 and D3017, or D1556. All engineered fill should be observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 yd³, whichever requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Site earthwork may be impacted by shallow groundwater, soil moisture and wet weather conditions. Earthwork in wet weather would likely require extensive use of additional crushed aggregate, cement or lime treatment, or other special measures, at considerable additional cost compared to earthwork performed under dry-weather conditions.

6.3 Excavating Conditions and Utility Trench Backfill

We anticipate that onsite soils can generally be excavated using conventional heavy equipment. Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926), or be shored. The existing native soils classify as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. These cut slope inclinations are applicable to excavations above the water table only.

Shallow, perched groundwater may be encountered during the wet weather season and should be anticipated in excavations and utility trenches. Vibrations created by traffic and construction equipment may cause some caving and raveling of excavation walls. In such an event, lateral

support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

Underground utility pipes should be installed in accordance with the procedures specified in ASTM D2321 and City of Sandy standards. We recommend that structural trench backfill be compacted to at least 95 percent of the maximum dry density obtained by the Standard Proctor (ASTM D698) or equivalent. Initial backfill lift thicknesses for a ¾"-0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g. hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be performed during construction to verify that the recommended relative compaction is achieved. Typically, at least one density test is taken for every 4 vertical feet of backfill on each 100-lineal-foot section of trench.

6.4 Erosion Control Considerations

During our field exploration program, we observed soil conditions that may be considered moderately susceptible to erosion, primarily located in the moderately sloping portions of the site. In our opinion, the primary concern regarding erosion potential will occur during construction in areas that have been stripped of vegetation. Erosion at the site during construction can be minimized by implementing the project erosion control plan, which should include judicious use of straw wattles, fiber rolls, and silt fences. If used, these erosion control devices should remain in place throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture.

6.5 Wet Weather Earthwork

Soils underlying the site are likely to be moisture sensitive and will be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will require expensive measures such as cement treatment or imported granular material to compact areas where fill may be proposed to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, the following recommendations should be incorporated into the contract specifications.

- Earthwork should be performed in small areas to minimize exposure to wet weather. Excavation or the removal of unsuitable soils should be followed promptly by the placement and compaction of clean engineered fill. The size and type of construction equipment used may have to be limited to prevent soil disturbance. Under some circumstances, it may be necessary to excavate soils with a backhoe to minimize subgrade disturbance caused by equipment traffic;

- The ground surface within the construction area should be graded to promote run-off of surface water and to prevent the ponding of water;
- Material used as engineered fill should consist of clean, granular soil containing less than 5 percent passing the No. 200 sieve. The fines should be non-plastic. Alternatively, cement treatment of on-site soils may be performed to facilitate wet weather placement;
- The ground surface within the construction area should be sealed by a smooth drum vibratory roller, or equivalent, and under no circumstances should be left uncompacted and exposed to moisture. Soils which become too wet for compaction should be removed and replaced with clean granular materials;
- Excavation and placement of fill should be observed by the geotechnical engineer to verify that all unsuitable materials are removed and suitable compaction and site drainage is achieved; and
- Geotextile silt fences, straw waddles, and fiber rolls should be strategically located to control erosion.

If cement or lime treatment is used to facilitate wet weather construction, GeoPacific should be contacted to provide additional recommendations and field monitoring.

6.6 Spread Foundations

Based upon communication with the client and review of preliminary project plans (Figure 2), GeoPacific understands that site development will consist of a 98 lot subdivision for single-family homes, new public streets, stormwater facilities, and associated underground utility installations. It is our understanding that the homes will be constructed with typical spread foundations and crawl spaces. We anticipate that maximum structural loading on column footings and continuous strip footings of the homes will be on the order of 10 to 35 kips, and 4 kips/ft respectively.

The proposed structures may be supported on shallow foundations bearing on stiff, native soils and/or engineered fill, appropriately designed and constructed as recommended in this report. We understand that much of the site proposed for construction of residential homes will be left at existing grades. Engineered fill may be placed on some lots. Areas where homes are to be constructed where no engineered fill will be placed should either be prepared as recommended for roadway areas; or the foundation envelopes of the proposed homes should be over-excavated to expose native soils on a lot by lot basis. (See *Site Preparation Recommendations* section).

Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 18 inches below exterior grade. If soft soil conditions are encountered at footing subgrade elevation, they should be removed and replaced with compacted crushed aggregate.

The anticipated allowable soil bearing pressure is 1,500 lbs/ft² for footings bearing on competent, native soil and/or engineered fill. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For loads heavier than 35 kips, the geotechnical engineer should be consulted. If heavier loads than described above are proposed, it may be necessary to over-excavate point load areas and replace with additional compacted crushed aggregate. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.42, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the

majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any disturbed soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require over-excavation of footings and backfill with compacted, crushed aggregate.

Our recommendations are for residential construction incorporating raised wood floors and conventional spread footing foundations. After site development, a Final Soil Engineer's Report should either confirm or modify the above recommendations.

6.7 Concrete Slabs-on-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in the *Site Preparation Recommendations* section. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within about 3 percent of optimum moisture content, and compacted to engineered fill specifications. Alternatively, disturbed soils may be removed and the removal zone backfilled with additional crushed rock.

For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 150 kcf (87 pci) should be assumed for the medium stiff, fine-grained soils anticipated to be present at foundation subgrade elevation following adequate site preparation as described above. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of 8 inches of 1½"-0 crushed aggregate beneath the slab. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction, and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 95 percent of its maximum dry density as determined by ASTM D1557 (Modified Proctor) or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. A commonly applied vapor barrier system consists of a 10-mil polyethylene vapor barrier placed directly over the capillary break material. Other damp/vapor barrier systems may also be feasible. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

6.8 Footing and Roof Drains

Construction should include typical measures for controlling subsurface water beneath the structure, including positive crawlspace drainage to an adequate low-point drain exiting the foundation, visqueen covering the expose ground in the crawlspace, and crawlspace ventilation (foundation vents). The client should be informed and educated that some slow flowing water in the crawlspaces is considered normal and not necessarily detrimental to the home given these other design elements incorporated into its construction. Appropriate design professionals should

be consulting regarding crawlspace ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Down spouts and roof drains should collect roof water in a system separate from the footing drains to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point and storm system well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

If the proposed structure will have a raised floor, and no concrete slab-on-grade floors are used, perimeter footing drains may be eliminated at the discretion of the geotechnical engineer based on soil conditions encountered at the site and experience with standard local construction practices. Where it is desired to reduce the potential for moist crawl spaces, footing drains may be installed. If concrete slab-on-grade floors are used, perimeter footing drains should be installed as recommended below.

Where necessary, perimeter footing drains should consist of 3 or 4-inch diameter, perforated plastic pipe embedded in a minimum of 1 ft³ per lineal foot of clean, free-draining drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Figure 3 presents a typical perimeter footing drain detail. In our opinion, footing drains may outlet at the curb, or on the back sides of lots where sufficient fall is not available to allow drainage to meet the street.

6.9 Permanent Below-Grade Walls

Lateral earth pressures against below-grade retaining walls will depend upon the inclination of any adjacent slopes, type of backfill, degree of wall restraint, method of backfill placement, degree of backfill compaction, drainage provisions, and magnitude and location of any adjacent surcharge loads. At-rest soil pressure is exerted on a retaining wall when it is restrained against rotation. In contrast, active soil pressure will be exerted on a wall if its top is allowed to rotate or yield a distance of roughly 0.001 times its height or greater.

If the subject retaining walls will be free to rotate at the top, they should be designed for an active earth pressure equivalent to that generated by a fluid weighing 35 pcf for level backfill against the wall. For restrained wall, an at-rest equivalent fluid pressure of 55 pcf should be used in design, again assuming level backfill against the wall. These values assume that the recommended drainage provisions are incorporated, and hydrostatic pressures are not allowed to develop against the wall.

During a seismic event, lateral earth pressures acting on below-grade structural walls will increase by an incremental amount that corresponds to the earthquake loading. Based on the Mononobe-Okabe equation and peak horizontal accelerations appropriate for the site location, seismic loading should be modeled using the active or at-rest earth pressures recommended above, plus an incremental rectangular-shaped seismic load of magnitude 6.5H, where H is the total height of the wall.

We assume relatively level ground surface below the base of the walls. As such, we recommend passive earth pressure of 300 pcf for use in design, assuming wall footings are cast against competent native soils or engineered fill. If the ground surface slopes down and away from the base of any of the walls, a lower passive earth pressure should be used and GeoPacific should be contacted for additional recommendations.

A coefficient of friction of 0.42 may be assumed along the interface between the base of the wall footing and subgrade soils. The recommended coefficient of friction and passive earth pressure values do not include a safety factor, and an appropriate safety factor should be included in design. The upper 12 inches of soil should be neglected in passive pressure computations unless it is protected by pavement or slabs on grade.

The above recommendations for lateral earth pressures assume that the backfill behind the subsurface walls will consist of properly compacted structural fill, and no adjacent surcharge loading. If the walls will be subjected to the influence of surcharge loading within a horizontal distance equal to or less than the height of the wall, the walls should be designed for the additional horizontal pressure. For uniform surcharge pressures, a uniformly distributed lateral pressure of 0.3 times the surcharge pressure should be added. Traffic surcharges may be estimated using an additional vertical load of 250 psf (2 feet of additional fill), in accordance with local practice.

The recommended equivalent fluid densities assume a free-draining condition behind the walls so that hydrostatic pressures do not build-up. This can be accomplished by placing a 12 to 18-inch wide zone of sand and gravel containing less than 5 percent passing the No. 200 sieve against the walls. A 3-inch minimum diameter perforated, plastic drain pipe should be installed at the base of the walls and connected to a suitable discharge point to remove water in this zone of sand and gravel. The drain pipe should be wrapped in filter fabric (Mirafi 140N or other as approved by the geotechnical engineer) to minimize clogging.

Wall drains are recommended to prevent detrimental effects of surface water runoff on foundations – not to dewater groundwater. Drains should not be expected to eliminate all potential sources of water entering a basement or beneath a slab-on-grade. An adequate grade to a low point outlet drain in the crawlspace is required by code. Underslab drains are sometimes added beneath the slab when placed over soils of low permeability and shallow, perched groundwater.

Water collected from the wall drains should be directed into the local storm drain system or other suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. Down spouts and roof drains should not be connected to the wall drains in order to reduce the potential for clogging. The drains should include clean-outs to allow periodic maintenance and inspection. Grades around the proposed structure should be sloped such that surface water drains away from the building.

GeoPacific should be contacted during construction to verify subgrade strength in wall keyway excavations, to verify that backslope soils are in accordance with our assumptions, and to take density tests on the wall backfill materials.

Structures should be located a horizontal distance of at least 1.5H away from the back of the retaining wall, where H is the total height of the wall. GeoPacific should be contacted for additional foundation recommendations where structures are located closer than 1.5H to the top of any wall.

6.10 Pavement Design

For design purposes, we used an estimated resilient modulus of 9,000 for compacted native soil. Table 2 presents our recommended minimum pavement section for dry weather construction.

Table 2. Recommended Minimum Dry-Weather Pavement Section

| Material Layer | Light-duty Public Streets | Compaction Standard |
|--|---------------------------|---|
| Asphaltic Concrete (AC) | 3 in. | 92% of Rice Density AASHTO T-209 |
| Crushed Aggregate Base ¾"-0 (leveling course) | 2 in. | 95% of Modified Proctor AASHTO T-180 |
| Crushed Aggregate Base 1½"-0 | 8 in. | 95% of Modified Proctor AASHTO T-180 |
| Subgrade | 12 in. | 95% of Standard Proctor AASHTO T-99 |

Any pockets of organic debris or loose fill encountered during ripping or tilling should be removed and replaced with engineered fill (see *Site Preparation* Section). In order to verify subgrade strength, we recommend proof-rolling directly on subgrade with a loaded dump truck during dry weather and on top of base course in wet weather. Soft areas that pump, rut, or weave should be stabilized prior to paving. If pavement areas are to be constructed during wet weather, the subgrade and construction plan should be reviewed by the project geotechnical engineer at the time of construction so that condition specific recommendations can be provided. The moisture sensitive subgrade soils make the site a difficult wet weather construction project.

During placement of pavement section materials, density testing should be performed to verify compliance with project specifications. Generally, one subgrade, one base course, and one asphalt compaction test is performed for every 100 to 200 linear feet of paving.

7.0 SEISMIC DESIGN

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2019 Statewide GeoHazards Viewer indicates that the site is in an area where *very strong* ground shaking is anticipated during an earthquake. Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2015 International Building Code (IBC) with applicable Oregon Structural Specialty Code (OSSC) revisions (current 2014). We recommend Site Class D be used for design per the OSSC, Table 1613.5.2 and as defined in ASCE 7, Chapter 20, Table 20.3-1. Design values determined for the site using the Applied Technology Council (ATC) 2019 Hazards by Location Online Tool are summarized in Table 3, and are based upon existing soil conditions.

Table 3. Recommended Earthquake Ground Motion Parameters (ATC, 2019)

| Parameter | Value |
|---|------------------|
| Location (Lat, Long), degrees | 45.388, -122.277 |
| Probabilistic Ground Motion Values, 2% Probability of Exceedance in 50 yrs | |
| Peak Ground Acceleration PGA_M | 0.383 g |
| Short Period, S_s | 0.772 g |
| 1.0 Sec Period, S_1 | 0.337 g |
| Soil Factors for Site Class D: | |
| F_a | 1.191 |
| F_v | 1.726 |
| $SD_s = 2/3 \times F_a \times S_s$ | 0.613 g |
| $SD_1 = 2/3 \times F_v \times S_1$ | 0.388 g |
| Seismic Design Category | D |

The Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon HazVu: 2019 Statewide GeoHazards Viewer indicates that the site is in an area not considered to be at risk for soil liquefaction during an earthquake. Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to ground shaking caused by strong earthquakes. Soil liquefaction is generally limited to loose, sands and granular soils located below the water table, and fine-grained soils with a plasticity index less than 15. The upper 12 feet of the site was observed to be underlain by very stiff, fine-grained soils with moderate plasticity. Groundwater was not encountered within our subsurface explorations. Regional geologic mapping indicates static groundwater is between 60 and 80 feet below ground surface (Snyder, 2008). Based upon the results of our study, it is our opinion that the risk of soil liquefaction in the upper 12 feet of the ground surface during a seismic event at the subject site should be considered to be low.

If deemed necessary, quantitative liquefaction assessment, beyond the scope of this study, may be conducted at the subject site to determine whether or not liquefiable soil layers are present underneath the subject site beyond the depths explored. Cone penetrometer testing (CPT) would be conducted at a selected location within the site boundaries to explore deeper subsurface soil layers, and the data would be used to estimate anticipated dynamic settlement at the subject site during a seismic ground shaking event.

8.0 UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. The checklist attached to this report outlines recommended geotechnical observations and testing for the project. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.



Beth K. Rapp, C.E.G.
Senior Engineering Geologist



James D. Imbrie, G.E., C.E.G.
Geotechnical Engineer

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CHECKLIST OF RECOMMENDED GEOTECHNICAL TESTING AND OBSERVATION

| Item No. | Procedure | Timing | By Whom | Done |
|----------|---|--|---|------|
| 1 | Preconstruction meeting | Prior to beginning site work | Contractor, Developer, Civil and Geotechnical Engineers | |
| 2 | Fill removal from site or sorting and stockpiling | Prior to mass stripping | Soil Technician/ Geotechnical Engineer | |
| 3 | Stripping, aeration, and root-picking operations | During stripping | Soil Technician | |
| 4 | Compaction testing of engineered fill (95% of Standard Proctor) | During filling, tested every 2 vertical feet | Soil Technician | |
| 5 | Retaining Wall Keyway and Subbase | During Excavation | Soil Technician/ Geotechnical Engineer | |
| 6 | Retaining Wall Backfill and Geogrid Placement | During Construction | Soil Technician/ Geotechnical Engineer | |
| 7 | Compaction testing of trench backfill (95% of Standard Proctor) | During backfilling, tested every 4 vertical feet for every 200 linear feet | Soil Technician | |
| 8 | Street Subgrade Inspection (95% of Standard Proctor) | Prior to placing base course | Soil Technician | |
| 9 | Base course compaction (95% of Modified Proctor) | Prior to paving, tested every 200 linear feet | Soil Technician | |
| 10 | Asphalt Compaction (92% Rice Value) | During paving, tested every 100 linear feet | Soil Technician | |
| 11 | Final Geotechnical Engineer's Report | Completion of project | Geotechnical Engineer | |



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FIGURES

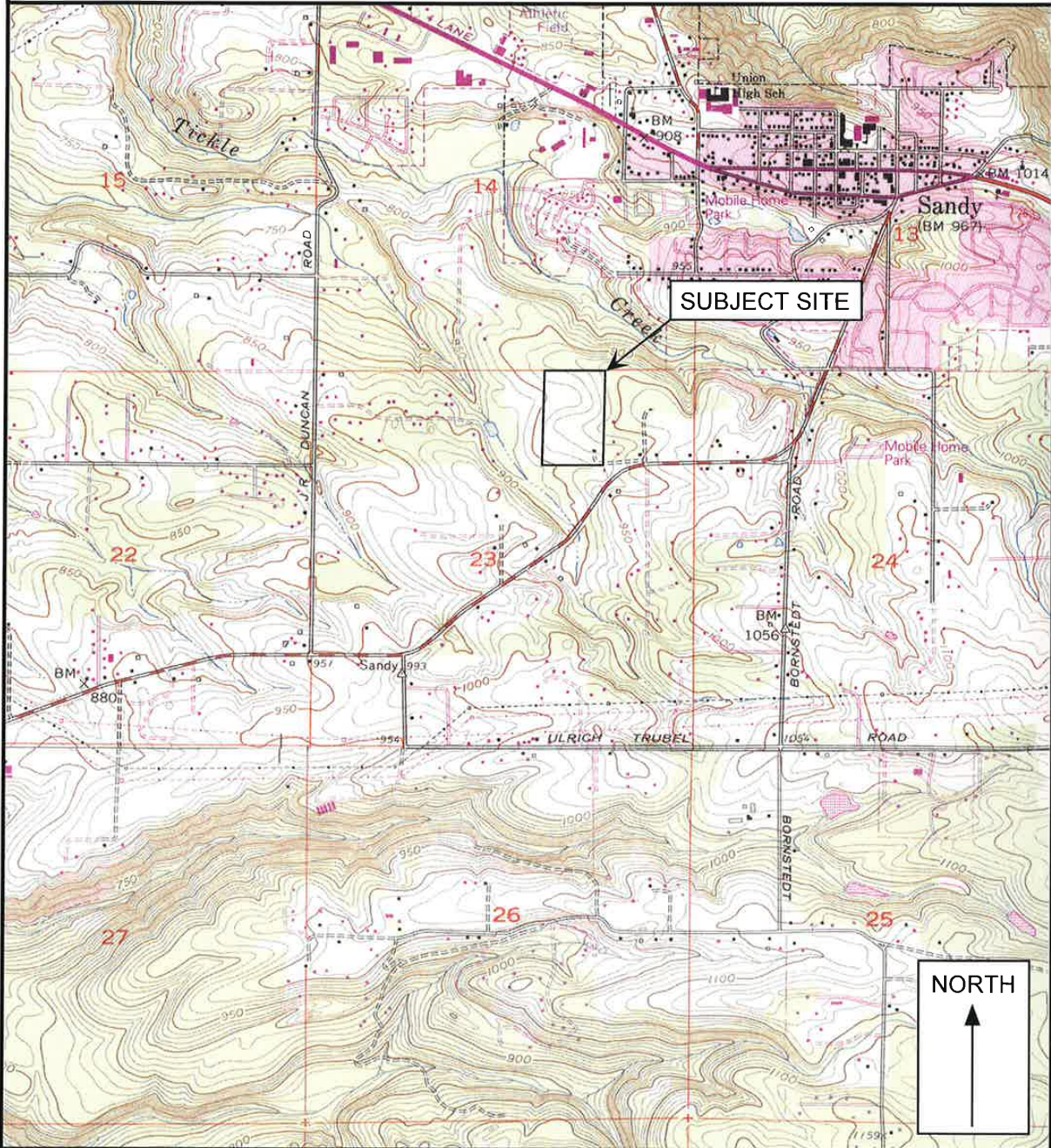
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Portland, Oregon 97224

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Fax (503) 941-9281



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VICINITY MAP



Legend

Approximate Scale 1 in = 2,000 ft

Date: 6/18/2019

Drawn by: EKR

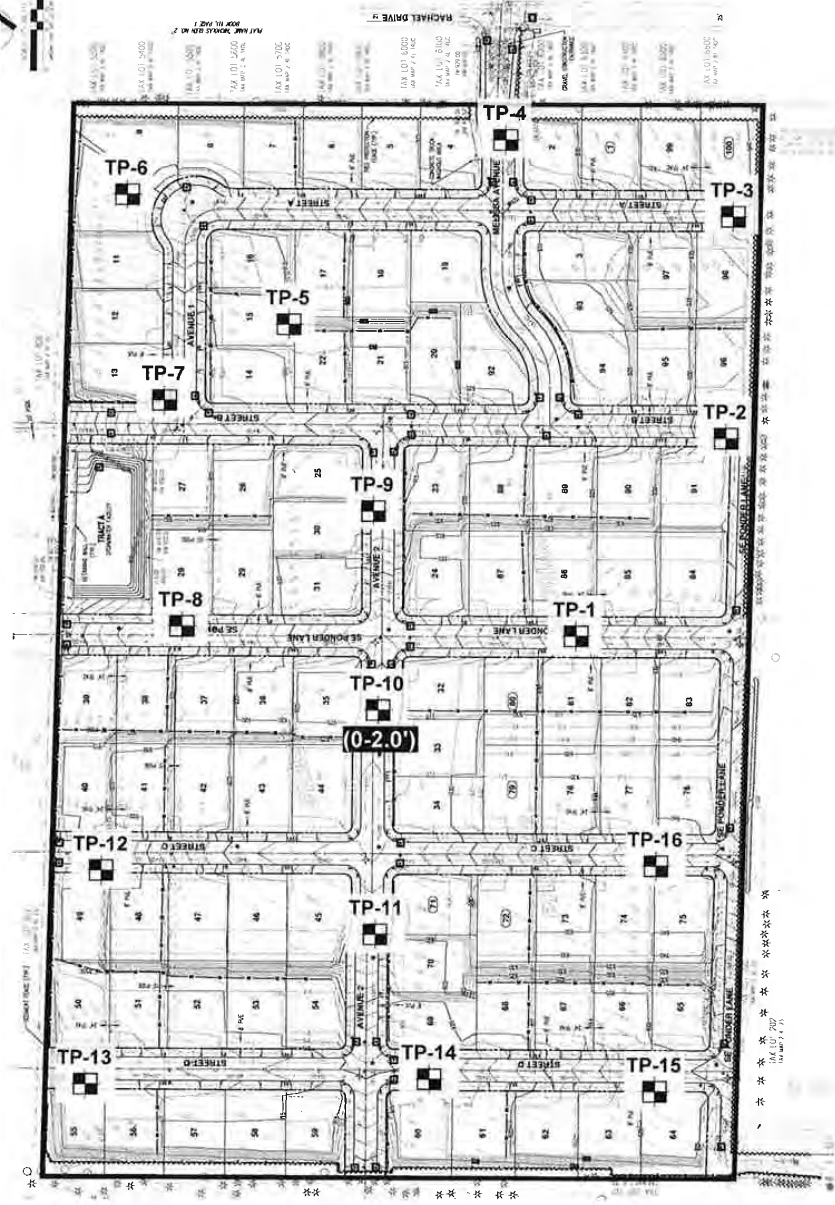
Base maps: U.S. Geological Survey 7.5 minute Topographic Map Series, Estacada, Oregon Quadrangle, 1961 (Photorevised in 1985) and Sandy, Oregon Quadrangle, 1961 (Photorevised in 1985).

| | | |
|--|---------------------|----------|
| Project: Bailey Meadows Sandy, Oregon | Project No. 19-5205 | FIGURE 1 |
|--|---------------------|----------|



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SITE PLAN AND EXPLORATION LOCATIONS



Legend

TP-1 Test Pit Designation and
 Approximate Location

(0-2.0') Depth of Fill
 Encountered

0 200'
 APPROXIMATE SCALE 1"=200'

Date: 6/18/2019
 Drawn by: EKR

Project: Bailey Meadows
 Sandy, Oregon

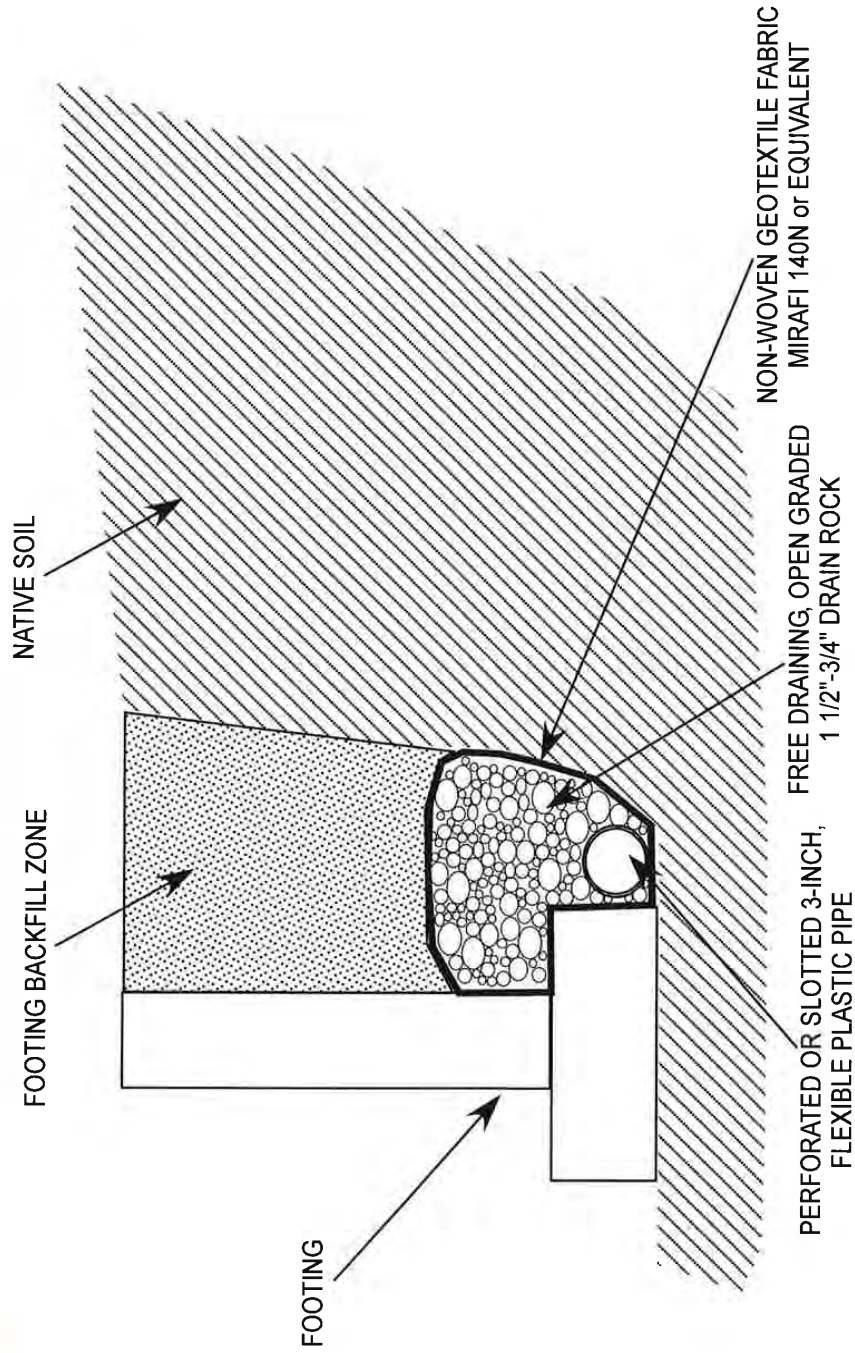
Project No. 19-5205

FIGURE 2



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TYPICAL PERIMETER FOOTING DRAIN DETAIL



Notes:

- 1) Drain rock should contain no more than 5 percent fines passing the U.S. No. 200 Sieve.
- 2) Trench bottom and drain pipe should be sloped to drain to approved discharge location.

Date: 6/18/2019
Drawn by: BLC

Project: Bailey Meadows
Sandy, Oregon

Project No. 19-5205

FIGURE 3



Real-World Geotechnical Solutions
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EXPLORATION LOGS

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TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-1**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 2.0 | | | | | Low organic SILT (OL-ML), light brown, fine roots throughout, loose, trace charcoal, damp to moist (Topsoil Horizon) |
| 2 | 2.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace fine roots to 4 feet, trace black staining, moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 3.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 10 Feet. |
| 11 | | | | | | Note: No seepage or groundwater encountered. |
| 12 | | | | | | |

LEGEND



100 to 1,000 g



5 Gal Bucket



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG







Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-2**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 4.5 | | | | | Low to moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, tilled, with charcoal fragments, damp to moist (Topsoil Horizon) |
| 2 | 2.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.5 | | | | | |
| 4 | 3.0 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL) with gravel to dense, silty GRAVEL (GM), light reddish brown to gray, subtle orange and gray mottling, trace black staining, rock is subrounded, moist (Pliocene-Pleistocene Gravels) |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 11 Feet. |
| 11 | | | | | | |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND

| | | | | | |
|--|---|--|---|--|--|
|  Bag Sample |  Bucket Sample |  Shelby Tube Sample |  Seepage |  Water Bearing Zone |  Water Level at Abandonment |
|--|---|--|---|--|--|

Date Excavated: 5/7/2019
 Logged By: B. Rapp
 Surface Elevation:



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TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-3**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 3.0 | | | | | Low to moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 2.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 2.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | Test Pit Terminated at 11 Feet. |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND



Bag Sample



5 Gal Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:




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TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-4**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--|--|
| 1 | 2.5 | | | | | Moderately organic, clayey SILT (OL-ML), dark brown, fine roots throughout, loose, damp to moist (Topsoil Horizon) |
| 2 | 2.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, trace large roots, subtle to strong orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 3.0 | | | | | |
| 5 | | | | |  | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | Test Pit Terminated at 10.5 Feet. |
| 12 | | | | | | Note: Groundwater seepage encountered at 5 feet. Discharge visually estimated at 1/2 gallon per minute. |

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Bailey Meadows Sandy, Oregon Project No. 10-5205 Test Pit No. **TP-5**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 3.0 | | | | | Moderately organic, clayey SILT (OL-ML), brown, fine roots throughout, loose, tilled, trace charcoal fragments, moist (Topsoil Horizon) |
| 2 | 2.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), trace weathered gravel, light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 2.5 | | | | | |
| 4 | 3.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | Dense, GRAVEL (GM), with clayey silt to silty clay matrix, light reddish brown, subtle orange and gray mottling, trace black staining, rock is subrounded, moist (Pliocene-Pleistocene Gravels) |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 12 Feet. Note: No seepage or groundwater encountered. |
| 11 | | | | | | |
| 12 | | | | | | |

LEGEND



100 to 1,000 g
Bag Sample



5 Gal Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG

Project: Bailey Meadows Sandy, Oregon Project No. 10-5205 Test Pit No. **TP-6**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 3.5 | | | | | Moderately organic, clayey SILT (OL-ML), dark brown, fine roots throughout, loose, damp to moist (Topsoil Horizon) |
| 2 | 3.5 | | | | | Stiff to very stiff, silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, trace large roots to 4 feet, moist (Residual Soil) |
| 3 | 3.5 | | | | | |
| 4 | 3.0 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | Test Pit Terminated at 11 Feet. |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND

| | | | | | |
|------------|---------------|--------------------|---------|--------------------|----------------------------|
| Bag Sample | Bucket Sample | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment |
|------------|---------------|--------------------|---------|--------------------|----------------------------|

Date Excavated: 5/7/2019
 Logged By: B. Rapp
 Surface Elevation:



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TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-7**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 2.0 | | | | | Moderately organic, clayey SILT (OL-ML), dark brown, fine roots throughout, 5 inch thick root mat, tilled, loose, damp to moist (Topsoil Horizon) |
| 2 | 2.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 3.0 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | Test Pit Terminated at 10.5 Feet. |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND



100 to 1,000 g
Bag Sample



5 Gal Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

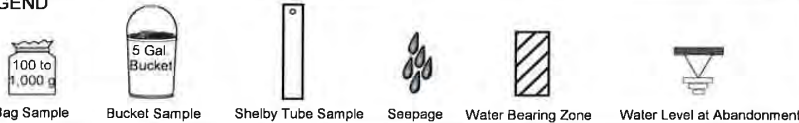
Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-8**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 3.0 | | | | | Moderately organic, clayey SILT (OL-ML), dark brown, fine roots throughout, loose, damp to moist (Topsoil Horizon) |
| 2 | 3.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 2.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 10 Feet. |
| 11 | | | | | | Note: No seepage or groundwater encountered. |
| 12 | | | | | | |

LEGEND



Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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TEST PIT LOG







Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-9**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 2.5 | | | | | Low to moderately organic, SILT (OL-ML), brown, fine roots throughout, 4-5 inch root mat, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 3.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, damp to moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 3.0 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | Dense, highly weathered GRAVEL (GM), with clayey silt to silty clay matrix, light reddish brown, subtle orange and gray mottling, trace black staining, rock is rounded, moist (Pliocene-Pleistocene Gravels) |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 11.5 Feet. |
| 11 | | | | | | |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND

| | | | | | |
|---|--|---|--|---|---|
|  Bag Sample |  Bucket Sample |  Shelby Tube Sample |  Seepage |  Water Bearing Zone |  Water Level at Abandonment |
|---|--|---|--|---|---|

Date Excavated: 5/7/2019
 Logged By: B. Rapp
 Surface Elevation:



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TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-10**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 2.5 | | | | | Moderately to highly organic, gravelly SILT (OL-ML), brown, with wood chips, trace fine roots, damp (Undocumented Fill) |
| 2 | 2.5 | | | | | Moderately organic, SILT (OL-ML), brown, moist (Buried Topsoil Horizon) |
| 3 | 3.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, trace roots to 4 feet, moist (Residual Soil) |
| 4 | 3.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | Test Pit Terminated at 10.5 Feet |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND



Bag Sample



5 Gal Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



14835 SW 72nd Avenue
 Portland, Oregon 97224
 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-11**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 2.0 | | | | | Moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 1.0 | | | | | Medium stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, damp to moist (Residual Soil) |
| 3 | 2.5 | | | | | |
| 4 | 3.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | Dense, highly weathered GRAVEL (GM), with clayey silt to silty clay matrix, light reddish brown, subtle orange and gray mottling, trace black staining, moist (Pliocene-Pleistocene Gravels) |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 12.5 Feet. |
| 11 | | | | | | |
| 12 | | | | | | |

Note: No seepage or groundwater encountered.

LEGEND



100 to 1,000 g



5 Gal Bucket



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



14835 SW 72nd Avenue
 Portland, Oregon 97224
 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-12**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 3.0 | | | | | Low to moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, tilled, with charcoal fragments, damp to moist (Topsoil Horizon) |
| 2 | 3.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 3.5 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL) with gravel, light reddish brown to gray, subtle orange and gray mottling, trace black staining, rock is subrounded and up to 6 inches diameter, moist (Pliocene-Pleistocene Gravels) |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | Test Pit Terminated at 9 Feet. |
| 10 | | | | | | Note: No seepage or groundwater encountered. |
| 11 | | | | | | |
| 12 | | | | | | |

LEGEND



Bag Sample



5 Gal. Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



14835 SW 72nd Avenue
 Portland, Oregon 97224
 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-13**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 2.0 | | | | | Low to moderately organic, SILT (OL-ML), brown, fine roots throughout, 4 inch thick root mat, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 3.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), trace subrounded gravel, light reddish brown, subtle orange and gray mottling, trace black staining, damp to moist (Residual Soil) |
| 3 | 3.0 | | | | | |
| 4 | 3.0 | | | | | |
| 5 | | | | | | |
| 6 | | | | | | Dense, highly weathered GRAVEL (GM), with clayey silt to silty clay matrix, light reddish brown, subtle orange and gray mottling, trace black staining, rock is rounded and up to 6" diameter, moist (Pliocene-Pleistocene Gravels) |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | Test Pit Terminated at 9 Feet. |
| 10 | | | | | | Note: No seepage or groundwater encountered. |
| 11 | | | | | | |
| 12 | | | | | | |

LEGEND



Bag Sample



5 Gal. Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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 Portland, Oregon 97224
 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-14**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 3.0 | | | | | Moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 2.0 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 3.5 | | | | | |
| 4 | 4.0 | | | | | |
| 5 | | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL) with weathered gravel, light reddish brown to gray, subtle orange and gray mottling, trace black staining, rock is subrounded, moist (Pliocene-Pleistocene Gravels) |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | Test Pit Terminated at 10.5 Feet. |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND



Bag Sample



Bucket Sample



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



14835 SW 72nd Avenue
 Portland, Oregon 97224
 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-15**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|---|
| 1 | 2.0 | | | | | Moderately organic, SILT (OL-ML), brown, fine roots throughout, 6 inch thick root mat, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 4.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, damp to moist (Residual Soil) |
| 3 | 3.5 | | | | | |
| 4 | 4.5 | | | | | |
| 5 | | | | | | Dense, highly weathered GRAVEL (GM), with clayey silt to silty clay matrix, light reddish brown, subtle orange and gray mottling, trace black staining, rock is rounded and up to 9 inches diameter, moist (Pliocene-Pleistocene Gravels) |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | Test Pit Terminated at 10.5 Feet. |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | Note: No seepage or groundwater encountered. |

LEGEND



100 to 1,000 g



5 Gal. Bucket



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



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 Portland, Oregon 97224
 Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Bailey Meadows
 Sandy, Oregon

Project No. 10-5205

Test Pit No. **TP-16**

| Depth (ft) | Pocket Penetrometer (tons/ft ²) | Sample Type | In-Situ Dry Density (lb/ft ³) | Moisture Content (%) | Water Bearing Zone | Material Description |
|------------|---|-------------|---|----------------------|--------------------|--|
| 1 | 3.5 | | | | | Moderately organic, SILT (OL-ML), brown, fine roots throughout, loose, tilled, damp to moist (Topsoil Horizon) |
| 2 | 2.5 | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL), light reddish brown, subtle orange and gray mottling, trace black staining, moist (Residual Soil) |
| 3 | 2.5 | | | | | |
| 4 | 2.0 | | | | | |
| 5 | | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL) with gravel, light reddish brown, subtle orange and gray mottling, trace black staining, rock is subrounded and up to 6 inches diameter, moist (Pliocene-Pleistocene Gravels) |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | Stiff to very stiff, clayey SILT (ML) to silty CLAY (CL) with gravel, light reddish brown, subtle orange and gray mottling, trace black staining, rock is subrounded and up to 6 inches diameter, moist (Pliocene-Pleistocene Gravels) |
| 9 | | | | | | |
| 10 | | | | | | Test Pit Terminated at 10 Feet. |
| 11 | | | | | | Note: No seepage or groundwater encountered. |
| 12 | | | | | | |

LEGEND



100 to 1,000 g



5 Gal Bucket



Shelby Tube Sample



Seepage



Water Bearing Zone



Water Level at Abandonment

Date Excavated: 5/7/2019

Logged By: B. Rapp

Surface Elevation:



July 2, 2019

Michael C. Robinson
Admitted in Oregon
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Kelly O'Neill, Jr., Director
City of Sandy Planning & Building Department
Sandy City Hall
39250 Pioneer Boulevard
Sandy, OR 97055

RE: Application by Allied Homes & Development for Approval of the 100-Lot Bailey Meadows Preliminary Plat Subdivision Application

Dear Mr. O'Neill:

This office represents the Applicant. On behalf of the Applicant, please find enclosed the required materials for submission of a tentative subdivision plat application pursuant to Sandy Municipal Code ("SMC") Chapter 17.100. The Application includes the information required by SMC Chapter 17.100, a check for the applicable application fee, a City of Sandy Land Use application form signed by the property owner and other materials required for a complete application.

AKS Engineering & Forestry and I are the Applicant's representatives. Please provide us with copies of the City's determination of application completeness, notices of public hearings, staff reports and any correspondence to or from the City concerning this Application.

Additionally, I want to discuss four issues raised at the pre-application conference held on November 20, 2018 and at the Applicant's second meeting with City staff on January 29, 2019. Those four issues and the Applicant's responses to each are shown below.

City staff raised the following issues at the pre-application for this Application.

A. The City believes that the subdivision application should comply with the Oregon Transportation Planning Rule (the "TPR"), OAR 660-012-0060(1)-(3);

B. The City of Sandy Parks and Trail Advisory Board (the "Parks Board") has recommended that the Applicant dedicate land for a public park in the subdivision rather than accept a fee-in-lieu payment for park improvements elsewhere in the city;

C. The City believes that the vehicle trips from the proposed 100-lot subdivision cannot use Melissa Avenue because doing so would cause Melissa Avenue to exceed the number of vehicle trips permitted for a Local Street under the City's Transportation System Plan (the "TSP"); and

Kelly O'Neill, Jr., Director
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Page 2

D. The City proposes that the Application include an extension of Gunderson Road outside of the City's acknowledged Urban Growth Boundary (the "UGB") in order to provide a street connection to Oregon Highway 211 so that vehicle trips would have an alternative to Melissa Avenue.

2. Response to each issue.

A. The Transportation Planning Rule (the "TPR") is not applicable to a subdivision application.

The TPR is an administrative rule adopted by the Oregon Land Conservation and Development Commission (the "LCDC") that implements Statewide Planning Goal (the "Goals") 12, "Transportation." As explained below, the TPR does not apply to a subdivision application such as this. The City annexed the subject property and properly zoned it following annexation but did not apply the TPR when it zoned the property for urban uses. It is too late to ask the applicant to address the TPR in a subdivision application where the zoning map designation is already final.

OAR 660-012-0060(1)-(3) should have been applied no later than the zoning of this property. OAR 660-012-0060(1) does not apply to land division applications; it applies only to "an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map)." A subdivision is none of these things. A subdivision is a "limited land use decision" as defined in ORS 197.015(12) that is subject to acknowledged land use regulations. *See* ORS 197.175(2)(d). Therefore, the TPR cannot be an approval standard or criterion for this subdivision application.

B. An exception to the Goals in order for Gunderson Road to be extended outside of the City's acknowledged UGB is not possible nor can it be required of the Applicant.

Because Gunderson Road is outside of the City's UGB and the extension of Gunderson Road would not be within an existing right-of-way, the Applicant would have to apply for and receive approval from Clackamas County (the "County") for an "exception" to Goals 3, 12 and 14 to allow the extension of Gunderson Road to Oregon Highway 211 outside of the City's UGB.

The Applicant told the City that it would talk with the County about whether an exception to Goals 3, 12, and 14 to allow the extension of Gunderson Road outside of the City's UGB would be possible. The Applicant met with County Planning Department staff on April 3, 2019 and explained its request. After reviewing the Applicant's information, the County Planning Department staff told the Applicant it would not support the required exception to the Goals and that it would be unlikely that the required exceptions would be approved by the Clackamas County Board of Commissioners. The Applicant has exhausted its good-faith efforts to determine whether an exception is possible to allow the extension of Gunderson Road outside of the City's UGB and has concluded that it is not.

Kelly O'Neill, Jr., Director
July 2, 2019
Page 3

Additionally, there is no evidentiary reason that Gunderson Road should be extended since adequate transportation facilities are available for the subdivision trips inside the UGB as demonstrated by the Applicant's June 3, 2019 Traffic Impact Analysis prepared by Lancaster Engineering. Finally, there is no legal basis for the City to require the Applicant to make an exception application to extend a transportation facility outside of the acknowledged UGB where there is no evidentiary reason to do so and where existing transportation facilities inside the UGB are adequate.

C. Park land dedication.

The Sandy Municipal Code allows the City to either require park dedication or to accept a fee-in-lieu payment. This Application is predicated on development of 100 lots without a park. The Applicant will make the fee-in-lieu payment.

There are at least two legal issues that preclude the City from requiring a park land dedication. First, a park land dedication is subject to the *Dolan* and *Nollan* analysis for exactions of real property, as well as the recent Oregon Court of Appeals decision in *Hill v. City of Portland*. These cases collectively impose on the City the legal burden of proof to demonstrate that the Application requires the dedication. The City has not demonstrated that the required "nexus" exists to require the Applicant to dedicate the park land. The City Attorney's February 27, 2019 memorandum contains a thorough analysis of this issue.

Second, the Sandy Municipal Code approval criterion in SMC 17.100.060.E.4. and the standard regarding the choice of park land dedication or fee-in-lieu payments are subjective and because this Application is a "Needed Housing" application pursuant to ORS 197.303(1) and 197.307(4), the City may not apply subjective standards to the Application. The choice between the dedication of land and the payment of cash is a subjective process without standards for making the decision in SMC Chapter 17.86. SMC 17.86.40 provides that the choice is "at the City's discretion only." ORS 197.307(4) prohibits such a subjective procedure and standard.

D. The City's Comprehensive Plan (the "Plan"), the 1997 Parks Master Plan (the "Park Plan") and the Transportation System Plan (the "TSP") are inapplicable to this Application.

The Plan, the Park Plan and the TSP are all elements of the City's Comprehensive Plan. Because this Application is a limited land use decision application as defined in ORS 197.015(12), it is subject to ORS 197.195(1). ORS 197.195(1) provides that limited land use decisions may not be subject to Plan standards as approval criteria unless those Plan standards are expressly incorporated in whole or in part into a City's acknowledged land use regulations. The City's acknowledged land use regulations for approval of a tentative subdivision are found in SMC 17.100.060.E.1.-6. The Plan, the Park Plan and the TSP standards are not expressly incorporated into the approval criteria with sufficient detail to satisfy the requirement of ORS 197.195(1). Therefore, those Plan standards cannot be approval criteria for this limited land use decision application.

Kelly O'Neil, Jr., Director
July 2, 2019
Page 4

SMC 17.100.110 refers to the TSP but does not expressly incorporate specific TSP standards. Even if SMC 17.100.110 did so, the "Function Classification Management Objectives" in TSP Chapter 3, Page 17, are subjective and may not be applied under ORS 197.307(4). TSP Chapter 3, Page 17 describes local streets such as Melissa Street as having a "typical capacity." This standard is not specifically incorporated into the SMC and may not be applied as an approval standard under SMC 17.100.060.E.3, 4, or 5.

The Applicant wishes it could agree with everything the City asked it to do but for the above legal and practical reasons, it cannot do so. However, the Applicant and its team will work with City staff as much as is possible to address issues so that the City staff can recommend approval and the Sandy Planning Commission can approve the Application.

Very truly yours,



Michael C. Robinson

MCR:jmhi
Enclosures

cc: Mr. Cody Bjugan (*via email*) (*w/o enclosures*)
Mr. Monty Hurley (*via email*) (*w/o enclosures*)
Mr. Chris Goodell (*via email*) (*w/o enclosures*)
Mr. Todd Mobley (*via email*) (*w/o enclosures*)

PDX\133569\245146\MCR\25711778.1

EXHIBIT K

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Sandy, OR 97055

24E23 00200
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Sandy, OR 97055

24E23 00201
Paul Roger Klahn
Po Box 671
Sandy, OR 97055

24E23 00202
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37777 SE Ponder Ln
Sandy, OR 97055

24E23 00502
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244 Plant Ln
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24E23 00700
Calvin & Teresa McKinnis II
37551 SE Highway 211
Sandy, OR 97055

24E23 00800
Myrtle Sturm
647 E Historic Col River Hwy
Troutdale, OR 97060

24E23 00801
Grant Sturm
647 E Historic Col River Hwy
Troutdale, OR 97060

24E23 00802
Myrtle Sturm
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Troutdale, OR 97060

24E23 00803
Grant Sturm
647 E Historic Col River Hwy
Troutdale, OR 97060

24E23 00804
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647 E Historic Col River Hwy
Troutdale, OR 97060

24E23 00805
Sherrene Eyck
37020 Deming Rd
Sandy, OR 97055

24E23 00806
Sherrene Eyck
37020 Deming Rd
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24E23 00807
Sherrene Eyck
37020 Deming Rd
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24E23 00901
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24E23 01800
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Sandy, OR 97055

24E23 00518
Garrett & Meri Lang
37730 SE Highway 211
Sandy, OR 97055

24E23 00701
Eyck Mark Ten
36940 Deming Rd
Sandy, OR 97055

24E14DC01500
Lynn & Eric Boldt
18181 Grey Ave
Sandy, OR 97055

24E14DC01600
William Schlaht Sr.
18203 Grey Ave
Sandy, OR 97055

24E14DC01700
L Darlene McKinney
18227 Grey Ave
Sandy, OR 97055

24E14DC01800
Carol Sue Dick
18255 Grey Ave
Sandy, OR 97055

24E14DC01900
Matthew Dillingham
18273 Grey Ave
Sandy, OR 97055

24E14DC02000
David & Steven Snyder
18299 Grey Ave
Sandy, OR 97055

24E14DC02100
Clyde Volesky
18317 Grey Ave
Sandy, OR 97055

24E14DC02200
Anthony & Regina Profitt
18306 Grey Ave
Sandy, OR 97055

24E14DC02300
Jose Escareno Garcia
18288 Grey Ave
Sandy, OR 97055

24E14DC02400
Alexander Keeth
18260 Grey Ave
Sandy, OR 97055

24E14DC02500
Edith Newton
18246 Grey Ave
Sandy, OR 97055

24E14DC02600
Esther Naomi Quick
18214 Grey Ave
Sandy, OR 97055

24E14DC02700
David & Sharon Meeker
18198 Grey Ave
Sandy, OR 97055

24E14DC02800
Clark John Moore
18172 Grey Ave
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24E14DC03500
Jack Putnam
37488 Solso Dr
Sandy, OR 97055

24E14DC03600
Robert Durst
1873 Bullevar
Philomath, OR 97370

24E14DC03700
Ronald & Sarah Bettey
18195 Melissa Ave
Sandy, OR 97055

24E14DC03800
Andy & Sarah Hill
18211 Melissa Ave
Sandy, OR 97055

24E14DC03900
Robert Maya
18243 Melissa Ave
Sandy, OR 97055

24E14DC04000
Lucas & Rachel Eibensteiner
18285 Melissa Ave
Sandy, OR 97055

24E14DC04100
Christina Ness
18377 Melissa Ave
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24E14DC04200
Karen Higgins
37487 Rachael Dr
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24E14DC04300
James Brady
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Estacada, OR 97023

24E14DC04400
Oliver Paul Mullan
18254 Myra Ct
Sandy, OR 97055

24E14DC04500
Edward Burgess
18222 Myra Ct
Sandy, OR 97055

24E14DC04600
Terrance Leland Myers
18205 Myra Ct
Sandy, OR 97055

24E14DC04700
Carl Jr & Rebecca Robinson
18237 Myra Ct
Sandy, OR 97055

24E14DC04800
Rhonda & Brad Norton
18269 Myra Ct
Sandy, OR 97055

24E14DC04900
Robert & Sandra Ludi
18275 Myra Ct
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24E14DC05000
Marguerite Wadkins
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18331 Myra Ct
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24E14DC05200
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24E14DC05300
Robert & Lori Graham
37322 Rachael Dr
Sandy, OR 97055

24E14DC05400
Christopher & Ashley Parrish
37356 Rachael Dr
Sandy, OR 97055

24E14DC05500
Tracy Drog
37374 Rachael Dr
Sandy, OR 97055

24E14DC05600
Bradley Robison
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24E14DC05700
Paul Kvamme
37438 Rachael Dr
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24E14DC05800
Ryan Tatlock
37466 Rachael Dr
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24E14DC05900
Marilyn Siewell
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24E14DC06000
Colin Hatfield
37490 Rachael Dr
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24E14DC06100
Paul Savage
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24E14DC06200
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24E14DC06300
Richard & Emily Sheldon
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24E14DC06400
Mitchell John Gray
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24E14DC06500
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24E14DC06600
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24E14DC06800
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24E14DC06900
Bryan Weisz
37565 Rachael Dr
Sandy, OR 97055

24E14DC07000
Carol Cohen
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24E14DC07100
Brian Crosswhite
18298 Melissa Ave
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24E14DC07200
Timothy Sellin
18256 Melissa Ave
Sandy, OR 97055

24E14DC07300
Troy Michael Kalhar
13841 SE Bluff Rd
Sandy, OR 97055

24E14DC07400
Warren Nelson
18206 Melissa Ave
Sandy, OR 97055

24E14DC07500
Todd Cooper
18190 Melissa Ave
Sandy, OR 97055

24E14DC07600
William Rolfe
37626 Solso Ct
Sandy, OR 97055

24E14DC07700
Lonnie McVey
37640 Solso Ct
Sandy, OR 97055

24E14DC07800
Brendan & Merlinda Turner
37668 Solso Ct
Sandy, OR 97055

24E14DC07900
Nathan & Norma House
Po Box 815
Sandy, OR 97055

24E14DC08000
Brian Wilder
37637 Solso Ct
Sandy, OR 97055

24E14DC08100
Norvin & Annabelle Vernon
37615 Solso Ct
Sandy, OR 97055

24E14DC08700
Ralph Ortman
37648 Dubarko Rd
Sandy, OR 97055

24E14DC10200
Michelle Bartle
18186 Wewer Ave
Sandy, OR 97055

24E14DC10300
Stefan & Tamera Grabinski
721 Main St
Oregon City, OR 97045

24E14DC10400
George & Kathryn Culp
47235 SE Coalman Rd
Sandy, OR 97055

24E14DC10500
Alissa Felix
18248 Wewer Ave
Sandy, OR 97055

24E14DC10600
Rene Huurman
18262 Wewer Ave
Sandy, OR 97055

24E14DC10700
Delores & Stephen Joslin
18294 Wewer Ave
Sandy, OR 97055

24E14DC10800
Alexander Doja
18302 Wewer Ave
Sandy, OR 97055

24E14DC10900
Cornelius & Christina Seulean
37253 Rachael Dr
Sandy, OR 97055

24E14DC11000
Barbara Henley
18287 Wewer Ave
Sandy, OR 97055

24E14DC11100
Randy & Lynette Fridlund
18253 Wewer Ave
Sandy, OR 97055

24E14DC11200
Andray & Marina Shcherban
18235 Wewer Ave
Sandy, OR 97055

24E14DC11300
Shannon Muse
38085 SE Trubel Rd
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24E14DC12900
Christopher Flowers
18208 Rachael Dr
Sandy, OR 97055

24E14DC13000
Matthew & Kimberly Wallace
18234 Rachael Dr
Sandy, OR 97055

24E14DC13100
Daniel Ortega Alvarado
18250 Rachael Dr
Sandy, OR 97055

24E14DC13200
Jonathan & Angela Allinger
18288 Rachael Dr
Sandy, OR 97055

24E14DC13300
Paul & Jolette Owen
Po Box 1676
Sandy, OR 97055

24E14DC13400
Amanda Sievertsen
Po Box 101
Gresham, OR 97030

24E14DC13500
Travis Fegel
37274 Rachael Dr
Sandy, OR 97055

24E14DC13600
John & Jennifer Leckie
Po Box 1024
Welches, OR 97067

24E14DC13700
Roy Jack & Doris Rooney
37214 Rachael Dr
Sandy, OR 97055

24E14DC13800
Shawn Fleming
37198 Rachael Dr
Sandy, OR 97055

24E14DC13900
James & Marie Debatty
18347 Rachael Dr
Sandy, OR 97055

24E14DC14000
Cheri Berglund
12818 SE Winston Rd
Damascus, OR 97089

24E14DC14100
Jerry Hopkins
13056 SE Division St
Portland, OR 97236

24E14DC14200
Steven & Michelle Snyder
18299 Rachael Dr
Sandy, OR 97055

24E14DC14300
Gigi Duncan
18275 Rachael Dr
Sandy, OR 97055

24E14DD01200
City Of Sandy
39250 Pioneer Blvd
Sandy, OR 97055

24E14DD08100
Ernie Peterson
37642 Rachael Dr
Sandy, OR 97055

24E14DD08200
Faith Egli
Po Box 1761
Sandy, OR 97055

24E14DD08300
Ruslan & Galina Motyko
37714 Rachael Dr
Sandy, OR 97055

24E14DD08400
Christian & Macey McDonald
37720 Rachael Dr
Sandy, OR 97055

24E14DD08500
Patrick & Jennifer Robichaud
37726 Rachael Dr
Sandy, OR 97055

24E14DD08600
Jack & Raelene Anderson
37732 Rachael Dr
Sandy, OR 97055

24E14DD08700
Juan Diaz
37810 Rachael Dr
Sandy, OR 97055

24E14DD08800
Patrick Owen
Po Box 8583
Portland, OR 97207

24E14DD08900
Anthony & Stephanie Galleran
37822 Rachael Dr
Sandy, OR 97055

24E14DD09000
Dena Williams
37828 Rachael Dr
Sandy, OR 97055

24E14DD09100
Shelley Bolfik
37835 Rachael Dr
Sandy, OR 97055

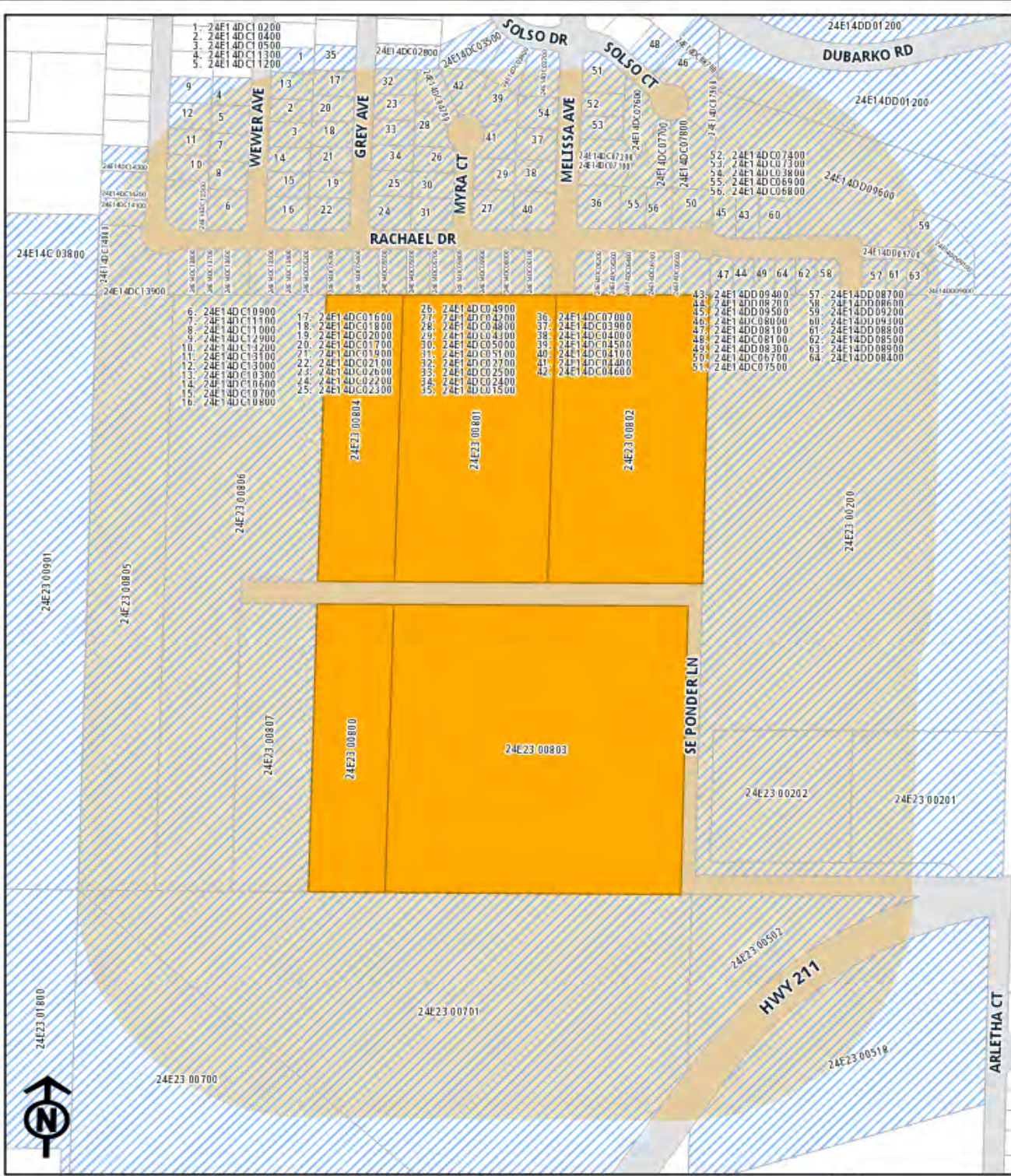
24E14DD09200
Jesse Brown
37839 Rachael Dr
Sandy, OR 97055

24E14DD09300
Craig & Sarah Barnes
37715 Rachael Dr
Sandy, OR 97055

24E14DD09400
Geoffrey & Kjersti Sanders
37703 Rachael Dr
Sandy, OR 97055

24E14DD09500
Kristofer J A & Skyler Oneill
37651 Rachael Dr
Sandy, OR 97055

24E14DD09600
City Of Sandy
39250 Pioneer Blvd
Sandy, OR 97055



- Taxlots
- Notification Parcels
- Subject

500
Feet

Prepared by: Fidelity National Title
 Data: CoreLogic, Metro RLIS
 Date: 5/22/2019
 This information is reliable, but not
 guaranteed. It is not a survey.

EXHIBIT L



TYPE III SUBDIVISION SUBMISSION REQUIREMENTS

A subdivision is required for a land division of four (4) or more parcels in a calendar year. A Type III subdivision procedure is applicable if unsatisfactory street conditions exist or the resulting lots do not comply with the standards of the zoning district and Chapter 17.100. All of the following materials must be submitted with your application. All plans should be drawn to engineering scale (1" = 10' or 1" = 20' preferred). Prior to submitting application materials, a pre-application conference with City staff is required to discuss procedures for approval, applicable state and local requirements, and the availability of services.

A. **One (1) copy of:**

1. Land Use Application Form

3 copies provided for initial submittal, information included as applicable

B. **Twenty (20) copies** of the tentative plan for the subdivision and project narrative documenting compliance with applicable code criteria. The tentative plan shall be a minimum of 8-1/2" x 11" in size and shall include the following information:

1. Scale of drawing, north arrow, and date.
2. Location of the subdivision by section, township and range, and a legal description sufficient to define the location and boundaries of the proposed tract.
3. A vicinity map, showing adjacent property boundaries and how proposed streets may be extended to connect to existing streets.
4. Names, addresses, and telephone numbers of the owner(s) of the property, the engineer or surveyor, and the date of the survey.
5. Streets: location, names, paved widths, alleys, and right-of-way (existing and proposed) on and within 400 feet of the boundaries of the subdivision tract.
6. Easements: location, widths, purpose of all easements (existing and proposed) on or serving the tract.
7. Utilities: location of storm drainage, sanitary sewers and water lines (existing and proposed) on and abutting the tract. If utilities are not on or abutting the tract, indicate the direction and distance to the nearest locations.
8. Ground elevations shown by contour lines at two-foot vertical intervals for ground slopes of less than 10 percent and at ten-foot vertical intervals for ground slopes exceeding 10 percent. Ground elevation shall be related to an established benchmark or other datum approved by the Director.
- N/A 9. Natural features such as marshes, rock outcroppings, watercourses on and abutting the property, location of wooded areas.
- N/A 10. Approximate location of areas subject to periodic inundation or storm sewer overflow, location of any floodplain or flood hazard district.
- N/A 11. Location, width, and direction of flow of all water courses.
- N/A 12. Identification of the top of bank and boundary of mandatory setback for any stream or water course.
- N/A 13. Identification of any associated wetland and boundary of mandatory setback.
- N/A 14. Identification of any wetland and boundary of mandatory setback.
15. Location of at least one temporary bench mark within the tract boundaries.
16. Existing uses of the property, including location and present use of all existing structures to remain on

the property after platting.

17. Lots and Blocks: approximate dimensions of all lots, minimum lot sizes, and proposed lot and block numbers.
18. Existing zoning and proposed land use.
19. Designation of land intended to be dedicated or reserved for public use, with the purpose, conditions, or limitations of such reservations clearly indicated.
20. Proposed development phases, if applicable.
21. Any other information determined necessary by the Director at the pre-application conference, such as a soil report or other engineering study, traffic analysis, floodplain or wetland delineation, etc.

C. **List of affected property owners** within 300 feet of the boundaries of the subject site and **mailing labels** for property owners within 300 feet of the site, excluding rights-of-way.

labels within 500 feet included per SDC 17.22.20.B

D. **Filing Fee** per Fees and Charges Resolution

E. **Required Plan Submittals:**

1. Vicinity Map
2. Preliminary Site Plan
3. Tentative Plat
4. Existing Features Plan
5. Utility Plan
6. Grading Plan
7. Tree Plan (Per Chapter 17.102)
8. Residential Parking Analysis

F. **Other Submissions That May Be Required:**

- Arborist's Report
- Flood, Slope and Hazard Analysis (FSH)
- FSH Reports (Hydrology and Soils, Native Vegetation)
- Composite Site Plan and FSH Overlay Analysis
- Traffic Impact Letter or Report
- Geotechnical Report
- Future Street Plan showing connectivity within 400 feet of the boundaries of the site
- Other _____

G. **Unsatisfactory Street Conditions**

1. The land division does not link streets that are stubbed to the boundaries of the property.
2. An existing street or a new proposed street will be extended beyond the boundaries of the land division to complete a street system or provide access to adjacent property.
3. The proposed street layout is inconsistent with a street pattern adopted as part of the Comprehensive Plan or officially adopted City street plan.

H. **Approval Criteria.** The Director shall review the tentative plan for a minor partition, subdivision or minor replat based on the following approval criteria:

1. The proposed partition is consistent with the density, setback and dimensional standards of the base-zoning district.
2. The proposed partition is consistent with applicable design standards.
3. The proposed street pattern is connected and consistent with the Transportation System Plan.
4. Adequate public facilities are available or can be provided to serve the proposed partition.
5. All proposed improvements meet City standards.
6. The plan preserves the potential for future redivision of the parcels (if applicable).

I. The application must also be in conformance with street design standards included in the City of Sandy Transportation System Plan and standards and construction specifications for public improvements as set forth in adopted Public Facilities Plans and the Sandy Municipal Code.

EXHIBIT M

| | |
|-----------------------------------|------------------------|
| Clackamas County Official Records | 2016-026546 |
| Sherry Hall, County Clerk | 04/26/2016 08:44:06 AM |
| D-D | Cnt=1 Stn=2 LESLIE |
| \$20.00 \$16.00 \$10.00 \$22.00 | \$68.00 |

After Recording Return to:
Kevin J. Tillson
Tillson Law P.C.
39075 Proctor Blvd., Suite C
Sandy, OR 97055

Send All Tax Statements To:
Grant E. Sturm & Myrtle J. Sturm, Trustees
Sturm Family Trust dated April 20, 2016
647 E. Hist. Columbia River Hwy
Troutdale, OR 97060

WARRANTY DEED – STATUTORY FORM

Grant E. Sturm, Trustee of the Grant Sturm Trust, (Grantor) conveys and warrants to Grant E. Sturm & Myrtle J. Sturm, Trustees of the Sturm Family Trust dated April 20, 2016, and any amendments thereto (Grantee), Grantor's interest in the following described real property situated in Clackamas County, State of Oregon, free of encumbrances except as specifically set forth herein, to-wit:

See Exhibit A attached hereto and incorporated herein

Parcel Nos.: 00675941, 00675923, 00675932, 00675950, and
00675969

This property is free from encumbrances, EXCEPT for all those items of record, if any, as of the date of this deed, including any real property taxes due, but not yet payable, or the rights of the public in and to that said portion of the above property lying within the limits of roads and highways.

The true and actual consideration for this conveyance is \$ 0.00 (transfer to trust) .

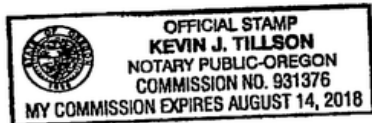
BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, AND SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS.92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930 AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, AND SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 to 7, CHAPTER 8, OREGON LAWS 2010.

IN WITNESS WHEREOF, the grantor has executed this instrument on April 20, 2016.


Grant E. Sturm, Trustee

STATE OF OREGON, County of Clackamas) ss.

This instrument was acknowledged before me on April 20, 2016, by Grant E. Sturm in his capacity as Trustee of the Grant Sturm Trust.



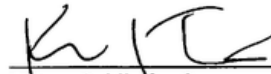

Notary Public for Oregon
My Commission Expires: 08/14/2018

Exhibit A

Real property situated in Clackamas County, Oregon, described as follows:

PARCEL I:

A part of the Northwest one-quarter of the Northeast one-quarter of Section 23, Township 2 South, Range 4 East, of the Willamette Meridian, in the County of Clackamas as State of Oregon, described as follows:

Beginning at a point on the North line of the Northwest one-quarter of the Northeast one-quarter of Section 23, Township 2 South, Range 4 East, of the Willamette Meridian, that is 330.00 feet West of the Northeast corner of said Northwest one-quarter; from said point of beginning thence South parallel with the East line thereof, 660.00 feet to a point; thence West parallel with the North line of the said Northwest one-quarter, a distance of 330.00 feet to a point; thence North parallel with the East line thereof, 660.00 feet to a point on the North line of said Northwest one-quarter; thence East along said North line, a distance of 330.00 feet to the point of beginning.

PARCEL II:

A portion of the Northwest quarter of the Northeast quarter of Section 23, Township 2 South, Range 4 East, of the Willamette Meridian, in the County of Clackamas and State of Oregon, described as follows:

Beginning at the Northeast corner of the Northwest quarter of the Northeast quarter of said Section 23; thence West along the North line of the Northwest quarter of the Northeast quarter of said Section 23, a distance of 330.00 feet to a point; thence South parallel with the East line of the Northwest quarter of the Northeast quarter of said Section 23, a distance of 660.00 feet to a point in the center of a public road; thence East parallel with the North line of said Section 23, a distance of 330.00 feet to the East line of the Northwest quarter of the Northeast quarter of said Section 23; thence North, along said East line, a distance of 660.00 feet to the point of beginning.

PARCEL III:

A tract of land in the Northwest quarter of the Northeast quarter of Section 23, Township 2 South, Range 4 East, of the Willamette Meridian, in the County of Clackamas and State of Oregon, described as follows:

Beginning at a point on the South line of the Northwest quarter of the Northeast quarter of said Section which is 660.00 feet West of the Southeast corner thereof; thence continuing West along said South line, a distance of 165.00 feet; thence North parallel with the East line of said legal subdivision, a distance of 1,312.00 feet, more or less, to the North line of said legal subdivision; thence East along said North line, a distance of 165.00 feet to a point 660.00 feet West of the

Northeast corner of said legal subdivision; thence South parallel with the East line thereof, 1,320.00 feet, more or less, to the point of beginning.

PARCEL IV:

A part of the Northwest one-quarter of the Northeast one-quarter of Section 23, Township 2 South, Range 4 East, of the Willamette Meridian, in the County of Clackamas and State of Oregon, described as follows:

Beginning at the Southeast corner of the Northwest one-quarter of the Northeast one-quarter of Section 23, Township 2 South, Range 4 East, of the Willamette Meridian; thence West along the South line of the said Northwest one-quarter, a distance of 660.00 feet to a point; thence North parallel with the East line thereof, a distance of 660.00 feet to a point; thence East parallel with the South line of said Northwest one-quarter, a distance of 660.00 feet to a point on the East line thereof; thence South along said East line, a distance of 660.00 feet to the point of beginning.

EXHIBIT N

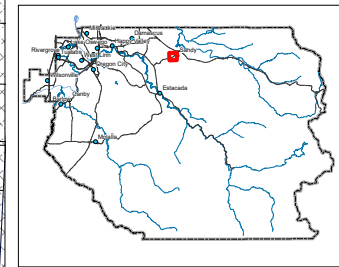
2 4 E 23

SECTION 23 T.2S. R.4E. W.M.
CLACKAMAS COUNTY
1" = 400'

Cancelled Taxlots

- 2801
- 1900
- 2819
- 2300A.1
- 1201
- 2701
- 506E1
- 503
- 1902
- 1802
- 517

- Parcel Boundary
- Private Road ROW
- Historical Boundary
- Railroad Centerline
- TaxCodeLines
- Map Index
- WaterLines
- Land Use Zoning
- Plats
- Water
- Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- DLC Line
- Meander Line
- PLSS Section Line
- Historic Corridor 40'
- Historic Corridor 20'



THIS MAP IS FOR ASSESSMENT
PURPOSES ONLY

5/17/2018

2 4 E 23

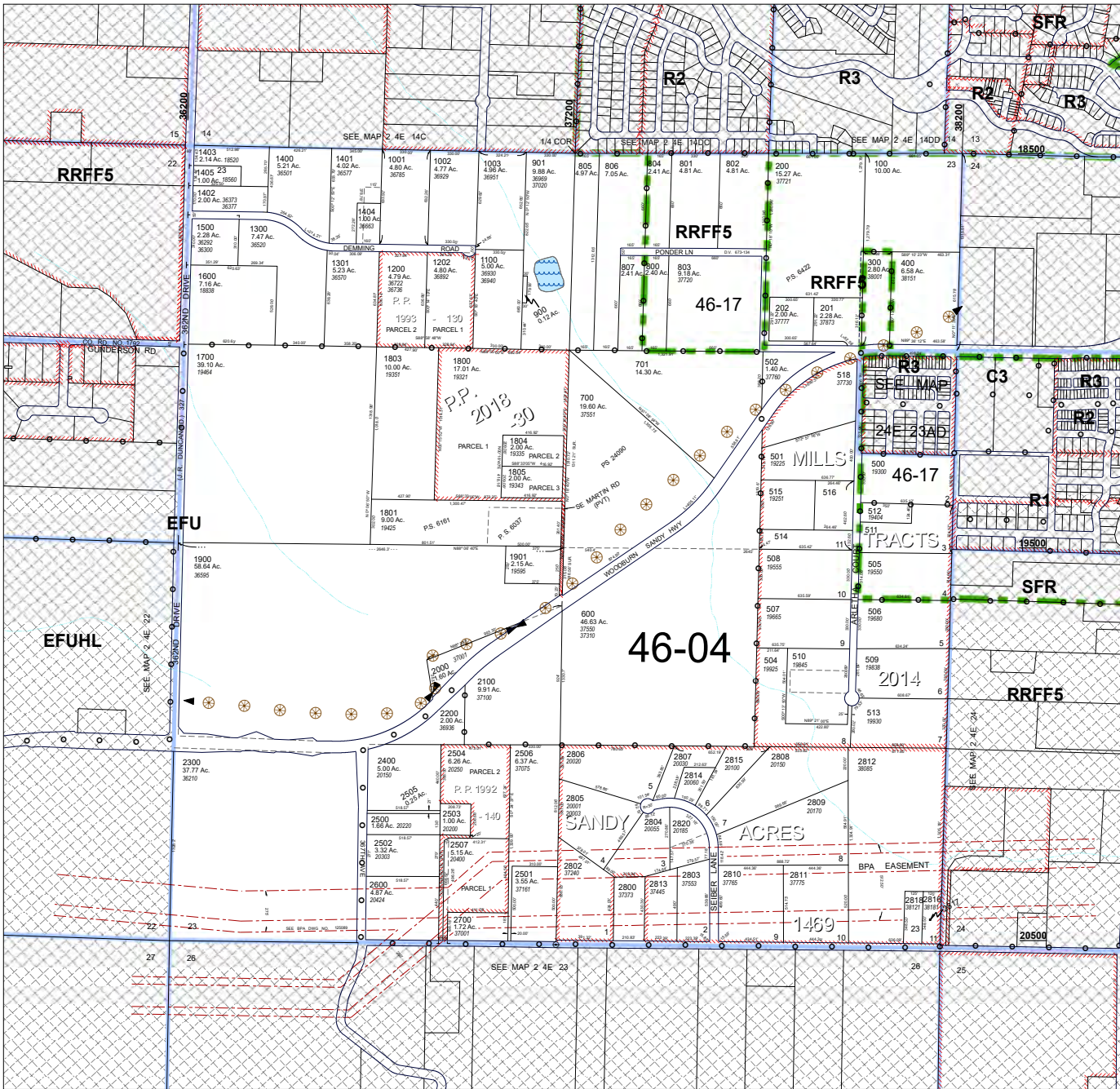


EXHIBIT O

From: [Gonzales, Renee](#)
To: [Marie Holladay](#); [Surveyor](#)
Subject: RE: Plat name reservation
Date: Wednesday, June 5, 2019 10:18:23 AM

EXTERNAL EMAIL: This email originated from outside of AKS Engineering & Forestry. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Marie,

Your request to reserve the plat name of “Bailey Meadows” is approved.

Thank you.

Renee Gonzales
Administrative Specialist
Clackamas County Surveyor’s Office
Phone: (503) 742-4475
Direct: (503) 742-4478

From: Marie Holladay [mailto:holladaym@aks-eng.com]
Sent: Tuesday, June 4, 2019 8:11 AM
To: Surveyor <Surveyor@co.clackamas.or.us>
Subject: Plat name reservation

Good Morning,

We’ve had a slight change in plat name which was reserved on 5/30. The subdivision should be called Bailey Meadows with an “s.”

Thank you,

Marie Holladay



AKS ENGINEERING & FORESTRY, LLC

12965 SW Herman Road, Suite 100 | Tualatin, OR 97062
P: 503.563.6151 Ext. 270 | www.aks-eng.com | holladaym@aks-eng.com
Offices in: Bend, OR | Keizer, OR | Tualatin, OR | Vancouver, WA

NOTICE: This communication may contain privileged or other confidential information. If you have received it in error, please advise the sender by reply e-mail and immediately delete the message and any attachments without copying or disclosing the contents. AKS Engineering and Forestry shall not be liable for any changes made to the electronic data transferred. Distribution of electronic data to others is prohibited without the express written consent of AKS Engineering and Forestry.

NOTE: This message was trained as non-spam. If this is wrong, please correct the training as soon as possible.

REQUEST TO RESERVE SUBDIVISION / CONDOMINIUM NAME

Clackamas County Surveyor's Office
150 Beaver Creek Road, #325
Oregon City, OR 97045
(503) 742-4475
E-mail address: surveyor@clackamas.us

PLAT NAME REQUESTED:

Bailey Meadows

| | TWP/RANGE: | SECTION#: | TAX LOT#(s): |
|--------------------------|-------------------|------------------|---------------------------|
| <i>Location of Plat:</i> | T: 2S, R:4E | 23 | 800, 801, 802, 803, & 804 |

I understand that if the above name plat is not pending or recorded within two years, the name will be removed from the reserved list.

RESERVED BY: AKS Engineering & Forestry, LLC

| | | |
|----------------------------|-------------------------------------|-------------------------------|
| DATE: 05/28/2019 | TELEPHONE: 503)563 - 6151 | FAX: 503)563 - 6152 |
|----------------------------|-------------------------------------|-------------------------------|

EMAIL ADDRESS: holladaym@aks-eng.com

PLAT SURVEYOR: #
Rob Rettig

NAME OF DEVELOPER:
Allied Homes & Development

ADDRESS: 12965 SW Herman Rd., Suite 100 Tualatin, OR 97062

| | |
|-------------------------------------|-------------------------------|
| TELEPHONE: 503)563 - 6151 | FAX: 503)563 - 6152 |
|-------------------------------------|-------------------------------|

EMAIL ADDRESS: holladaym@aks-eng.com

APPROVED BY:

APPROVAL DATE:



August 20, 2019

Michael C. Robinson
Admitted in Oregon
T: 503-796-3756
C: 503-407-2578
mrobinson@schwabe.com

VIA OVERNIGHT MAIL FOR AUGUST 21, 2019 DELIVERY

Ms. Emily Meharg, Associate Planner
City of Sandy Planning Department
Sandy City Hall
39250 Pioneer Boulevard
Sandy, OR 97055

RE: City of Sandy File No. 19-023, SUB/VAR; Application by Allied Homes & Development for Preliminary Plat Approval for Bailey Meadows Subdivision

Dear Ms. Meharg:

This office represents the Applicant, Allied Homes & Development.

This letter responds to the City’s August 1, 2019 determination that the Application submitted on July 5, 2019 is incomplete (**Exhibit 1**).

1. Introduction.

The Applicant submitted the Application on July 5, 2019. ORS 227.178(3)(a) requires that an applicant make an application complete within 180 days of the date the application was first submitted.

This letter and its enclosures provide some or all of the missing information identified by the City in the August 1, 2019 incompleteness determination. ORS 227.178(2)(b). Therefore, the Application has been made complete within the required 180-day period.

The Application is deemed complete for on the date the City receives some or all of the missing information. ORS 227.178(2). Because the City has received some or all of the missing information and written notice from the Applicant that no other information will be provided on August 21, 2019, the 120-day period starts on August 21, 2019 and ends on December 29, 2019, unless waived or extended by the Applicant 2019. ORS 277.178(1).

2. Response to determination of incompleteness items by provision of some or all of the missing information.

A. “Define how [the Applicant] satisfy[ies] Appendix D, Section D 107 of the Oregon Fire Code. Include a letter from the fire department.”



Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 2

RESPONSE: Appendix D, Section D107 of the Oregon Fire Code addresses one- and two-family residential developments. Where the number of dwelling units exceeds thirty, two separate and approved fire apparatus access roads shall be provided. Application Sheet P1-26 shows two preliminary emergency vehicle access routes, utilizing both Melissa Avenue and SE Ponder Lane. As detailed on Application Sheet P1-25 of the Preliminary Plans, four temporary fire access road gates are planned to be located on the west side of SE Ponder Lane. Correspondence from the Fire Marshall stating the requirements are satisfied is included. The fire department's August 14, 2019 email to the Applicant is attached (**Exhibit 2**). Mr. Patty's email states that he talked to the City and that the City and the fire department will not approve Ponder Lane for access to the proposed subdivision.

The Applicant has provided all of the missing information.

The Applicant will address this issue in the following ways. First, it will seek to meet with Mr. Patty to understand the basis for his email. His email does not specifically address the use of Ponder Lane for fire access. Second, the City's August 1, 2019 letter did not identify a relevant approval criterion in Sandy Development Code 17.100.60.A-G that requires compliance with the Fire Code. Moreover, SDC 17.100.60.E.4, requiring that adequate public facilities are available or can be provided, does not include fire access roads. SDC 17.10 defines "Public Facility" as including both Major Public Facilities and Minor Public Facilities but neither includes fire access roads. Third, Ponder Lane is an existing public right-of-way. The Applicant believes that Ponder Lane is adequate for temporary emergency access only, or can be made so by the Applicant through a clear and objective condition of approval.

The Applicant has provided all of the missing information.

B. "Explain phasing plan rationale."

RESPONSE: The phasing plan for Bailey Meadows Subdivision is intended to allow for appropriate market absorption into the City of Sandy. The configuration of Phase 1, the largest of the three phases, is a result of various points of infrastructure connection, detailed as follows. Phase 1 begins at the north property boundary to allow the extension of underground utilities from Melissa Avenue into the subdivision. The phase moves west to the low point of the site to construct the stormwater facility and is then directed to the southeast property boundary to implement the second required emergency vehicle access on SE Ponder Lane. The design of Phases 2 and 3 are a result of planned utility installation sequencing. The phasing plan is designed to be carried out in a manner that provides necessary public improvements for each phase as it moves forward.

The Applicant has provided all of the missing information.

C. "Confirm the maximum lot width for Lot 92."

RESPONSE: The minimum average lot width for single detached dwellings in the Single-Family Residential district is 60 feet per SDC 17.34.30(B). According to SDC 17.10.30, Lot

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 3

Width is defined as the horizontal distance between the midpoints of the side lot lines. Please see Exhibit 3, included, which illustrates and confirms the criteria are met.

The Applicant has provided all of the missing information.

D. “Have you fully exhausted your options for extending Gunderson Road? Can you provide a formal decision from the Clackamas County Planning Commission or Clackamas County Board of Directors? Can Gunderson be extended within the [Urban Growth Boundary] via the property to the east as depicted in the [Transportation System Plan]? Regardless, a minimum half-street of Gunderson will need to be detailed on the Site Plan.”

RESPONSE: a. The Applicant has fully exhausted its options for extending Gunderson Road outside of the UGB. Exhibit 4 to this letter are two emails from Clackamas County Principal Planner Martha Fritzie that followed the Applicant’s meeting with Ms. Fritzie.

Ms. Fritzie explained in the email that the Clackamas County Planning Department staff would not support an exception to Statewide Planning Goals (the “Goals”) 3, “Agriculture,” 12, “Transportation,” and 14, “Urbanization.” Exceptions to all three Goals are required to extend an urban road outside of the Sandy Urban Growth Boundary (the “UGB”) on land zoned Exclusive Farm Use (“EFU”). In response to the City of Sandy Planning Director’s request that we further discuss this matter, the Applicant discussed the exception application to allow Gunderson Road to be extended outside of the UGB. Ms. Fritzie consulted with Ms. Jennifer Hughes, Clackamas County Planning Director. Ms. Hughes confirmed Ms. Fritzie’s position.

The Applicant has exhausted its options for extending Gunderson Road outside of the UGB. Aside from the fact that there is no legal requirement for the Applicant to seek an exception to one or more of the Goals in order to extend Gunderson Road to Oregon Highway 211 outside of the UGB, there is similarly no requirement that the Applicant make a fruitless application to Clackamas County. An exception application is an amendment to the County’s acknowledged Comprehensive Plan (the “Plan”). An exception application demonstrates compliance with the exception criteria found in Goal 2, “Planning,” and applicable polices from the Plan and the Clackamas County Zoning and Ordinance, the County’s acknowledged land use regulations. An exception application is initially heard by the Clackamas County Planning Commission, which makes a recommendation to the Clackamas County Board of Commissioners. Notwithstanding the inherent complexity and difficulty of submitting a successful exception application, such an application is made even more difficult where County staff has said, as in this case, that it will not support the exception application.

Additionally, the Applicant would expect the Oregon Department of Land Conservation and Development (“DLCD”) and 1000 Friends of Oregon to oppose the exception application. Both the DLCD and 1000 Friends of Oregon take an active role in applications that seek to allow

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 4

urban uses outside of urban growth boundaries, especially those located on Exclusive Farm Use lands.

For these reasons, the Applicant believes that it has, in good faith, exhausted its efforts to seek an exception to allow Gunderson Road to be extended outside of the UGB to connect with Oregon Highway 211.

b. The Applicant cannot provide a recommendation from the Clackamas County Planning Commission nor a final land use decision from the Clackamas County Board of County Commissioners because it has not submitted an exception application. As explained in “A.” above, the Applicant believes that submitting such an application would be a fruitless endeavor which would take at least six months to prosecute and cost at least \$50,000.00 to prepare. For these reasons, the Applicant did not submit a formal application to the County.

c. The Applicant cannot extend Gunderson Road within the UGB over the properties to the east as depicted in the Transportation System Plan (the “TSP”) for several reasons. First, the Applicant’s planning and engineering consultant, AKS Engineering & Forestry, has identified an area that would be required for this extension of Gunderson Road which is not within the UGB; in other words, to accomplish this extension would still require an exception (**Exhibit 5**). Second, the Applicant has contacted the property owners to the east and none of them are interested in selling a fee interest in their property or granting an easement for Gunderson Road. The Applicant does not have the power of eminent domain and could not proceed with extending Gunderson Road without the consent of those property owners. Finally, even if the Applicant could obtain an exception for that portion of Gunderson Road outside the UGB and if the property owners consented to either sell a fee interest in their property or grant an exception for the Gunderson Road exception, its connection with Oregon Highway 211 would not be within the Oregon Department of Transportation’s (“ODOT”) sight distance requirements.

d. The Applicant will not “detail” on the plan a half-street extension of Gunderson Road on its property for several reasons. First, as explained in the Application, the Applicant does not have the legal burden of proof to provide a right-of-way to the City for Gunderson Road since it is unrelated to the impacts of the subdivision. Even in the event the Applicant detailed (or dedicated) its property for a half-street extension of Gunderson Road, that portion of Gunderson Road will not go anywhere. This means that vehicles from the proposed subdivision would not be able to use Gunderson Road. Second, as explained in the Application, the City has the burden of proof under relevant state and federal law to demonstrate that the impacts of the Application require dedication of real property by the Applicant. Additionally, this Application is a “Needed Housing” application under ORS 197.303(1), 197.307(4) and 197.522. A proposed condition of approval requiring the detailing or dedication of a half-street for Gunderson Road may not be imposed because it is not based on clear and objective standards since the City has the burden of proof to demonstrate that the Application’s impacts require the dedication. Finally, because the Application is also a Limited Land Use Decision, no applicable policy of the acknowledged TSP or Comprehensive Plan expressly requires a half-street detailing or dedication for Gunderson Road.

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 5

e. Additionally, Mr. Todd Mobley of Lancaster Engineering, the Applicant's traffic engineer, states:

“With access to the subdivision via Melissa Avenue, all of the study area intersections will operate with acceptable delay and level of service during both peak hours, even with the subdivision at full build-out. This includes the intersection of Melissa Avenue and Dubarko Road. Left turn lanes are not needed on Melissa Avenue or on Dubarko Road at the intersection. These findings include the worst-case assumption that Bailey Meadows will be fully built out and occupied before other street connections are available. In fact, access solely via Melissa Avenue is a temporary condition and additional development in the area will provide additional access and connectivity.

The project team spent a considerable amount of time investigating a potential connection of Gunderson Road to Highway 211. This investigation began by exploring the Gunderson Road alignment that is shown in the TSP. It is noted that future street alignments in the TSP are planning-level representations of a general alignment and are not precisely shown. While the intersection location shown in the TSP is within the existing UGB, an engineering analysis found problems with an intersection in that location due to the potential skew angle of the intersection, poor sight distance, and challenging turning movements to and from the highway due to severe superelevation (banking of the roadway). The intersection location would need to be shifted to the southwest to avoid these issues. Alternatively, a future street connection serving the area north of Highway 211 could be established to the east, in the location of Arletha Court or Village Boulevard.”

The Applicant has provided all of the missing information.

E. “Provide a narrative to Section 17.84.50(B) regarding Gunderson Road, which is a minor arterial and is detailed in the TSP along the southern property boundary.”

RESPONSE: The Applicant's response incorporates the response to Item 4, above. The City has not specified how the minor arterial is “detailed in the TSP.” The Application addressed Sandy Municipal Code (“SMC”) 17.84.50(B) (Application Page 16).

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 6

SMC 17.84.50(B) provides that “location of new arterial streets shall conform to the Transportation System Plan in accordance with the following: . . .” However, the City has not identified a provision in the TSP that complies with ORS 197.195(1). ORS 197.195(1) provides:

“Within two years of September 29, 1991, cities and counties shall incorporate all comprehensive plan standards applicable to limited land use decisions into their land use regulations. . . If a city or county does not incorporate its comprehensive plan provisions into its land use regulations, the comprehensive plan provisions may not be used as a basis for a decision by the city or county or an appeal from that decision.”

The generalized reference to the “TSP” is insufficient to comply with the Oregon Court of Appeals holding in *Paterson v. City of Bend*, 201 Or App 344, 351, 352, 118 P3d 842 (2005), holding that the City’s failure to incorporate “any specific standards set out in the general plan” precluded the City from applying its Comprehensive Plan to the limited land use application. *See also Holland v. City of Cannon Beach*, 142 Or App 5, 920 P2d 562, *rev. den.* 324 Or 229, 925 P2d 907 (1996) (when considering an application for a subdivision, City was precluded from applying “Comprehensive Plan provisions that had not been incorporated into the City’s land use regulations pursuant to ORS 197.195(1)”).

The Applicant has provided all of the missing information.

F. “Address connections to existing and planned streets outside the development in your narrative response to Section 17.100.100(F).”

RESPONSE: The Preliminary Plans show local street and pedestrian walkway (sidewalk) connections internal to the subdivision and stubbed street sections on the south, west, and east boundaries of the site to undeveloped properties which have no future street plan. A planned and existing street stub north of the property, Melissa Avenue, is extended into the subdivision. West and south of the site, local streets terminate at stubs which abut the City Limits, the UGB, and an undeveloped property. To the east, the street stubs abut SE Ponder Lane, an existing driveway, and the City Limits. The local streets within Bailey Meadows do not cross any collector or arterial roads and there are no exemptions necessary for the intended street network. **Exhibit 5** illustrates connections past the 400-foot radius to show the Conceptual Future Streets Plan as has been requested.

The Applicant has provided all of the missing information.

G. “Update the plan set to extend Street A to the west property boundary and apply for a Type III Variance to block lengths to the north side of Street A between Melissa Ave and the west property boundary. Staff will support this variance request due to the existing block length on Rachel Drive.”

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 7

RESPONSE: The Applicant appreciates the staff's offer to support the block length variance. As explained above, the variance is unnecessary to meet the applicable approval criteria (which were not specifically identified by the City in Item 7) and the Sandy Planning Commission or the Sandy City Council might find the variance approval criteria not to be satisfied, thus meaning that the Application can be denied.

Street A currently meets City block length standards to the south without necessity for a variance. Although City staff stated support of the variance request, the Planning Commission is the final decision-making body. The extension of Street A would be the fifth stubbed street section to the west property boundary. The project includes four additional street stubs to the property to the west, one on average every 330 feet.

The Applicant has provided some but not all of the missing information.

H. "Update the future street plan to detail how the proposed future street network ties into the Bornstedt Village Illustrated Street Plan in the Bornstedt Specific Area Plan Report labeled Gunderson Road and show connection to Cascadia Village Drive as shown in the TSP. Eliminate the cul-de-sac on the property to the west and extend Street A to the west property boundary."

RESPONSE: SDC 17.100.100 provides that a Future Street Plan shall provide proposed connections to abutting properties, and extension of streets to adjacent parcels within a 400-foot radius of the project area. The Bornstedt Village Illustrative Street Plan is not within 400 feet of the project site; however, the intended Bailey Meadows street network could align with the proposed streets of the Bornstedt Village Illustrative Street Plan as shown in Exhibit 7. Exhibit 7 is updated to show the conceptual Gunderson Road connection to Cascadia Village Drive and the elimination of the cul-de-sac on the property to the west by way of a north-south oriented local street.

The Applicant has provided all of the missing information.

I. "Provide clarification on the twenty-foot PSDE extending to the west of Street B. Where is the stormwater proposed to go? Does the easement end approximately 400 feet to the west, and, if so, is this sufficient area to accommodate stormwater flow from the site?"

RESPONSE: Application Exhibit Sheet E107 shows this information. The stormwater is planned to be routed to an existing ditch to the west of the project site. The easement extends to the outfall approximately 160 feet west of the subject site. The area is sufficient to accommodate stormwater flow from the site.

The Applicant has provided all of the missing information.

J. "Submit an explanation of how the proposal meets subdivision criteria 17.100.60(E)(3)-(4)."

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 8

RESPONSE: As shown on the original preliminary plans, the intended local street pattern within the subdivision is interconnected. Access from the existing street stub, Melissa Avenue, provides a continuous street network through and to the boundaries of the subdivision. Internal local streets are stubbed at the property boundaries, which are the UGB and the City limits to the south and west, and the City limits to the east. To the extent possible, the street pattern internal to the subdivision is consistent with the official street plan for the City. Various constraints prevent the implementation of the arterial road to the south of the site and there is no applicable requirement in the City's acknowledged land use regulations that the Applicant make this connection. Additionally, this standard may not be applied under ORS 197.307(4) because the phrase "connected and consistent" is subjective and because the phrase "City standards" is subjective and because the words "objective" and "necessary" are subjective.

The configuration of the phasing plan is designed to provide adequate public facilities to serve the subdivision. Public facilities to be provided include but are not limited to stormwater management, sanitary sewer, municipal water, and franchise utilities.

The Applicant has provided all of the missing information.

K. "Update the parking plan (sheet P-24) to detail which parking space is for which lot so we can confirm that there's parking spot within 200 feet of each lot."

RESPONSE: The updated Parking Detail Plan, **Exhibit 6**, is numbered to illustrate correspondence with each associated lot. Additionally, the furthest distances from associated on-street parking spaces are to Tax Lots 42, 47, 52, and 57 and are measured as shown to ensure the requirement is satisfied.

The Applicant has provided all of the missing information.

L. "Provide clarification on which, if any, of the following variances you are requesting and payment of the associated fee, or an updated plan set reflecting that you are not requesting any variances/deviations:

- **Special Variance Section 17.100.120(A) for single tiered lot configuration for lots 55-59.**
- **Special Variance Section 17.82.20(A) for houses on lots 55-59 to not have primary entrances oriented toward Gunderson Road."**

RESPONSE: The Applicant does not intend to request variances or deviations because Gunderson Road is not to be extended.

The Applicant has provided all of the missing information.

M. "Submit additional fees totaling \$3,477.00 as outlined below. This is Type III review per 17.100.20(E) and also due to the variances and special variances."

Ms. Emily Meharg, Associate Planner
August 20, 2019
Page 9

RESPONSE: A check in the amount of \$180 for the additional fee is enclosed. The additional fees are for the Type III Subdivision fee and the Tree Removal fee.

The Applicant has provided all of the missing information because it is not requesting additional variance applications, so additional fees are not required.

3. Conclusion.

The Applicant respectfully requests that the City select a date for the initial evidentiary hearing before the Sandy Planning Commission. On behalf of the Applicant, we appreciate your time and effort and look forward to working with you further on this Application.

Very truly yours,

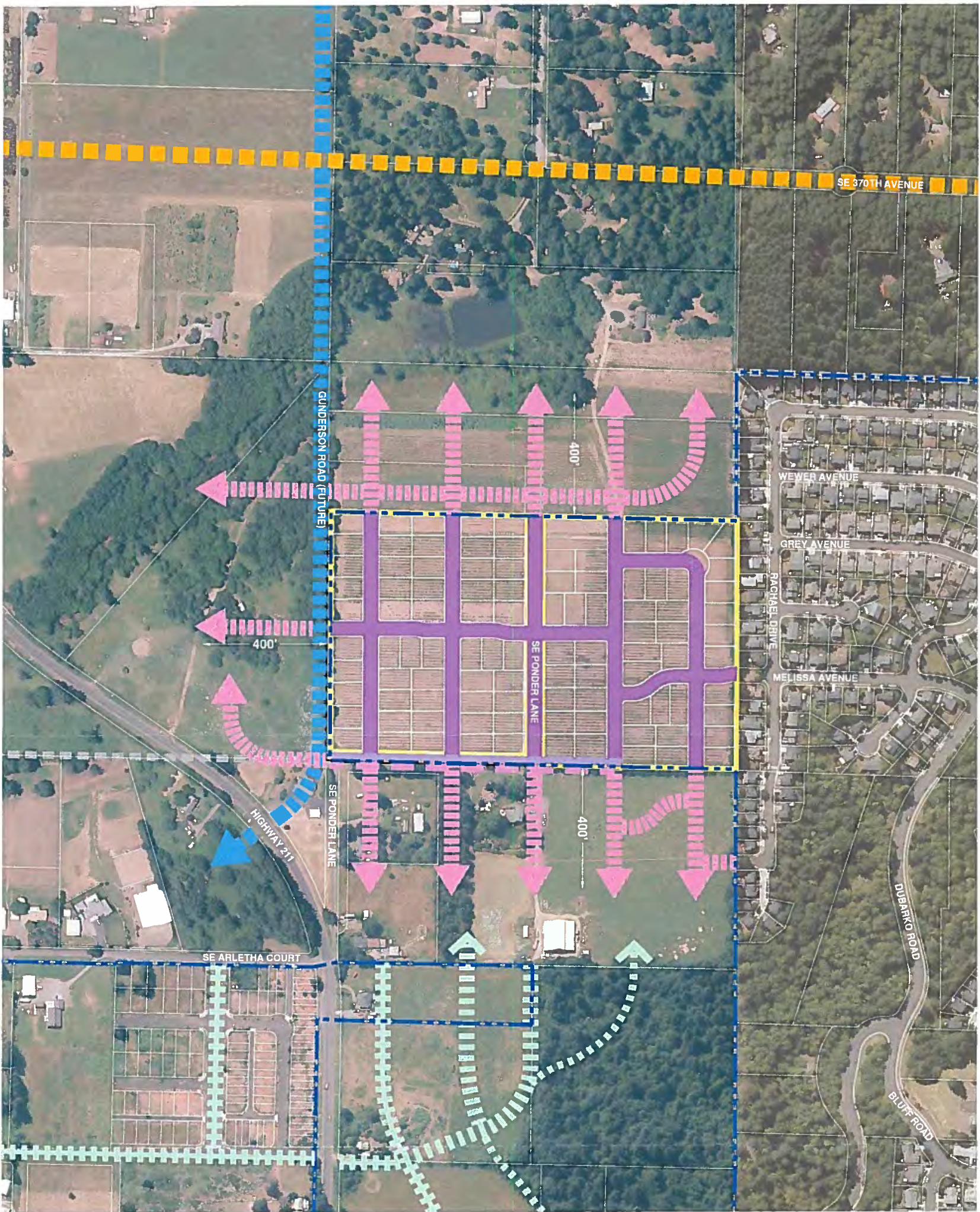


Michael C. Robinson

MCR:jmhi
Enclosures

cc: Mr. Cody Bjugan (*via email*) (*w/enclosures*)
Mr. Monty Hurley (*via email*) (*w/enclosures*)
Mr. Chris Goodell (*via email*) (*w/enclosures*)
Mr. Todd Mobley (*via email*) (*w/enclosures*)
Mr. Rand Waltz (*via email*) (*w/enclosures*)

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LEGEND

CITY LIMITS

URBAN GROWTH BOUNDARY

PROJECT SITE BOUNDARY

PLANNED LOCAL STREET

PLANNED LOCAL STREET (1/2 STREET APPROACHES)

FUTURE MINOR ARTERIAL (1/2 STREET APPROACHES)

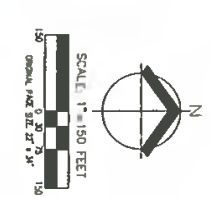
FUTURE COLLECTOR (1/2 STREET APPROACHES)

FUTURE LOCAL STREET

FUTURE LOCAL STREET (1/2 STREET APPROACHES)

CONCEPTUAL STREET FROM BURSTED VILLAGE SPECIFIC AREA PLAN ILLUSTRATIVE STREET PLAN DATED 8/18/2003

- NOTES**
- THIS PLAN IS INCLUDED TO MEET THE SUBMITTAL REQUIREMENTS APPLICATION.
 - CONCEPTUAL FUTURE STREET LOCATIONS ARE SHOWN FOR ALL OTHER THE PROPOSED LOTS. THE SUBMISSION AND THE NOT BEING ON ANY OTHER PROPERTIES.



BAILEY MEADOWS
 CONCEPTUAL CONNECTIVITY PLAN
 DATE: 08/09/2018
 SHEET: 7107
 AKS
 503.563.6151
 WWW.AKS-DIG.COM

August 1, 2019

Allied Homes & Development
12042 SE Sunnyside Rd. Ste. 706
Clackamas, OR 97015

Grant E. & Myrtle J. Sturm
647 E Historic Columbia River Hwy
Troutdale, OR 97060

Chris Goodell
AKS Engineering & Forestry, LLC
12965 SW Herman Rd., Suite 100
Tualatin, OR 97062

RE: NOTICE REGARDING COMPLETION OF SUBMISSION
FILE NUMBER: 19-023 SUB/VAR
PROJECT NAME: Bailey Meadows

Application accepted as complete on: _____

Application incomplete. The additional information necessary to consider your application is listed below. The application will be deemed complete upon submission of one of the following options:

1. All of the missing information;
2. Some of the missing information and written notice that no other information will be provided; or
3. Written notice that none of the missing information will be provided.

If one of the above listed options is not received by the city by the 180th day following submittal of your application, the application will be void per state law (ORS 227.178 (4)).

Requested additional information filed on: _____

Following submission of your land use application (received on 07/05/19), staff finds the application incomplete. Please submit the following as soon as possible so that City staff can move your application review forward for staff review and analysis in preparation of a City of Sandy Planning Commission public hearing:

- Define how you satisfy Appendix D, Section D107 of the Oregon fire code; include a letter from the fire department.
- Explain phasing plan rationale.
- Confirm the minimum average lot width for Lot 92.
- Have you fully exhausted your options for extending Gunderson Road? Can you provide a formal decision from the Clackamas County Planning Commission or Clackamas County Board of Directors? Can Gunderson be extended within the UGB via the property to the east as depicted in the TSP? Regardless, a minimum half-street of Gunderson Road will need to be depicted on the site plan.

W City Hall\Planning Correspondence\2019 19-023 SUB VAR Bailey Meadows Incompleteness.doc

RECEIVED
NOV 26 2019
CITY OF SANDY

Exhibit 1
Page 1 of 3

- Provide a narrative to Section 17.84.50(B) regarding Gunderson Road, which is a minor arterial and is detailed in the TSP along the southern property boundary.
- Address connections to existing and planned streets outside the development in your narrative response to Section 17.100.100(F).
- Update the plan set to extend Street A to the west property boundary and apply for a Type III Variance to block length for the north side of Street A between Melissa Ave and the west property boundary. Staff will support this variance request due to the existing block length on Rachael Drive.
- Update the future street plan to detail how the proposed future street network ties into the Bornstedt Village Illustrative Street Plan in the Bornstedt Village Specific Area Plan Report. Label Gunderson Road and show connection to Cascadia Village Drive as shown in the TSP. Eliminate the cul-de-sac on the property to the west and extend Street A to the west property boundary.
- Provide clarification on the 20 foot PSDE extending to the west of Street B. Where is the stormwater proposed to go? Does the easement end approximately 400 feet to the west, and, if so, is this sufficient area to accommodate stormwater flow from the site?
- Submit an explanation of how the proposal meets subdivision criteria 17.100.60(E.3-4).
- Update the parking plan (sheet P1-24) to detail which parking space is for which lot so we can confirm that there's a parking spot within 200 feet of each lot.
- Provide clarification on which, if any, of the following variances you are requesting and payment of the associated fee, or an updated plan set reflecting that you are not requesting any variances/deviations:
 - Special Variance to Section 17.100.120(A) for single tiered lot configuration for Lots 55-59.
 - Special Variance to Section 17.82.20(A) for houses on Lots 55-59 to not have primary entrances oriented towards Gunderson Road.
- Submit additional fees totaling \$3,477 as outlined below. This is a Type III review per 17.100.20(E.3), and also due to the variance and special variances.

| Fee | Amount paid | Balance |
|--|-----------------|----------------|
| Traffic review fee: \$1,500 | \$1,500 | \$0 |
| Type III Subdivision: \$3,297 + \$86/lot = \$11,897 | \$11,810 | \$87 |
| Unidentified | \$10 | -\$10 |
| Special Variance for single tiered lot configuration: \$1,099 | \$0 | \$1,099 |
| Special Variance for houses to not face Gunderson Road: \$1,099 | \$0 | \$1,099 |
| Type III Variance for block length of Street A between Melissa Ave and west property boundary: \$1,099 | \$0 | \$1,099 |
| Tree removal: \$103 | \$0 | \$103 |
| Total | \$13,320 | \$3,477 |

Citizen involvement is Goal #1 in the Oregon Statewide Planning Goals. Please keep in mind that this project with 100 lots is proposing its sole street connection through an existing neighborhood on an existing local street. Regardless of the letter dated July 2, 2019 from Mr. Robinson, this

project will be heavily scrutinized by the residents that live in the Nicholas Glen subdivision and therefore we respectfully request more robust analysis on why Gunderson Road cannot be extended and how the applicant finds they meet the Local Street Plan in the TSP.

Once the application is ready to be deemed complete, we will request additional hard copies and a digital copy of all items.

Please call me at (503) 783-2585 or email emeharg@ci.sandy.or.us if you have any questions.

Sincerely,


Emily Meharg
Associate Planner

From: Don Patty <d.patty3710@gmail.com>
Sent: Wednesday, August 14, 2019 8:53 AM
To: Rand Waltz <rand@aks-eng.com>
Subject: Re: FW: Bailey Meadows - Fire Department Letter

EXTERNAL EMAIL: This email originated from outside of AKS Engineering & Forestry. Do not click links or open attachments unless you recognize the sender and know the content is safe.

HI RANDY TALKED TO THE CITY ABOUT PONDER LANE AND THEY AND SANDY FIRE WILL NOT APPROVE PONDER LANE FOR ACCESS TO YOUR SUBDIVISION .THANK YOU DON PATTY FIRE MARSHAL SANDY FIRE .

On Tue, Aug 13, 2019 at 3:23 PM Rand Waltz <rand@aks-eng.com> wrote:

1

Exhibit 2

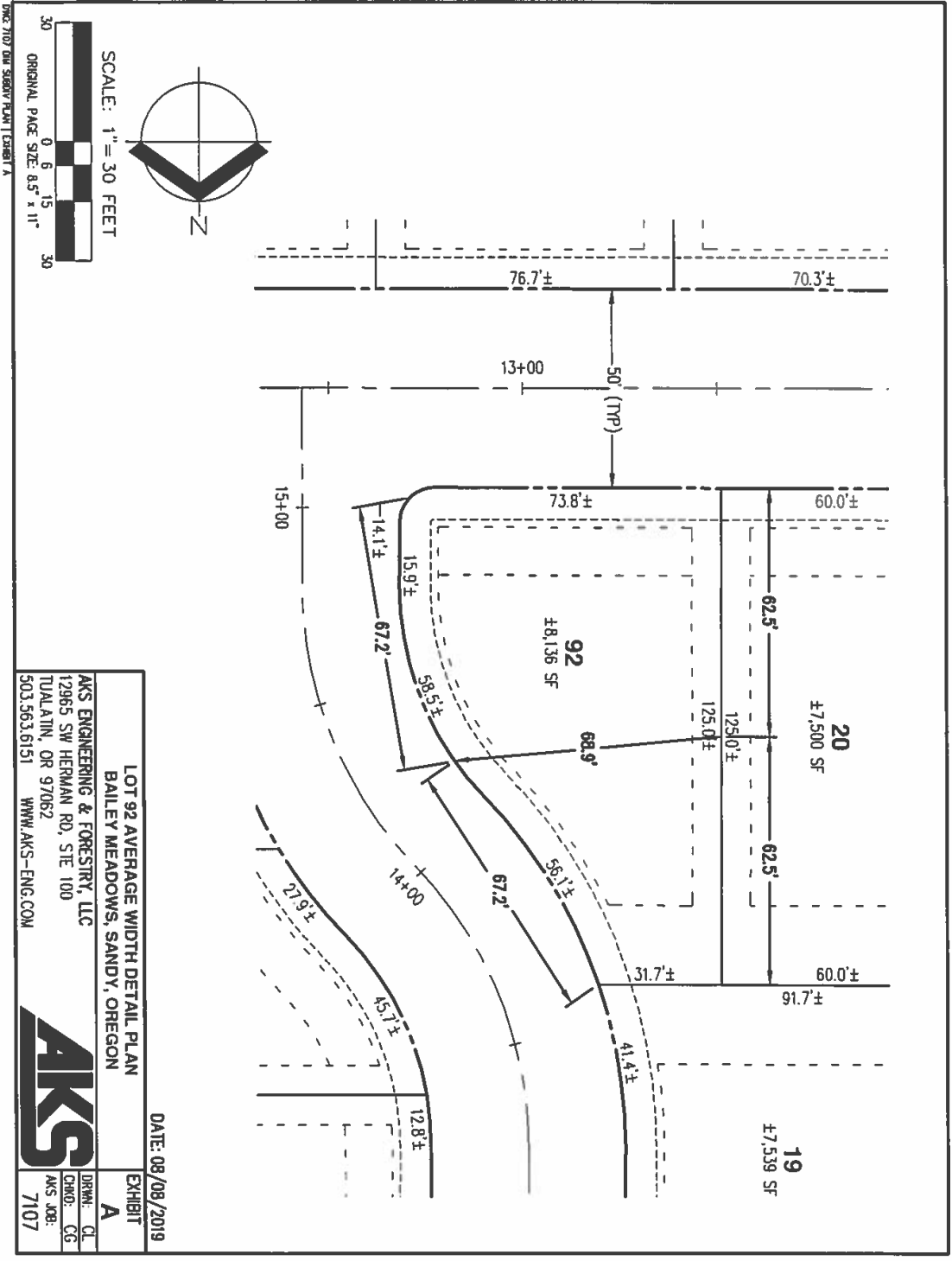


Exhibit 3
 Page 1 of 1

Robinson, Michael C.

From: Fritzie, Martha <MFritzie@clackamas.us>
Sent: Thursday, May 2, 2019 4:13 PM
To: Chris Goodell
Cc: Robinson, Michael C.; Cody Bjugan; Todd Mobley (todd@lancasterengineering.com); Kelly O'Neill; Hughes, Jennifer
Subject: RE: Sandy Development

Chris – I did speak to our Planning Director, Jennifer Hughes, and she concurs.

Martha

Martha Fritzie, Senior Planner
Clackamas County DTD | Planning & Zoning Division
150 Beaver Creek Road | Oregon City, OR 97045
(503) 742-4529
Office hours 8:00am to 6:00pm | Monday - Thursday

The Clackamas County Department of Transportation and Development is dedicated to providing excellent customer service. Please help us to serve you better by giving us your feedback. We appreciate your comments and will use them to evaluate and improve the quality of our public service.

From: Chris Goodell [mailto:chrsg@aks-eng.com]
Sent: Monday, April 22, 2019 7:56 AM
To: Fritzie, Martha <MFritzie@clackamas.us>
Cc: Robinson, Michael C. <MRobinson@SCHWABE.com>; Cody Bjugan <cody@investpdx.com>; Todd Mobley (todd@lancasterengineering.com) <todd@lancasterengineering.com>; Kelly O'Neill <koneill@ci.sandy.or.us>
Subject: RE: Sandy Development

Martha:

We met with City of Sandy staff on Friday and they asked us if we could confirm that the sentiment below is shared by the Planning Director also. They were concerned that it might not be. Can you please confirm that this is the case?

Thanks.

Chris Goodell, AICP, LEED^{AP} - Associate
AKS ENGINEERING & FORESTRY, LLC
P: 503.563.6151 | F: 503.563.6152 | www.aks-eng.com | chrsg@aks-eng.com

From: Fritzie, Martha <MFritzie@clackamas.us>
Sent: Friday, April 5, 2019 10:50 AM
To: Chris Goodell <chrsg@aks-eng.com>
Cc: Robinson, Michael C. <MRobinson@SCHWABE.com>; Cody Bjugan <cody@investpdx.com>; Todd Mobley (todd@lancasterengineering.com) <todd@lancasterengineering.com>
Subject: RE: Sandy Development

Chris - My general reaction is that Goal Exceptions in general are a very difficult processes and this one, in particular, would be a very heavy lift. In all honesty, I think the likelihood of approval is fairly low.

To start, there would need to be a very strong argument built for the need for an urban road outside a UGB being built for the sole purpose of serving the urban subdivision. I understand that this road segment is identified on the city's TSP as a long-term need, but there would need to be a demonstration that there is an immediate need for the road, and for the road in this exact location (the TSP identifies conceptual alignments for future roadways).

There would also need to be an alternatives analysis completed that demonstrates that there is no reasonable alternative location for this road (or way to accommodate the need) inside the UGB; keeping in mind that the "reasonable" standard is pretty high - it is not simply a preference, but the analysis would need to demonstrate that is essentially not possible - even if it is more expensive, or would require a redesign of the subdivision, etc- to locate the road in the UGB.

The other two main criteria for the Goal Exception include an ESEE (economic, social, environmental and energy consequences) analysis of the proposed alignment with other possible alignments that also would require a Goal Exception and an analysis of potential adverse effects on surrounding rural lands. I do not have a real good sense for how difficult or not these analyses would be, but the fact that the proposed road crosses the historic Barlow Rd Corridor (a Goal 5 resource in the county) would definitely need to be factored into the ESEE analysis.

Per the request at the meeting, I have attached a file to this email containing the findings and some of the analysis for a Goal Exception that was taken for a portion of Arndt Rd; this is the most recent example that I am aware of for a Goal Exception for a new roadway through agricultural-zoned land.

Please let me know if you have any more questions,
Martha

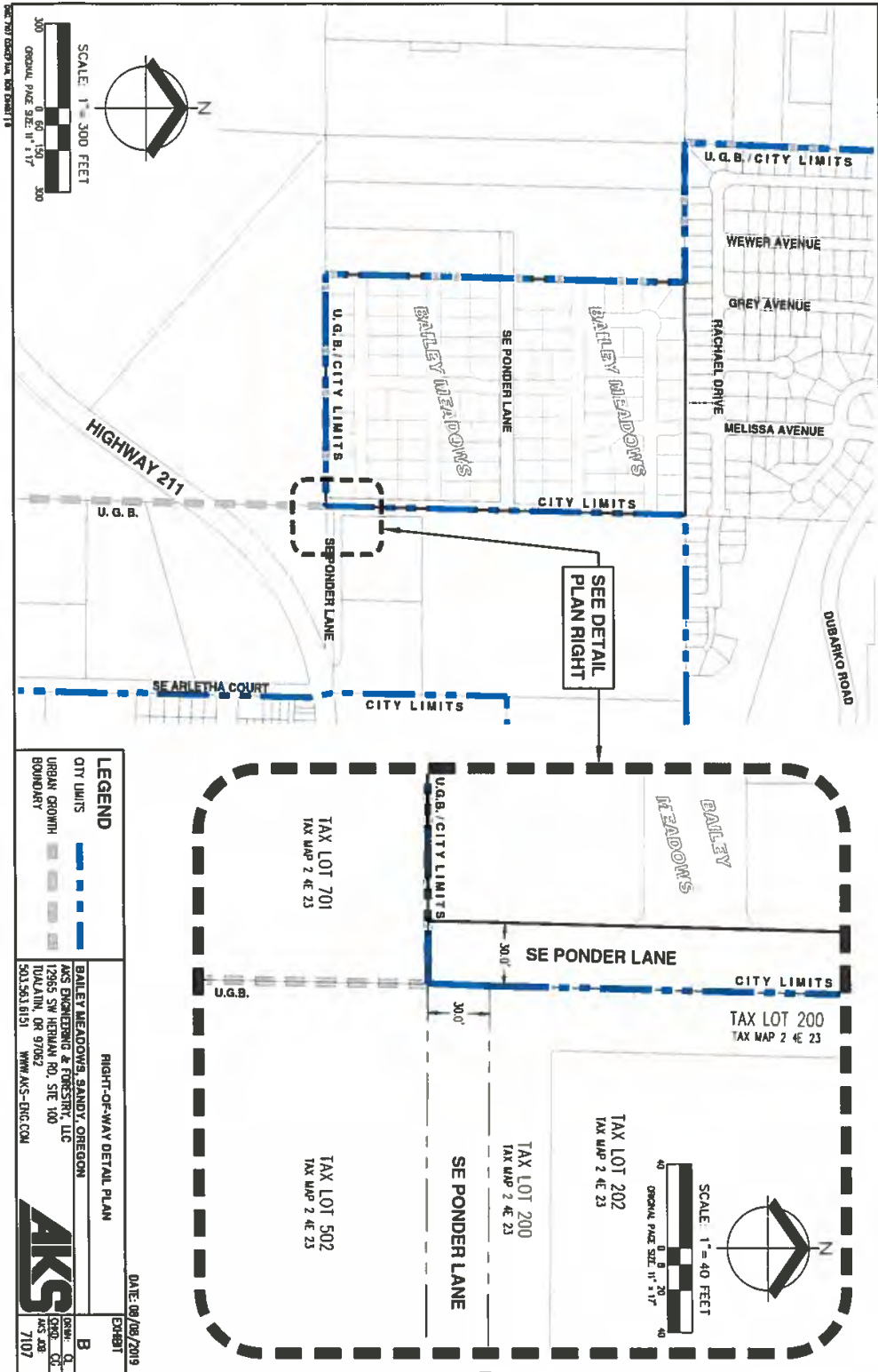


Exhibit 5
Page 1 of 1

October 15, 2019

Michael C. Robinson
Admitted in Oregon
T: 503-796-3756
C: 503-407-2578
mrobinson@schwabe.com

VIA E-MAIL

Mr. Kelly O'Neill, Jr., Director
Development Services Department
Sandy City Hall
39250 Pioneer Blvd.
Sandy, OR 97055

RE: City of Sandy File No. 19-023 SUB/VAR/TREE

Dear Mr. O'Neill:

This office represents the Applicant.

The Applicant requests that the City cancel the scheduled October 28, 2019 Sandy Planning Commission initial evidentiary hearing on this Application by providing mailed notice to all property owners entitled to such notice. The Applicant also requests that the City reschedule the Sandy Planning Commission initial evidentiary hearing for December 17, 2019 at 7:00 p.m. The Applicant will extend the 120-day period in ORS 227.178(1) by fifty (50) days, the period of the continuance.

Please let me know if you have any questions.

Very truly yours,



Michael C. Robinson

MCR/jmhi

Cc Ms. Emily Meharg (via email)
Mr. Cody Bjugan (via email)
Mr. Monty Hurley (via email)
Mr. Chris Goodell (via email)
Mr. David Doughman (via email)

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EXHIBIT R



November 21, 2019

Michael C. Robinson
Admitted in Oregon
T: 503-796-3756
C: 503-407-2578
mrobinson@schwabe.com

Ms. Kelly O'Neill, Director
City of Sandy Planning & Building Department
Sandy City Hall
39250 Pioneer Boulevard
Sandy, OR 97055

RE: City of Sandy File No. 19-23 SUB/VAR; Application by Allied Homes & Development for Approval of the 100-Lot Bailey Meadows Preliminary Plat Subdivision Application; Revised Application Narrative and Exhibits for December 17, 2019 Planning Commission Hearing

Dear Ms. O'Neill:

This office represents the Applicant. Attached to this letter is the Applicant's revised Application narrative and exhibits demonstrating compliance with applicable approval criteria. Please place this letter and its enclosures in the official Planning Department file for this Application and before the City of Sandy Planning Commission at its initial evidentiary hearing on December 17, 2019.

Very truly yours,

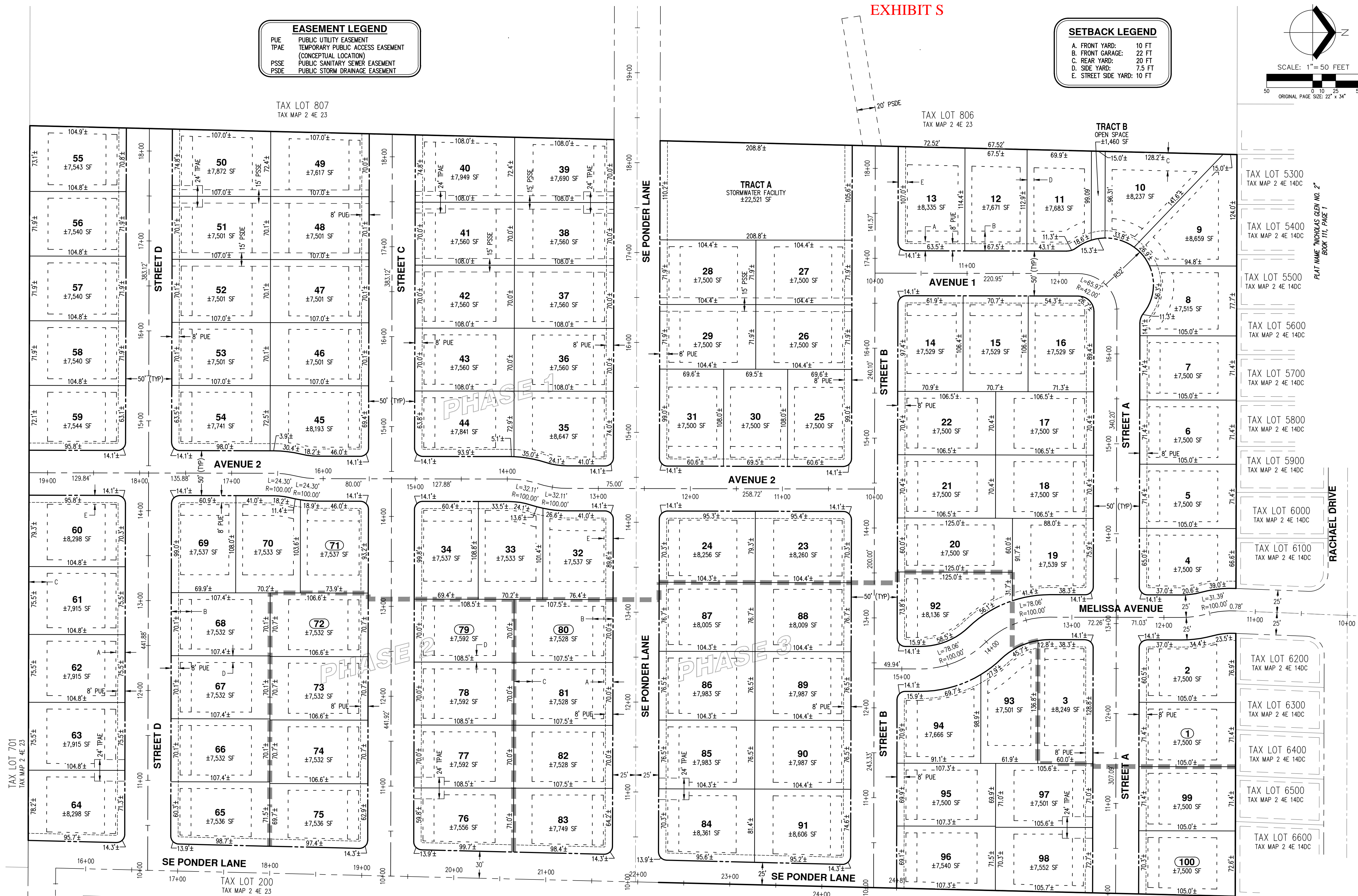
Michael C. Robinson

MCR:jmhi
Enclosures

cc: Mr. Cody Bjugan (*via email*) (*w/enclosures*)
Mr. Monty Hurley (*via email*) (*w/enclosures*)
Mr. Chris Goodell (*via email*) (*w/enclosures*)
Mr. Todd Mobley (*via email*) (*w/enclosures*)
Ms. Emily Meharg (*via email*) (*w/enclosures*)
Mr. David Doughman (*via email*) (*w/enclosures*)

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AKS DRAWING FILE: 7107 DWM SUBDIV PLANNING LAYOUT PL-04

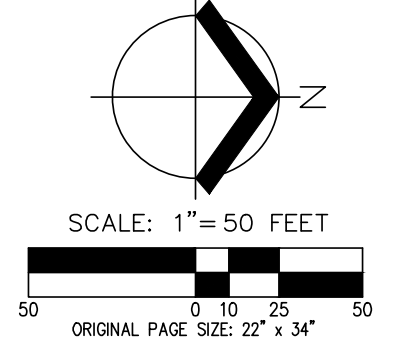


EASEMENT LEGEND

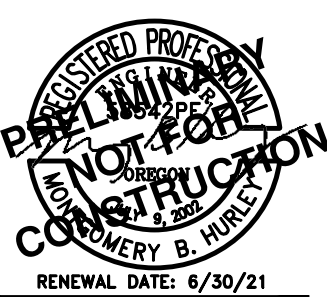
| | |
|------|--|
| PUE | PUBLIC UTILITY EASEMENT |
| TPAE | TEMPORARY PUBLIC ACCESS EASEMENT (CONCEPTUAL LOCATION) |
| PSSE | PUBLIC SANITARY SEWER EASEMENT |
| PSDE | PUBLIC STORM DRAINAGE EASEMENT |

SETBACK LEGEND

| | | |
|----|-------------------|--------|
| A. | FRONT YARD: | 10 FT |
| B. | FRONT GARAGE: | 22 FT |
| C. | REAR YARD: | 20 FT |
| D. | SIDE YARD: | 7.5 FT |
| E. | STREET SIDE YARD: | 10 FT |



**PRELIMINARY SUBDIVISION PLAT
WITH FUTURE BUILDING SETBACKS
BAILEY MEADOWS
SANDY, OREGON**



RENEWAL DATE: 6/30/21
JOB NUMBER: 7107
DATE: 11/15/2019
DESIGNED BY: WN
DRAWN BY: CL
CHECKED BY: RSW

P1-04

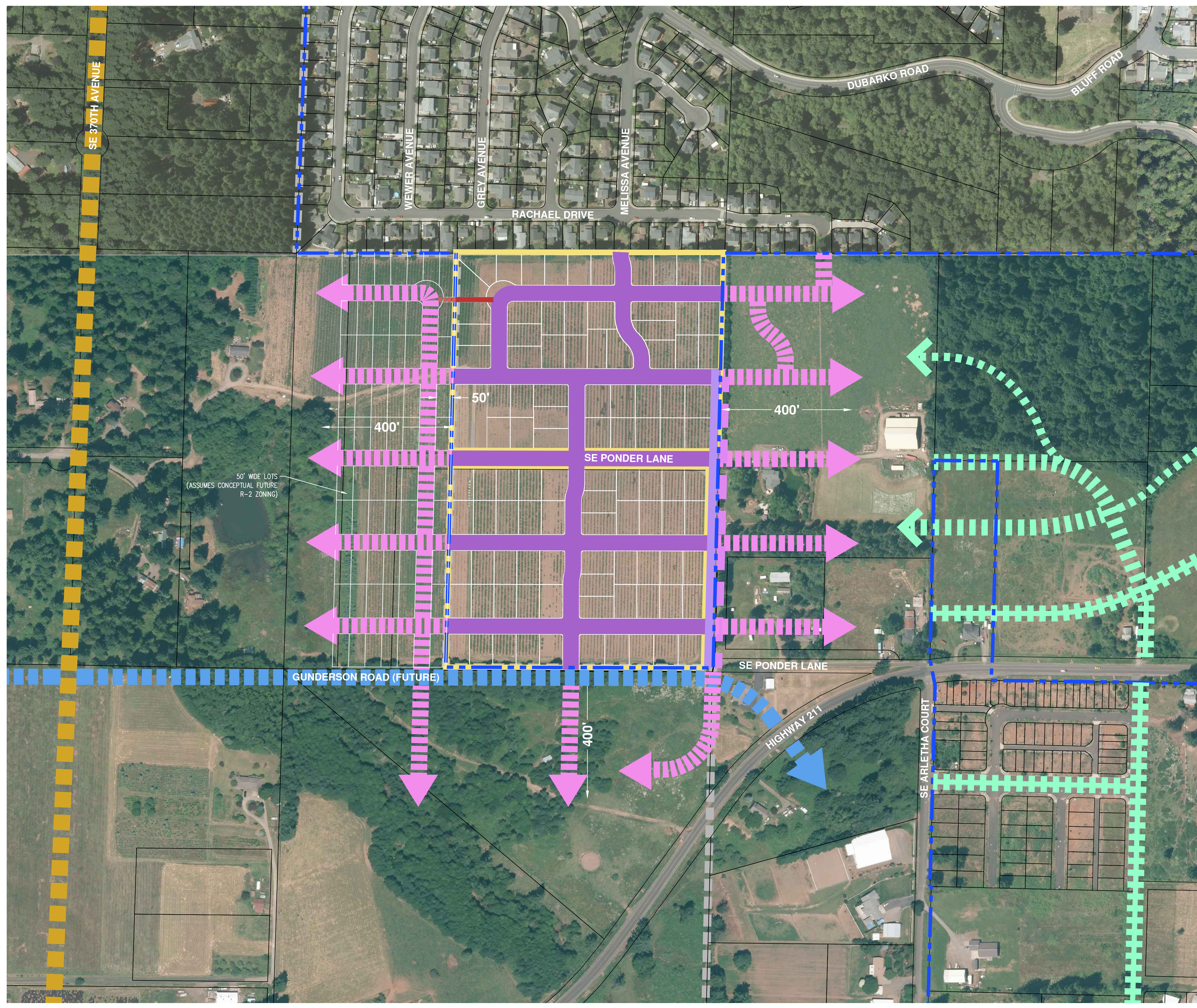
AKS
AKS ENGINEERING & FORESTRY, LLC
12905 SW HERMAN RD., STE. 100
TUALATIN, OR 97062
503.563.6151
WWW.AKS-ENG.COM
ENGINEERING - SURVEYING - NATURAL RESOURCES
FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

PLAT NAME: NICHOLAS GLEN NO. 2
BOOK 111, PAGE 1

- TAX LOT 5300 TAX MAP 2 4E 14DC
- TAX LOT 5400 TAX MAP 2 4E 14DC
- TAX LOT 5500 TAX MAP 2 4E 14DC
- TAX LOT 5600 TAX MAP 2 4E 14DC
- TAX LOT 5700 TAX MAP 2 4E 14DC
- TAX LOT 5800 TAX MAP 2 4E 14DC
- TAX LOT 5900 TAX MAP 2 4E 14DC
- TAX LOT 6000 TAX MAP 2 4E 14DC
- TAX LOT 6100 TAX MAP 2 4E 14DC
- TAX LOT 6200 TAX MAP 2 4E 14DC
- TAX LOT 6300 TAX MAP 2 4E 14DC
- TAX LOT 6400 TAX MAP 2 4E 14DC
- TAX LOT 6500 TAX MAP 2 4E 14DC
- TAX LOT 6600 TAX MAP 2 4E 14DC

EXHIBIT S

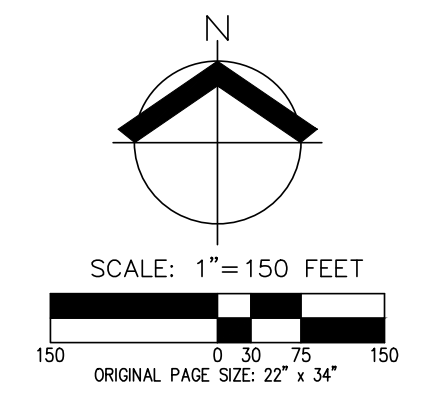
EXHIBIT T



LEGEND

| | |
|--|--|
| CITY LIMITS | |
| URBAN GROWTH BOUNDARY | |
| PROJECT SITE BOUNDARY | |
| PLANNED LOCAL STREET | |
| PLANNED LOCAL STREET (FEE-IN-LIEU FOR 1/2 STREET IMPROVEMENTS) | |
| CONCEPTUAL FUTURE MINOR ARTERIAL (ON TSP) | |
| CONCEPTUAL FUTURE COLLECTOR (ON TSP) | |
| CONCEPTUAL FUTURE LOCAL STREET | |
| CONCEPTUAL FUTURE LOCAL STREET (1/2 STREET IMPROVEMENTS) | |
| CONCEPTUAL STREET FROM BORNSTEDT VILLAGE SPECIFIC AREA PLAN ILLUSTRATIVE STREET PLAN DATED 8/18/2003 | |
| PLANNED PEDESTRIAN PATH | |
| CONCEPTUAL FUTURE PEDESTRIAN PATH | |

- NOTES**
1. THIS PLAN IS INCLUDED TO MEET THE SUBMITTAL REQUIREMENTS FOR THE CITY OF SANDY FOR THE BAILEY MEADOWS SUBDIVISION APPLICATION.
 2. CONCEPTUAL FUTURE STREET LOCATIONS ARE SHOWN FOR ILLUSTRATIVE PURPOSES FOR THE LAND USE APPLICATION ONLY AND ARE NOT PROPOSED WITH THIS SUBDIVISION AND ARE NOT BINDING ON ANY OFFSITE PROPERTIES.



AKS
 AKS ENGINEERING & FORESTRY, LLC
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 WWW.AKS-ENG.COM
 ENGINEERING - SURVEYING - NATURAL RESOURCES
 FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE

**CONCEPTUAL FUTURE
 STREET PLAN
 BAILEY MEADOWS
 SANDY, OREGON**

**REGISTERED PROFESSIONAL
 ENGINEER
 NOT FOR
 CONSTRUCTION**
 RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 11/21/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

P1-15

Bailey Meadows Subdivision

Date: July 2019
Updated November 2019

Submitted to: City of Sandy
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

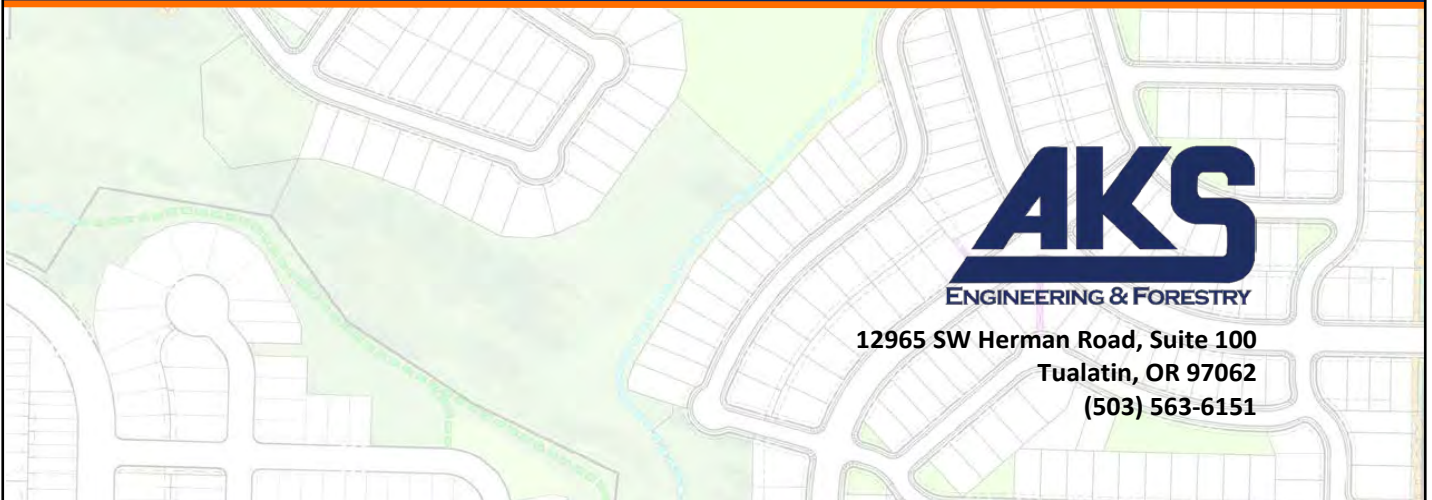


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Exhibits

- Exhibit A:** Preliminary Plans
- Exhibit B:** City of Sandy Land Use Application Forms and Checklists
- Exhibit C:** Property Ownership Information
- Exhibit D:** Clackamas County Assessor’s Map
- Exhibit E:** Public Notification
- Exhibit F:** Traffic Impact Analysis
- Exhibit G:** Preliminary Stormwater Report
- Exhibit H:** Flood & Slope Hazard (FSH) Analysis
- Exhibit I:** Documentation of Plat Name Reservation
- Exhibit J:** Geotechnical Engineering Report

Also Included with This Application

- Cover Letter from Applicant’s Legal Counsel (November 2019)
 - Cover Letter from Applicant’s Legal Counsel (July 2019)
-

Bailey Meadows Subdivision

| | |
|---|---|
| Submitted to: | City of Sandy Planning Department 39250 Pioneer Boulevard Sandy, OR 97055 |
| Applicant: | Allied Homes and Development 12402 SE Sunnyside Road, Suite 706 Clackamas, OR 97015 |
| Property Owner: | Myrtle J. Sturm and Grant E. Sturm, Trustees of the Sturm Family Trust 647 E Historic Columbia River Highway Troutdale, OR 97060 |
| Applicant's Consultant: | AKS Engineering & Forestry, LLC 12965 SW Herman Road, Suite 100 Tualatin, OR 97062 Contact(s): Chris Goodell, AICP, LEED ^{AP} Email: chrisg@aks-eng.com Phone: (503) 563-6151 |
| Applicant's Legal Counsel: | Schwabe, Williamson & Wyatt Pacwest Center 1211 SW 5th Avenue, Suite 190 Portland, OR 97204 Contact(s): Michael Robinson Email: mrobinson@schwabe.com Phone: (503) 796-3756 |
| Applicant's Transportation Engineer: | Lancaster Engineering 321 SW 4 th Avenue, Suite 400 Portland, OR 97204 Contact(s): Todd Mobley Email: todd@lancasterengineering.com Phone: (503) 248-0313 |
| Applicant's Geotechnical Engineer: | GeoPacific Engineering, Inc. 14835 SW 72 nd Avenue Tigard, OR 97224 Contact(s): Jim Imbrie Email: jimbrie@geopacificeng.com Phone: (503) 598-8445 |
| Clackamas County Assessor's Map: | 24E 23 Tax Lots 800, 801, 802, 803, and 804 |



Site Size:

One subdivision affecting five lots at ±23.42 total acres:

±2.40 acres (Lot 800)

±4.74 acres (Lot 801)

±4.74 acres (Lot 802)

±9.17 acres (Lot 803)

±2.37 acres (Lot 804)

Land Use District:

Single-Family Residential (SFR)



I. Executive Summary

To address the City of Sandy's identified need for urban land for housing under statewide planning goal 10, "housing," the City of Sandy (City) in 2017 expanded its Urban Growth Boundary (UGB) south to include the subject site. In June 2017, the property was annexed to the City of Sandy. The UGB expansion is final and acknowledged by the state.

This application for the Bailey Meadows Subdivision (the "Subdivision") is part of the planned progression of land use planning for the area and involves the creation of "Needed Housing" under ORS 197-303(1) and 197.307(4) on residential land properly zoned for the proposed use within the incorporated limits of the City of Sandy. The Applicant is submitting this application to the City of Sandy for a Single-Family Residential Subdivision on the ±23.42-acre site, designated with Single Family Residential (SFR) zoning. Planned project site features include:

- 100 lots for single-family detached housing
- Interconnected system of sidewalks and local public streets
- On-street parking
- Three planned phases with concurrent infrastructure improvements
- Full range of underground utilities including sanitary sewer, water, and franchise utilities
- Fee-in-lieu payment for parkland dedication
- Fee-in-lieu payment for improvements to SE Ponder Lane

This application package includes the City of Sandy application forms, written materials, and Preliminary Plans necessary for City staff to review and determine compliance with the applicable approval criteria. The evidence is substantial and supports the City's approval of this Subdivision.

This application is a "Needed Housing" application under ORS 197.303(1)(a) as it provides housing within an acknowledged urban growth boundary. ORS 197.307(4) states that a local government may apply only clear and objective standards, conditions, and procedures regulating the creation of Needed Housing, and such standards, conditions, and procedures cannot have the effect, either in themselves or cumulatively, of discouraging Needed Housing through unreasonable cost or delay.

Oregon Courts and the Land Use Board of Appeals (LUBA) have held that an approval standard is not clear and objective if it imposes on an applicant "subjective, value-laden analyses that are designed to balance or mitigate impacts of the development." *Rogue Valley Association of Realtors v. City of Ashland*, 35 Or LUBA 139, 158 (1998) *aff'd*, 158 Or App 1 (1999). ORS 197.831 places the burden on local governments to demonstrate that the standards and conditions placed on Needed Housing applications can be imposed only in a clear and objective manner. While this application addresses all standards and conditions, the Applicant reserves the right to object to the application of standards or conditions that are not clear and objective and does not waive its right to assert that the Needed Housing statutes apply to this application. The exceptions in ORS 197.307(4)(a) and 197.307(5) do not apply to this application. ORS 197.307(7)(a) is controlled by ORS 197.307(4). The City has not taken an exception for Needed Housing under 197.303(3).

II. Site Description and Setting

The subject property is approximately ±23.42 acres and is comprised of five separate tax lots generally located directly south of the Nicolas Glen No. 2 Subdivision. The site is designated "SFR" with no existing structures on the site. The site is primarily used for agricultural purposes with a few trees along the southern border of Tax Lots 800 and 803.

Surrounding Land Uses

North: The site abuts 14 residential lots within the southern portion of the Nicolas Glen No. 2 Subdivision. These properties have a general lot size of ±0.12 acres and are zoned Medium Density Residential (MDR) and are in the City. The planned access for Bailey Meadows Subdivision is via the existing right-of-way street stub terminus at Melissa Avenue, directly north of the project boundary.

East: The property to the east is within both the City's UGB and unincorporated Clackamas County and is zoned Rural Residential Farm Forest 5-Acre (RRFF-5). It is currently improved with a single-family dwelling which accesses off Ponder Lane.

South/West: The properties south and west of the site are undeveloped and located outside of the City's UGB and are zoned Exclusive Farm Use District (EFU) by Clackamas County.

III. Applicable Review Criteria

CITY OF SANDY MUNICIPAL CODE

Title 17 – DEVELOPMENT CODE

CHAPTER 17.18 - PROCESSING APPLICATIONS

17.18.00 PROCEDURES FOR PROCESSING LAND USE APPLICATIONS

An application shall be processed under a Type I, II, III or IV procedure. The differences between the procedures are generally associated with the different nature of the decisions as described in Chapter 17.12.

When an application and proposed development is submitted, the Director shall determine the type of procedure the Code specifies for its processing and the potentially affected agencies.

If a development proposal requires an applicant to file a land use application with the city (e.g. a design review application) and if there is a question as to the appropriate procedure to guide review of the application (e.g. a Type II versus a Type III design review process), the question will be resolved in favor of the lower type number.

If a development proposal requires an applicant to file more than one land use application with the city (e.g. a design review application and a variance) and if the development code provides that the applications are to be reviewed under separate types of procedures (e.g. a Type II design review and a Type III variance):

- the Director will generally elevate all of the required applications to the highest number procedure for review (e.g. the Type II design review application would be reviewed by the Planning Commission along with the Type III variance).

In situations where an applicant has attended a pre-application conference and has reviewed the application with the Director prior to submitting the applications, the Director may exercise his/her discretion to review the Type II application(s) at the staff level and only schedule a public hearing for the Type III portion(s) of the development proposal.

Response: The application requires a Type III Review Procedure, following conclusions of the November 20, 2018 pre-application conference (see response below).

17.18.20 PRE-APPLICATION CONFERENCE

A pre-application conference is required for all Type II, III, and IV applications unless the Director determines a conference is not needed. A request for a pre-application conference shall be made on the form provided by the city and will be scheduled following submittal of required materials and payment of fees. The purpose of the conference is to acquaint the applicant with the substantive and procedural requirements of the Code, provide for an exchange of information regarding applicable elements of the Comprehensive Plan and development requirements, arrange such technical and design assistance which will aid the applicant, and to otherwise identify policies and regulations that create opportunities or pose significant constraints for the proposed development. The Director will provide the applicant with notes from the conference within 10 days of the conference. These notes may include confirmation of the procedures to be used to process the application, a list of materials to be submitted, and the applicable code sections and criteria that may apply to the application. Any opinion expressed by the Director or City staff during a pre-application conference regarding substantive provisions of the City's code is advisory and is subject to change upon official review of the application.

Response: A pre-application conference was held with the City of Sandy on November 20, 2018. An additional meeting with City staff was held on January 29, 2019. This requirement is met.

17.18.30 LAND USE APPLICATION MATERIALS

Unless otherwise specified in this code, an application shall consist of the materials specified in this section, plus any other materials required by this Code.

- A. A completed application form and payment of fees.
- B. List and mailing labels of Affected Property Owners.
- C. An explanation of intent, stating the nature of the proposed development, reasons for the request, pertinent background information, information required by the Development Code and other material that may have a bearing in determining the action to be taken.
- D. Proof that the property affected by the application is in the exclusive ownership of the applicant, that the applicant has the consent of all parties in ownership of the affected property, or the applicant is the contractual owner.
- E. Legal description of the property affected by the application.
- F. Written narrative addressing applicable code chapters and approval criteria.
- G. Vicinity Map showing site in relation to local and collector streets, plus any other significant features in the nearby area.
- F. Site plan of proposed development
- G. Number of Copies to be Submitted:
 - 1. One copy of items A through D listed above;
 - (...)



-
4. Type III: 15 copies of site plan and other materials required by the Code

The Director may vary the quantity of materials to be submitted as deemed necessary.

Response: The application submittal materials include the items listed above. The list and mailing labels are applicable to property owners within 500 feet of the subject properties. The remainder of the Code Section discusses the processing requirements to be completed by the City. For purposes of brevity, those Sections are not included in this narrative. This requirement is met.

CHAPTER 17.20 - PUBLIC HEARINGS

17.20.40 APPLICANT'S RESPONSIBILITY

(...)

- C. Neighborhood Meetings. Applicants intending to develop a major project within the City are strongly urged to conduct their own informational meetings in the neighborhood affected prior to submitting their application to the City.

Response: On September 18, 2019, the Applicant conducted a neighborhood meeting at the Sandy Public Library. The above City recommendation has been satisfied.

CHAPTER 17.30 - ZONING DISTRICTS

17.30.20 RESIDENTIAL DENSITY CALCULATION PROCEDURE

The number of dwelling units permitted on a parcel of land is calculated after the determination of the net site area and the acreage of any restricted development areas (as defined by Chapter 17.60). Limited density transfers are permitted from restricted development areas to unrestricted areas consistent with the provisions of the Flood and Slope Hazard Area Overlay District, Chapter 17.60.

Calculation of Net Site Area (NSA): Net site area should be calculated in acres based upon a survey of the property boundaries excluding areas dedicated for public use.

- A. Minimum and Maximum Dwelling Units for Sites with No Restricted Areas. The allowable range of housing units on a piece of property is calculated by multiplying the net site area (NSA) in acres by the minimum and maximum number of dwelling units allowed in that zone.

For example: A site (NSA) containing 10 acres in the Single-Family Residential Zoning District requires a minimum of 30 units and allows a maximum of 58 units. (NSA x 3 units/acre = 30 units minimum) (NSA x 5.8 units/acre = 58 units maximum)

Response: The subject site is zoned Single Family Residential (SFR). The planned subdivision includes a total of 100 units on a total net site area of ±18.21 acres resulting in a net residential density of ±5.49 units per acre. This planned density falls within the minimum number of dwelling units required of 3 and the maximum of 5.8 units per acre. The tables below provide the details of the density calculations. Note that the gross site area excludes existing SE Ponder Lane right-of-way. The criteria are met.



| Gross Area (AC) | ROW (AC) | NSA (AC)= GROSS-ROW |
|-----------------|----------|---------------------|
| 23.42 | 5.21 | 18.21 |

| | Units Per Acre | Density | Total Density |
|------------|----------------|---------|---------------|
| MIN | 3 | 54.63 | 55 |
| MAX | 5.8 | 105.62 | 106 |

B. Minimum and Maximum Dwelling Units for Sites with Restricted Areas

1. **Unrestricted Site Area:** To calculate unrestricted site area (USA): subtract all restricted development areas (RDA) as defined by Section 17.60.20(A) from the net site area (NSA), if applicable.

$$\text{NSA} - \text{RDA} = \text{USA}$$

2. **Minimum Required Dwelling Units:** The minimum number of dwelling units required for the site is calculated using the following formula:

$$\text{USA (in acres)} \times \text{Minimum Density (Units per Acre) of Zoning District} = \text{Minimum Number of Dwelling Units Required.}$$

3. **Maximum Allowed Dwelling Units:** The maximum number of dwelling units allowed on a site is the lesser of the results of these two formulas:

- a. $\text{NSA (in acres)} \times \text{Maximum Density of Zoning District (units/acre)}$

- b. $\text{USA (in acres)} \times \text{Maximum Density of Zoning District (units/acre)} \times 1.5$ (maximum allowable density transfer based on Chapter 17.60)

For example: suppose a site in a zone with a maximum density of eight (8) units per acre has 6 acres of unrestricted site area (USA= 6) and two acres of restricted development area (RDA=2), for a total net site area of 8 acres (NSA= 8). Then NSA (8) x 8 units/acre = 64 and USA (6) x 8 units/acre x 1.5 = 72, so the maximum permitted number of dwelling units is 64 (the lesser of the two results).

Response: The project site does not contain any restricted areas. See Exhibit H for Flood and Slope Hazard Analysis. The criteria do not apply.

- C. **Lot Sizes:** Lot sizes shall comply with any minimum lot size standards of the underlying zoning district.

- D. **Rounding:** A dwelling unit figure is rounded down to the nearest whole number for all total maximum or minimum figures less than four dwelling units. For dwelling unit figures greater than four dwellings units, a partial figure of one-half or greater is rounded up to the next whole number.

For example: A calculation of 3.7 units is rounded down to 3 units. A calculation of 4.2 units is rounded down to 4 units and a calculation of 4.5 units is rounded up to 5 units.



Response: The application involves subdividing the subject site into 100 lots suitable for future single-family detached dwellings, all complying with the minimum lot size of 7,500 square feet. The subdivision also includes one tract for stormwater management infrastructure. Rounding as stated above is demonstrated in the density calculation. The criterion is met.

CHAPTER 17.34 - SINGLE-FAMILY RESIDENTIAL (SFR)

17.34.10 PERMITTED USES

A. Primary Uses Permitted Outright:

1. Single detached dwelling subject to design standards in Chapter 17.90;

Response: The Applicant plans on building model homes with this subdivision. To the extent this cannot be done, the Applicant will work with the City and build a new single-family home on each of the lots of record prior to plat recordation, similar to a model home scenario.

2. Single detached manufactured dwelling subject to design standards in Chapter 17.90;

17.34.30 DEVELOPMENT STANDARDS

| Type | Standard |
|--|---|
| A. Minimum Lot Area – Single detached dwelling | 7,500 square ft. |
| B. Minimum Average Lot Width – Single detached dwelling | 60 ft. |
| C. Minimum Lot Frontage | 20 ft, except as allowed by Section 17.100.160 |
| D. Minimum Average Lot Depth | No minimum |
| E. Setbacks (Main Building) Front Yard Rear Yard Side Yard (interior) Corner Lot | 10 ft. minimum 20 ft. minimum 7.5 ft. minimum 10 ft. minimum on side abutting the street ¹ |
| F. Setbacks (Garage/Carport) | 22 ft. minimum for front vehicle access 15 ft. minimum if entrance is perpendicular to street (subject to Section 17.90.220) 5 ft. minimum for alley or rear access |

Response: This application proposes lots for the permitted use of “single detached dwelling” listed above. The minimum standards for newly created lots in the SFR district are included in the table above. As planned, each of the lots meets the 20-foot minimum lot frontage to the street and the 60-foot average lot width for a single detached dwelling. The Preliminary Subdivision Plat, included in Exhibit A, demonstrates that future homes can meet the minimum setback requirements at the time of future building permit submittal. As shown, each lot meets the 7,500 square-foot minimum lot size requirement. The criteria are met.

17.34.40 MINIMUM REQUIREMENTS

- A. Must connect to municipal water.
- B. Must connect to municipal sewer if service is currently within 200 feet of the site. Sites more than 200 feet from municipal sewer, may be

approved to connect to an alternative disposal system provided all of the following are satisfied:

1. A county septic permit is secured and a copy is provided to the city;
 2. The property owner executes a waiver of remonstrance to a local improvement district and/or signs a deed restriction agreeing to complete improvements, including but not limited, to curbs, sidewalks, sanitary sewer, water, storm sewer or other improvements which directly benefit the property;
 3. The minimum size of the property is one acre or is a pre-existing buildable lot, as determined by the city;
 4. Site consists of a buildable parcel(s) created through dividing property in the city, which is less than five acres in size.
- C. The location of any real improvements to the property must provide for a future street network to be developed.
- D. Must have frontage or approved access to public streets.

Response: The Preliminary plans include information illustrating how the subdivision is planned to be serviced with municipal water, sanitary sewer, planned street network and improvements, and frontage on public streets. These criteria will be met.

17.34.50 ADDITIONAL REQUIREMENTS

- A. Design review as specified in Chapter 17.90 is required for all uses.

Response: This application involves a subdivision; design review for specific uses will be reviewed at the time of future permit submittal, if necessary. The standard is understood.

- B. Lots with 40 feet or less of street frontage shall be accessed by a rear alley or a shared private driveway.

Response: As illustrated by the Preliminary Plans, each lot is planned with at least 40 feet of street frontage. This criterion does not apply.

- C. Lots with alley access may be up to 10 percent smaller than the minimum lot size of the zone.

Response: Alleys are not included in this project. The criterion does not apply.

- D. Zero Lot Line Dwellings: Prior to building permit approval, the applicant shall submit a recorded easement between the subject property and the abutting lot next to the yard having the zero setback. This easement shall be sufficient to guarantee rights for maintenance purposes of structures and yard, but in no case shall it be less than 5 ft. in width.

Response: Building setback requirements will be reviewed at the time of future building permit submittal. This criterion is understood.

CHAPTER 17.60 - FLOOD & SLOPE HAZARD (FSH) OVERLAY DISTRICT



17.60.10 INTERPRETATION AND MAPPING

The Director has the ultimate responsibility for maintaining the FSH Overlay District on the City of Sandy Zoning Map, determining on-site measuring methods, and otherwise interpreting the provisions of this chapter. Technical terms used in this chapter are defined in Chapter 17.10, Definitions. This chapter does not regulate development on lots or parcels entirely outside the FSH Overlay District.

A. FSH Overlay District. The only areas subject to the restrictions and prohibitions of the FSH overlay district are those indicated on the City of Sandy Zoning Map on file in the Planning Department and areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled, "Flood Insurance Study (FIS) for Clackamas County, Oregon and Incorporated Areas," dated January 18, 2019, with accompanying Flood Insurance Rate Maps (FIRMs). This chapter does not regulate lots or parcels entirely outside the FSH Overlay District.

1. The FIS and FIRMs are hereby adopted by reference and declared to be a part of Section 17.60 and are on file at the City of Sandy.

Response: According to the current Zoning Map, the site is located inside the City limits, within the UGB and is unaffected by the FSH Overlay. However, the project site was not included on the City's Goal 5 Inventory to determine whether wetlands, streams, or the FSH Overlay applies to the site because that inventory was created prior to the site's inclusion within the UGB and annexation to the City. A FSH Analysis (Exhibit H) is included in the application materials demonstrating that the FSH Overlay District does not apply to the project site.

B. Development Approval Required. No development shall occur within the FSH overlay district without first obtaining City approval under the provisions of this chapter. The Director shall notify the Oregon Division of State Lands whenever any inventoried wetland is proposed for development, in accordance with ORS 227.350. In riverine situations, the Director shall notify adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notification to the administrator.

C. Interpretation

All provisions of the FSH overlay code shall be:

1. Considered as minimum requirements;
2. Liberally construed in favor of the governing body; and
3. Deemed neither to limit nor repeal any other powers granted under state statutes.

D. Applicant Responsibilities. The applicant for alteration or development within the FSH overlay district shall be responsible for preparing a survey of the entire site, based on site-specific field surveys or Corps of Engineers data that precisely maps and delineates the following areas:

1. The name, location and dimensions of affected streams or rivers, and the tops of their respective banks.

-
2. Area of Special Flood Hazard boundaries and elevations as determined by the January 18, 2019 FIS for Clackamas County and Incorporated Areas.

Response: According to Federal Emergency Management Area (FEMA) mapping, Special Flood Hazard Areas are not mapped within the project site.

3. The City of Sandy FSH overlay district boundary as depicted on the City of Sandy FSH Map.

Response: The subject site is not located within the City's FSH Overlay District.

4. The water quality and slope setback area(s) as defined in Section 17.60.30.

5. The size and location of locally significant wetlands shall be determined based on the City of Sandy Locally Significant Wetland Inventory (2002) unless modified by a wetland delineation approved by the Oregon Division of State Lands and submitted to the City. Wetland delineations that have formal concurrence from the Division of State Lands shall be valid for the period specified in that agency's administrative rules.

Response: The project site is located outside of the City of Sandy's Local Wetland Inventory.

6. Steep slope areas where the slope of the land is 25% or greater within the FSH overlay district boundary.

7. The area enclosed by a continuous line, measured 25 feet horizontally, parallel to and upland from the top of a steep slope area, where the top of the steep slope is within the FSH overlay district boundary.

Response: The FSH Analysis (Exhibit H) concludes that wetlands, waters, or slopes greater than 25% are not located on the subject site.

8. Existing public rights-of-way, structures, roads and utilities.

9. Natural vegetation, including trees or tree clusters and understory within the FSH Overlay District boundary.

10. Existing and proposed contours at 2-foot intervals.

Response: The FSH Analysis (Exhibit H) contains the applicable information as listed above. The criteria are met.

17.60.20 PERMITTED USES AND ACTIVITIES

This chapter lists permitted uses, or uses allowed under prescribed conditions, within the FSH overlay district. Where there are conflicts, this chapter supersedes the use provisions of the underlying district.

Response: The FSH Analysis (Exhibit H) documents that wetlands, waters, or slopes greater than 25% are not located on the subject site. Therefore, the FSH Overlay District does not apply to the project site and thus the criteria of Chapter 17.60 do not apply and have been omitted for brevity.



CHAPTER 17.84 - IMPROVEMENTS REQUIRED WITH DEVELOPMENT

17.84.20 TIMING OF IMPROVEMENTS

- A. All improvements required by the standards in this chapter shall be installed concurrently with development, as follows:
1. Where a land division is proposed, each proposed lot shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to approval of the final plat.
 2. Where a land division is not proposed, the site shall have required public and franchise utility improvements installed or financially guaranteed in accordance with the provisions of Chapter 17 prior to temporary or final occupancy of structures.

Response: As shown in the Preliminary Plans in Exhibit A, each lot is to be provided with utility, sanitary sewer, water, and stormwater infrastructure. The criterion is met.

- B. Where specific approval for a phasing plan has been granted for a planned development and/or subdivision, improvements may similarly be phased in accordance with that plan.

Response: As depicted in the Preliminary Plans, improvements are planned to be phased with the approved plans. See Exhibit A for detailed phasing logistics.

17.84.30 PEDESTRIAN AND BICYCLIST REQUIREMENTS

- A. Sidewalks shall be required along both sides of all arterial, collector, and local streets, as follows:

Response: As shown on the Preliminary Plans, sidewalks are planned to be provided on the streets within the subdivision and along the unimproved street stub section of Melissa Avenue.

1. Sidewalks shall be a minimum of 5 ft. wide on local streets. The sidewalks shall be separated from curbs by a tree planting area that provides separation between sidewalk and curb, unless modified in accordance with Subsection 3 below.

Response: As shown on the Preliminary Plans, sidewalks will be a minimum of 5 feet wide on the local street sections interior to the subdivision. See Exhibit A for detailed landscaping plans. The criterion is met.

2. Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 ft. wide.

Response: The project site does not include proposed arterial or collector streets. The criterion does not apply.



-
3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.
 - a) Narrow landscape strips
 - b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width
 - c) Eliminate landscape strips
 - d) Narrow on-street improvements by eliminating on-street parking
 - e) Eliminate sidewalks

Response: As shown on the Preliminary Plans, sidewalks are planned adjacent to the new streets within the subdivision. The criteria do not apply.

4. The timing of the installation of sidewalks shall be as follows:
 - a) Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.

Response: The project site does not include proposed arterial or collector streets. The criterion does not apply.

- b) Sidewalks along local streets shall be installed in conjunction with development of the site, generally with building permits, except as noted in (c) below.

Response: Sidewalks are planned to be completed in conjunction with frontage improvements as phased with the approved plans. The criterion is met.

- c) Where sidewalks on local streets abut common areas, drainageways, or other publicly owned or semi-publicly owned areas, the sidewalks and planted areas shall be installed with street improvements.

Response: The project site does not abut drainageways, publicly owned areas, or common areas. The criterion does not apply.

- B. Safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions, planned developments, commercial developments, industrial areas, residential areas, public transit stops, school transit stops, and neighborhood activity centers such as schools and parks, as follows:



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1. For the purposes of this section, “safe and convenient” means pedestrian and bicyclist facilities that: are reasonably free from hazards which would interfere with or discourage travel for short trips; provide a direct route of travel between destinations; and meet the travel needs of pedestrians and bicyclists considering destination and length of trip.

Response: As shown on the Updated Preliminary Plan Sheets, a pedestrian path is planned in the northwest portion of the project site to provide a potential connection for a future development to the west. Pedestrian routes as planned are safe, direct, and convenient and don’t deviate unnecessarily from a straight line, involve a significant amount of out-of-direction travel for likely users, or contain hazards. The criteria are met.

2. To meet the intent of “B” above, right-of-ways connecting cul-de-sacs or passing through unusually long or oddly shaped blocks shall be a minimum of 15 ft. wide with 8 feet of pavement.

Response: The application does not include cul-de-sac improvements or unusual blocks; the criterion is met.

3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.

Response: The application does not involve high volume pedestrian travel. The criterion does not apply.

4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance with the following standards:
 - a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.
 - b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
 - c) Walkways shall be as direct as possible and avoid unnecessary meandering.
 - d) Walkway/driveway crossings shall be minimized. Internal parking lot design shall maintain ease of access for pedestrians from abutting streets, pedestrian facilities, and transit stops.

Response: As shown on the Preliminary Plans, pedestrian walkways are intended to connect to the existing and planned pedestrian circulation system and future building entrances. Therefore, the applicable standards above are met.



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- e) With the exception of walkway/driveway crossings, walkways shall be separated from vehicle parking or vehicle maneuvering areas by grade, different paving material, painted crosshatching or landscaping. They shall be constructed in accordance with the sidewalk standards adopted by the City. (This provision does not require a separated walkway system to collect drivers and passengers from cars that have parked on site unless an unusual parking lot hazard exists).

Response: The application does not involve common space walkways of this nature. Therefore, the criteria are not applicable.

- f) Pedestrian amenities such as covered walkways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.

Response: The application does not include pedestrian amenities as described above. The criterion is not applicable.

- C. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.

Response: According to the City of Sandy's Transportation System Plan (the "TSP"), there are no existing or planned trails adjacent to the project site which warrant a linkage. Therefore, the standard does not apply. However, this application is not subject to the TSP as explained above.

- D. To provide for orderly development of an effective pedestrian network, pedestrian facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).

Response: As illustrated by the Updated Preliminary Plan Sheets, continuous pedestrian facilities extending from the Nicolas Glen No. 2 Subdivision throughout the site are planned concurrently with each individual project phase. In addition, a pedestrian pathway is planned to provide a potential connection for a future development west of the project site. Sidewalks are planned to be completed prior to occupancy of the adjoining home, as indicated on the Preliminary Plans. Therefore, the standard is met.

- E. To ensure improved access between a development site and an existing developed facility such as a commercial center, school, park, or trail system, the Planning Commission or Director may require off-site pedestrian facility improvements concurrent with development.

Response: Existing adjacent trails, future phases, or public parks that warrant a connection are not included in the project. Therefore, the standard does not apply.



17.84.40 TRANSIT AND SCHOOL BUS TRANSIT REQUIREMENTS

- A. Development sites located along existing or planned transit routes shall, where appropriate, incorporate bus pull-outs and/or shelters into the site design. These improvements shall be installed in accordance with the guidelines and standards of the transit agency. School bus pull-outs and/or shelters may also be required, where appropriate, as a condition of approval for a residential development of greater than 50 dwelling units where a school bus pick-up point is anticipated to serve a large number of children.
- B. New developments at or near existing or planned transit or school bus transit stops shall design development sites to provide safe, convenient access to the transit system, as follows:
 - 1. Commercial and civic use developments shall provide a prominent entrance oriented towards arterial and collector streets, with front setbacks reduced as much as possible to provide access for pedestrians, bicycles, and transit.
 - 2. All developments shall provide safe, convenient pedestrian walkways between the buildings and the transit stop, in accordance with the provisions of 17.84.30 B.

Response: The project site is not located along any existing or planned transit or school bus transit stops. The criteria do not apply.

17.84.50 STREET REQUIREMENTS

- A. Traffic evaluations may be required of all development proposals in accordance with the following:
 - 1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.

Response: The Traffic Impact Analysis (Exhibit F) assesses the traffic in accordance with planned site improvements and accepted traffic engineering practices. The standard is met.

- 2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.

Response: The Traffic Impact Analysis (Exhibit F) reports conditions which meet the minimum standard established in the Transportation System Plan. The criterion does not apply.



B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

1. Arterial streets should generally be spaced in one-mile intervals.
2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.

Response: This application does not include construction of new arterial streets. The criteria do not apply.

C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, "through traffic" means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:

1. Straight segments of local streets should be kept to less than a quarter mile in length. As practical, local streets should include traffic calming features, and design features such as curves and "T" intersections while maintaining pedestrian connectivity.
2. Local streets should typically intersect in "T" configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent "T" intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights-of-way.

Response: The Preliminary Plans include information on the local street pattern and intersections internal to the subdivision. The design incorporates curves, "T" intersections, straight segments less than a quarter mile in length, and maintains pedestrian connectivity. The traffic traveling through the area will be of local origin. The criteria are met.

3. Cul-de-sacs should generally not exceed 400 ft. in length nor serve more than 20 dwelling units, except in cases where existing topography, wetlands, or drainage systems or other existing features necessitate a longer cul-de-sac in order to provide adequate access to an area. Cul-de-sacs longer than 400 feet or developments with only one access point may be required to provide an alternative access for emergency vehicle use only, install fire prevention sprinklers, or provide other mitigating measures, determined by the City.

Response: The project site does not include cul-de-sacs as defined in SDC 17.10.30: *a local street with only one outlet and having a bulb at the opposite end*. Additionally, as shown on the Updated Preliminary Plans Sheets, the project site is planned to be served with two accesses. The standard does not apply.

D. Development sites shall be provided with access from a public street improved to City standards in accordance with the following:

1. Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.

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2. Half-street improvements are considered the minimum required improvement. Three-quarter-street or full-street improvements shall be required where traffic volumes generated by the development are such that a half-street improvement would cause safety and/or capacity problems. Such a determination shall be made by the City Engineer.
 3. To ensure improved access to a development site consistent with policies on orderly urbanization and extension of public facilities the Planning Commission or Director may require off-site improvements concurrent with development. Off-site improvement requirements upon the site developer shall be reasonably related to the anticipated impacts of the development.
 4. Reimbursement agreements for $\frac{3}{4}$ street improvements (i.e., curb face to curb face) may be requested by the developer per Chapter 12 of the SMC.
 5. A $\frac{1}{2}$ street improvement includes curb and pavement 2 feet beyond the center line of the right-of-way. A $\frac{3}{4}$ street improvement includes curbs on both sides of the side and full pavement between curb faces.

Response: The Preliminary Plans show the project site is provided with access extending from Melissa Avenue, an existing public street right-of-way stubbed to the property. Per the Preliminary Plans, a fee-in-lieu of half-street improvements is planned on east SE Ponder Lane. Required frontage improvements on streets applicable to the project site will be completed as necessary. The criterion is met.

- E. As necessary to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies) in accordance with the following:
 1. Temporary dead-ends created by this requirement to extend street improvements to the edge of adjacent properties may be installed without turn-arounds, subject to the approval of the Fire Marshal.
 2. In order to assure the eventual continuation or completion of the street, reserve strips may be required.

Response: The Preliminary Plans illustrate local street sections extending through the site to the edge of the property boundaries. Temporary dead-ends, as necessary, can be provided in the phase it is associated with, as indicated on the Preliminary Plans. The criteria can be met.

Appendix D, Section D107 of the Oregon Fire Code addresses standards regarding fire apparatus access roads for one or two-family residential developments. Developments which exceed 30 dwelling units shall be provided with two separate and approved fire apparatus access roads and shall meet the requirements of Section D104.3.

- F. Where required by the Planning Commission or Director, public street improvements may be required through a development site to provide for the logical extension of an existing street network or to connect a site with a nearby neighborhood activity center, such as a

school or park. Where this creates a land division incidental to the development, a land partition shall be completed concurrent with the development.

Response: This application does not include an incidental land division as stated above. The standard does not apply.

G. Except for extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. Street names and numbers shall conform to the established pattern in the surrounding area and be subject to approval of the Director.

Response: Street names which conform to the surrounding area will be subjected to the approval of the Director. The criterion is met.

H. Location, grades, alignment, and widths for all public streets shall be considered in relation to existing and planned streets, topographical conditions, public convenience and safety, and proposed land use. Where topographical conditions present special circumstances, exceptions to these standards may be granted by the City Engineer provided the safety and capacity of the street network is not adversely affected. The following standards shall apply:

1. Location of streets in a development shall not preclude development of adjacent properties. Streets shall conform to planned street extensions identified in the Transportation Plan and/or provide for continuation of the existing street network in the surrounding area.
2. Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.

Response: The planned locations of streets internal to the subdivision provide continuation of the existing street network stemming from the stub at Melissa Avenue, as identified in the Transportation Plan. Location of streets internal to the subdivision do not preclude development of adjacent properties. The grades on the planned local streets are not intended to exceed 15 percent; the project does not include arterial or collector streets. It is understood that if any special circumstances are identified, the standards of this Section will apply and be reviewed for compliance by the City Engineer. The criterion is met.

3. As far as practical, arterial streets and collector streets shall be extended in alignment with existing streets by continuation of the street centerline. When staggered street alignments resulting in "T" intersections are unavoidable, they shall leave a minimum of 150 ft. between the nearest edges of the two rights-of-way.

Response: The project site does not include the extension of arterial or collector streets. The standard does not apply.

4. Centerline radii of curves shall not be less than 500 ft. on arterial streets, 300 ft. on collector streets, and 100 ft. on local streets.



Response: The Preliminary Plans show the centerline radii of curves are not less than 100-foot on internal local streets. The standard is met.

5. Streets shall be designed to intersect at angles as near as practicable to right angles and shall comply with the following:

a) The intersection of an arterial or collector street with another arterial or collector street shall have a minimum of 100 ft. of straight (tangent) alignment perpendicular to the intersection.

Response: The project site does not include arterial or collector streets. The criterion does not apply.

b) The intersection of a local street with another street shall have a minimum of 50 ft. of straight (tangent) alignment perpendicular to the intersection.

c) Where right angle intersections are not possible, exceptions can be granted by the City Engineer provided that intersections not at right angles have a minimum corner radius of 20 ft. along the right-of-way lines of the acute angle.

d) Intersections with arterial streets shall have a minimum curb corner radius of 20 ft. All other intersections shall have a minimum curb corner radius of 10 ft.

Response: The project site does not intersect with existing arterial streets. The criteria do not apply.

6. Right-of-way and improvement widths shall be as specified by the Transportation System Plan. Exceptions to those specifications may be approved by the City Engineer to deal with specific unique physical constraints of the site.

Response: As shown on the Preliminary Plans, right-of-way and improvement widths for streets within Bailey Meadows are being designed in accordance with City standards. The criterion is met.

J. Private streets may be considered within a development site provided all the following conditions are met:

Response: This application includes public, local street infrastructure and thus the criteria for private streets do not apply and has been deleted for brevity.

17.84.50 STREET REQUIREMENTS

(...)

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

1. Arterial streets should generally be spaced in one-mile intervals.

2. Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.



Response: This application does not involve the completion of arterial street infrastructure. The TSP details Gunderson Road as a minor arterial street section along the southern property boundary. Due to circumstances outside of the Applicant's control, Gunderson Road cannot be extended within the UGB via the property to the east as depicted in the TSP.

17.84.60 PUBLIC FACILITY EXTENSIONS

- A. All development sites shall be provided with public water, sanitary sewer, broadband (fiber), and storm drainage.
- B. Where necessary to serve property as specified in "A" above, required public facility installations shall be constructed concurrent with development.
- C. Off-site public facility extensions necessary to fully serve a development site and adjacent properties shall be constructed concurrent with development.
- D. As necessary to provide for orderly development of adjacent properties, public facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).
- E. All public facility installations required with development shall conform to the City's facilities master plans.

Response: The Preliminary Plans include information detailing the nature of public facility extensions to each lot, and to the edge of properties adjacent to the subdivision, where applicable. Installations are planned to be completed concurrent with the approved phasing of the subdivision and conform to the City's facilities master plans. The criteria are met.

- F. Private on-site sanitary sewer and storm drainage facilities may be considered provided all the following conditions exist:
 - 1. Extension of a public facility through the site is not necessary for the future orderly development of adjacent properties;
 - 2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above);
 - 3. The facilities are designed and constructed in accordance with the Uniform Plumbing Code and other applicable codes, and permits and/or authorization to proceed with construction is issued prior to commencement of work.

Response: The application does not include private facilities as described above. The criterion does not apply.

17.84.70 PUBLIC IMPROVEMENT PROCEDURES

It is in the best interests of the community to ensure public improvements installed in conjunction with development are constructed in accordance with all applicable City policies, standards, procedures, and ordinances. Therefore, prior to commencement of installation of public water, sanitary sewer, storm drainage, broadband (fiber), street, bicycle, or pedestrian improvements for any development site, developers shall contact the City Engineer to receive information regarding adopted procedures governing plan submittal, plan



review and approval, permit requirements, inspection and testing requirements, progress of the work, and provision of easements, dedications, and as-built drawings for installation of public improvements. All work shall proceed in accordance with those adopted procedures, and all applicable City policies, standards, and ordinances.

Whenever any work is being done contrary to the provisions of this Code, the Director may order the work stopped by notice in writing served on the persons engaged in performing the work or causing the work to be performed. The work shall stop until authorized by the Director to proceed with the work or with corrective action to remedy substandard work already completed.

Response: Site work is planned to be completed in accordance with the public improvement procedures described above.

17.84.80 FRANCHISE UTILITY INSTALLATIONS

These standards are intended to supplement, not replace or supersede, requirements contained within individual franchise agreements the City has with providers of electrical power, telephone, cable television, and natural gas services (hereinafter referred to as "franchise utilities").

- A. Where a land division is proposed, the developer shall provide franchise utilities to the development site. Each lot created within a subdivision shall have an individual service available or financially guaranteed prior to approval of the final plat.
- B. Where necessary, in the judgment of the Director, to provide for orderly development of adjacent properties, franchise utilities shall be extended through the site to the edge of adjacent property(ies), whether or not the development involves a land division.
- C. The developer shall have the option of choosing whether or not to provide natural gas or cable television service to the development site, providing all of the following conditions exist:
 - 1. Extension of franchise utilities through the site is not necessary for the future orderly development of adjacent property(ies);
 - 2. The development site remains in one ownership and land division does not occur (with the exception of land divisions that may occur under the provisions of 17.84.50 F above); and
 - 3. The development is non-residential.
- D. Where a land division is not proposed, the site shall have franchise utilities required by this section provided in accordance with the provisions of 17.84.70 prior to occupancy of structures.
- E. All franchise utility distribution facilities installed to serve new development shall be placed underground except as provided below. The following facilities may be installed above-ground:
 - 1. Poles for street lights and traffic signals, pedestals for police and fire system communications and alarms, pad mounted transformers, pedestals, pedestal mounted terminal boxes and meter cabinets, concealed ducts, substations, or facilities used to carry voltage higher than 35,000 volts;



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2. Overhead utility distribution lines may be permitted upon approval of the City Engineer when unusual terrain, soil, or other conditions make underground installation impracticable. Location of such overhead utilities shall follow rear or side lot lines wherever feasible.

Response: The Preliminary Plans include information for franchise utility installations. The installation of franchise utilities will be in accordance with the provisions of this Section and arranged with franchise utility providers. The criteria are met.

- F. The developer shall be responsible for making necessary arrangements with franchise utility providers for provision of plans, timing of installation, and payment for services installed. Plans for franchise utility installations shall be submitted concurrent with plan submittal for public improvements to facilitate review by the City Engineer.

Response: The Preliminary Plans include information for franchise utility installations. The standard is met.

- G. The developer shall be responsible for installation of underground conduit for street lighting along all public streets improved in conjunction with the development in accordance with the following:
 1. The developer shall coordinate with the City Engineer to determine the location of future street light poles. The street light plan shall be designed to provide illumination meeting standards set by the City Engineer.
 2. The developer shall make arrangements with the serving electric utility for trenching prior to installation of underground conduit for street lighting.

Response: The installation of franchise utilities will be in accordance with the provisions of this Section and arranged with franchise utility providers. The criteria are met.

17.84.90 LAND FOR PUBLIC PURPOSES

- A. Easements for public sanitary sewer, water, storm drain, pedestrian and bicycle facilities shall be provided whenever these facilities are located outside a public right-of-way in accordance with the following:
 1. When located between adjacent lots, easements shall be provided on one side of a lot line.
 2. The minimum easement width for a single utility is 15 ft. The minimum easement width for two adjacent utilities is 20 ft. The easement width shall be centered on the utility to the greatest extent practicable. Wider easements may be required for unusually deep facilities.
- B. Public utility easements with a minimum width of 5 feet shall be provided adjacent to all street rights-of-way for franchise utility installations.

Response: The Preliminary Subdivision Plat in the Preliminary Plans depicts required dedications and easements. The criteria are met.



C. Where a development site is traversed by a drainageway or water course, a drainage way dedication shall be provided to the City.

Response: The project site does not include water course or drainageway, as reported in the FSH Analysis (Exhibit H). This criterion does not apply.

D. Where a development is traversed by, or adjacent to, a future trail linkage identified within the Transportation System Plan, dedications of suitable width to accommodate the trail linkage shall be provided. This width shall be determined by the City Engineer, considering the type of trail facility involved.

Response: The project site does not contain adjacent or future trails within the Transportation System Plan. This criterion does not apply.

E. Where existing rights-of-way and/or easements within or adjacent to development sites are nonexistent or of insufficient width, dedications may be required. The need for and widths of those dedications shall be determined by the City Engineer.

Response: As shown on the Preliminary Plans, right-of-way and improvement widths for streets within Bailey Meadows are being designed in accordance with City standards. Dedications related to existing right-of-way on SE Ponder Lane, east adjacent to the subdivision, are detailed for review by the City Engineer. The criterion is met.

F. Where easement or dedications are required in conjunction with land divisions, they shall be recorded on the plat. Where a development does not include a land division, easements and/or dedications shall be recorded on standard document forms provided by the City Engineer.

Response: The Preliminary Subdivision Plat in Exhibit A includes details of necessary easements and dedications to be recorded on the plat as required. The criteria are met.

G. If the City has an interest in acquiring any portion of a proposed subdivision or planned development site for a public purpose, other than for those purposes listed above, or if the City has been advised of such interest by a school district or other public agency, and there is a reasonable assurance that steps will be taken to acquire the land, the Planning Commission may require those portions of the land be reserved for public acquisition for a period not to exceed 1 year.

Response: Other than for necessary supporting public infrastructure, this application does not include land designated for a public purpose. The criteria do not apply.

H. Environmental assessments for all lands to be dedicated to the public or City may be required to be provided by the developer. An environmental assessment shall include information necessary for the City to evaluate potential liability for environmental hazards, contamination, or required waste cleanups related to the dedicated land. An environmental assessment shall be completed prior to the acceptance of dedicated lands in accordance with the following:



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1. The initial environmental assessment shall detail the history of ownership and general use of the land by past owners. Upon review of the information provided by the grantor, as well as any site investigation by the City, the Director will determine if the risks of potential contamination warrant further investigation. When further site investigation is warranted, a Level I Environmental Assessment shall be provided by the grantor.

Response: Other than for necessary supporting public infrastructure, this application does not include land designated for a public purpose. The criteria do not apply.

17.84.100 MAIL DELIVERY FACILITIES

- A. In establishing placement of mail delivery facilities, locations of sidewalks, bikeways, intersections, existing or future driveways, existing or future utilities, right-of-way and street width, and vehicle, bicycle and pedestrian movements shall be considered. The final location of these facilities shall meet the approval of the City Engineer and the Post Office. Where mail delivery facilities are being installed in conjunction with a land division, placement shall be indicated on the plat and meet the approval of the City Engineer and the Post Office prior to final plat approval.
- B. Where mail delivery facilities are proposed to be installed in areas with an existing or future curb-tight sidewalk, a sidewalk transition shall be provided that maintains the required design width of the sidewalk around the mail delivery facility. If the right-of-way width will not accommodate the sidewalk transition, a sidewalk easement shall be provided adjacent to the right-of-way.
- C. Mail delivery facilities and the associated sidewalk transition (if necessary) around these facilities shall conform with the City's standard construction specifications. Actual mailbox units shall conform with the Post Office standards for mail delivery facilities.
- D. Installation of mail delivery facilities is the obligation of the developer. These facilities shall be installed concurrently with the public improvements. Where development of a site does not require public improvements, mail delivery facilities shall be installed concurrently with private site improvements.

Response: In conjunction with the final construction plans, locations for mail delivery facilities will be coordinated and established with the U.S. Post Office.

CHAPTER 17.86 - PARKLAND & OPEN SPACE

Parkland Dedication: New residential subdivisions, planned developments, multi-family or manufactured home park developments shall be required to provide parkland to serve existing and future residents of those developments. Multi-family developments which provide some "congregate" services and/or facilities, such as group transportation, dining halls, emergency monitoring systems, etc., but which have individual dwelling units rather than sleeping quarters only, are considered to be multi-family developments for the purpose of parkland dedication. Licensed adult congregate living facilities, nursing homes, and all other similar facilities which provide their clients with individual beds and sleeping quarters, but in which all other care and services are communal and provided by facility employees, are specifically exempt from parkland dedication and system development fee requirements.



1. The required parkland shall be dedicated as a condition of approval for the following:
 - a. Tentative plat for a subdivision or partition;
2. Calculation of Required Dedication: The required parkland acreage to be dedicated is based on a calculation of the following formula rounded to the nearest 1/100 (0.00) of an acre:

Required parkland dedication (acres) = (proposed units) x (persons/unit) x 0.0043 (per person park land dedication factor)

 - a. Population Formula: The following table shall be used to determine the number of persons per unit to be used in calculating required parkland dedication:

| Type of Unit | Total Persons Per Unit |
|---------------------------|------------------------|
| Single-family residential | 3.0 |

Persons per unit, age distribution, and local conditions change with time. The specific formula for the dedication of land will, therefore, be subject to periodic review and amendment.

- b. Per Person Parkland Dedication Factor: The total parkland dedication requirement shall be 0.0043 of an acre per person based on the adopted standard of 4.3 acres of land per one thousand of ultimate population per the Parks Master Plan
 1. This standard represents the citywide land-to-population ratio for city parks, and may be adjusted periodically through amendments to the Parks Master Plan.

Response: The criteria above are satisfied by means of a fee in lieu of parkland dedication per the City standard 17.86.40. The remainder of Chapter 17 Section 86, which does not apply to the project, has been omitted for brevity.

17.86.40 CASH IN LIEU OF DEDICATION

At the city's discretion only, the city may accept payment of a fee in lieu of land dedication. The city may require payment in lieu of land when the park land to be dedicated is less than 3 acres. A payment in lieu of land dedication is separate from Park Systems Development Charges, and is not eligible for a credit of Park Systems Development Charges. The amount of the fee in lieu of land dedication (in dollars per acre) shall be set by City Council Resolution, and it shall be based on the typical market value of developed property (finished lots) in Sandy net of related development costs.

1. The following factors shall be used in the choice of whether to accept land or cash in lieu:

Response: This application is a "Needed Housing" application pursuant to ORS 197.303(1) and ORS 197.307(4), therefore, only objective standards and procedures apply to the application



review. The choice between dedication and payment is subjective, as is the procedure to make the recommendation on the choice.

- a. The topography, geology, access to, parcel size, and location of land in the development available for dedication;

Response: This criterion is subjective and cannot be applied to a “Needed Housing” application under ORS 197.307(4).

- b. Potential adverse/beneficial effects on environmentally sensitive areas;

Response: This application does not include any environmentally sensitive areas as reported in the FSH Analysis (Exhibit H). The criterion does not apply.

- c. Compatibility with the Parks Master Plan, Public Facilities element of the Comprehensive Plan, and the City of Sandy Capital Improvements Program in effect at the time of dedication;

Response: This application is a “Limited Land Use Decision” pursuant to ORS 197.195(1) and Plans may be approval criteria only if specific policies are incorporated into the City’s land use regulations. The City’s land use regulation’s approval criteria in SDC 17.100.60 do not incorporate the 1997 Parks Master Plan, nor the above Plans with the specificity required by ORS 197.195(1), so they are not mandatory approval criteria and do not apply to this application.

- d. Availability of previously acquired property; and
- e. The feasibility of dedication.

Response: The above criteria are subjective and cannot be applied to a “Needed Housing” application per ORS 197.307(4).

- 2. Cash in lieu of parkland dedication shall be paid prior to approval of the final plat or as specified below:
 - a. 50 percent of the payment shall be paid prior to final plat approval, and
 - b. The remaining 50 percent of the payment pro-rated equally among the lots, plus an administrative surcharge as determined by the City Council through a resolution, will constitute a lien against the property payable at the time of sale.

Response: Cash in lieu of parkland dedication will be paid as determined and recorded in the resolution. The table below provides a preliminary cost estimate calculation. The criteria can be met.

| CASH IN LIEU OF DEDICATION | |
|----------------------------|-----|
| Proposed Units | 100 |
| Persons Per Unit | 3 |

| | |
|--|-----------|
| Per Person Parkland Dedication Factor | 0.0043 |
| Required Parkland (Acres) | 1.29 |
| Cash in Lieu Cost Estimate | \$310,890 |

CHAPTER 17.90 - DESIGN STANDARDS

17.90.10 APPLICABILITY

The provisions of this chapter apply to all zones and uses as follows except as specified in Sections 17.90.10(B), (C), (D), (E), and (F) below:

- C. **Residential Dwelling Exception:** Single family dwellings, duplexes, manufactured dwellings on individual lots of record, and manufactured dwellings in parks are exempt from all requirements of this chapter except for Section 17.90.150.

Response:

This application involves a planned subdivision of lots suitable for future single-family detached dwellings. The Preliminary Dimensioned Subdivision Plan with Setbacks, included in Exhibit A, demonstrates that future homes can meet the minimum setback requirements of the Single-Family Residential zone. The residential design standards, which apply to the street-facing facades of all new single-family dwellings, will be assessed at time of future building permit submittal. The remainder of Section 17.90.150 has been omitted for brevity.

CHAPTER 17.92 - LANDSCAPING & SCREENING GENERAL STANDARDS - ALL ZONES

17.92.30 REQUIRED TREE PLANTINGS

Planting of trees is required for all parking lots with 4 or more parking spaces, public street frontages, and along private drives more than 150 feet long. Trees shall be planted outside the street right-of-way except where there is a designated planting strip or City adopted street tree plan.

The City maintains a list of appropriate trees for street tree and parking lot planting situations. Selection of species should be made from the city-approved list. Alternate selections may be approved by the Director following written request. The type of tree used shall determine frequency of trees in planting areas. Trees in parking areas shall be dispersed throughout the lot to provide a canopy for shade and visual relief.

| Area/Type of Planting | Canopy | Spacing |
|-----------------------|--------|------------------|
| Street Tree | Medium | 30 ft. on center |
| Street Tree | Large | 50 ft. on center |

Trees may not be planted:

- Within 5 ft. of permanent hard surface paving or walkways, unless specific species, special
- planting techniques and specifications approved by the Director are used.
- Unless approved otherwise by the City Engineer:
- Within 10 ft. of fire hydrants and utility poles



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- Within 20 ft. of street light standards
 - Within 5 ft. from an existing curb face
 - Within 10 ft. of a public sanitary sewer, storm drainage or water line
 - Where the Director determines the trees may be a hazard to the public interest or general welfare.
 - Trees shall be pruned to provide a minimum clearance of 8 ft. above sidewalks and 12 ft. above street and roadway surfaces.

Response: As shown on the Preliminary Street Tree and Stormwater Screening Planting Plan (included in Exhibit A), required street trees and planting strips are generally planned to be completed prior to occupancy of the adjoining lot. Street trees and planting strips that are located along the stormwater facility and at the site access are planned to be completed with the subdivision infrastructure as shown on the Preliminary Plans. Landscaping will be provided in accordance with the above criteria. Therefore, this standard is met.

17.92.40 IRRIGATION

Landscaping shall be irrigated, either with a manual or automatic system, to sustain viable plant life.

Response: This standard is understood. No additional response is necessary.

17.92.60 REVEGETATION IN UNLANDSCAPED OR NATURAL LANDSCAPED AREAS

- A. Areas where natural vegetation has been removed or damaged through grading or construction activity in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements shall be replanted.
- B. Plant material shall be watered at intervals sufficient to assure survival and growth.
- C. The use of native plant materials or plants acclimatized to the Pacific Northwest is encouraged to reduce irrigation and maintenance demands.

Response: This standard is understood. No additional response is necessary.

17.98.20 OFF-STREET PARKING REQUIREMENTS

- A. Off Street Parking Requirements. Off street parking shall conform to the following standards:
 1. All square footage measurements are gross square feet of total floor area.
 2. 18 lineal inches of bench shall be considered 1 seat.
 3. Except as otherwise specified, parking for employees shall be provided based on 1 space per 2 employees for the largest shift in addition to required parking specified in Sections A6-A9 below.

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4. Where less than 5 parking spaces are required, then only one bicycle space shall be required except as otherwise modified in Sections 5-9 below.
 5. In addition to requirements for residential off street parking, new dwellings shall meet the on-street parking requirements in Section 17.98.200.

6.

| Residential Uses | Number of Parking Spaces | Number of Bicycle Spaces |
|------------------------|--------------------------|--------------------------|
| Single Family Detached | 2 per dwelling | 0 |

Response: This application is for a residential subdivision suitable for single-family detached homes. As shown on the Preliminary Parking Plan in Exhibit A, future driveways provide for two off-street parking spaces per dwelling. Bicycle parking is not required or provided. As applicable, the criteria above are met.

17.98.200 RESIDENTIAL ON-STREET PARKING REQUIREMENTS

A. **Residential On-Street Parking Requirements.** Residential on-street parking shall conform to the following standards:

1. In addition to required off-street parking, all new residential planned developments, subdivisions and partitions shall provide one (1) on-street parking space within 200 feet of each dwelling except as provided in Section 17.98.200(A)(6) below.

Response: As shown on the Preliminary Parking Plan in Exhibit A, in addition to required off-street parking, the 100-lot subdivision is planned to provide 122 on-street parking spaces. The criterion is met.

2. The location of residential on-street parking shall be reviewed for compliance with this section through submittal of a Residential Parking Analysis Plan as required in Section 17.98.10(M).

Response: The Preliminary Plans (Exhibit A) include a Preliminary Parking Plan sheet. The submittal requirements are met.

3. Residential on-street parking shall not obstruct required clear vision areas and shall not violate any local or state laws.
4. Parallel residential on-street parking spaces shall be 22 feet minimum in length.
5. Residential on-street parking shall be measured along the curb from the outside edge of a driveway wing or curb cut. Parking spaces must be set back a minimum of 15 feet from an intersection and may not be located within 10 feet of a fire hydrant.

Response: As shown on the Preliminary Parking Plan in Exhibit A, on-street parking is planned to not obstruct clear vision areas. Parallel on-street parking spaces meet the minimum length and setback requirements as detailed above. The criteria are met.

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6. Portions of residential on-street parking required by this section may be provided in parking courts that are interspersed throughout a development when the following standards are met:
- a. No more than eight (8) parking spaces shall be provided in a parking court;
 - b. Parking spaces within a parking court shall be nine (9) feet wide and 18 feet in depth;
 - c. Notwithstanding Section 17.98.70, vehicles parked in a parking court are permitted to back onto the public right-of-way from the parking court;
 - d. A parking court shall be located within 200 feet of the dwellings requiring parking in accordance with the requirements of Section 17.98.10(M);
 - e. No more than two (2) parking courts shall be provided within a block, with only one (1) parking court provided along a block face;
 - f. A parking court shall be paved in compliance with the standards of this chapter and the latest adopted grading and drainage standards; 17.98 - 13 Revised by Ordinance No. 2013-04 (effective 07/03/13)
 - g. If a parking court is adjacent to a public right-of-way, it shall be publicly owned and maintained;
 - h. If a parking court is adjacent to a private drive, it shall be privately owned and maintained. For each parking court there shall be a legal recorded document which includes:
 - i. A legal description of the parking court;
 - ii. Ownership of the parking court;
 - iii. Use rights; and
 - iv. A maintenance agreement and the allocation and/or method of determining liability for maintenance of the parking court;
 - i. A parking court shall be used solely for the parking of operable passenger vehicles.

Response: This application does not include parking courts. The criteria listed above are not applicable.

CHAPTER 17.100 - LAND DIVISION

17.100.20 LAND DIVISION CLASSIFICATION - TYPE I, II OR III PROCEDURES

- E. Type III Land Division (Major Partition or Subdivision). A major partition or subdivision shall be a Type III procedure if unsatisfactory street conditions exist or the resulting parcels/lots do not comply with the standards of the zoning district and this chapter. The Director shall determine if unsatisfactory street conditions exist based on one of the following criteria:



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1. The land division does not link streets that are stubbed to the boundaries of the property.

Response: This application links to and includes the continuation of the existing Melissa Avenue right-of-way street stub, north of the project site as shown on the Preliminary Plans in Exhibit A. Therefore, this criterion does not apply, and future street conditions will be satisfactory.

2. An existing street or a new proposed street will be extended beyond the boundaries of the land division to complete a street system or provide access to adjacent property.

Response: As shown on the Preliminary Plans, planned streets are not extended beyond the boundaries of the subdivision. Therefore, this criterion does not apply, and future street conditions will be satisfactory.

3. The proposed street layout is inconsistent with a street pattern adopted as part of the Comprehensive Plan or officially adopted City street plan.

Response: The Preliminary Plans include information illustrating how the infrastructure is planned to be consistent with City standards. Therefore, the criterion will be met, and future street conditions will be satisfactory.

17.100.60 SUBDIVISIONS

Approval of a subdivision is required for a land division of 4 or more parcels in a calendar year.

A two-step procedure is required for subdivision approval: (1) tentative plat review and approval; and (2) final plat review and approval.

A. **Preapplication Conference.** The applicant for a subdivision shall participate in a preapplication conference with city staff to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services. The preapplication conference provides the opportunity to discuss the conceptual development of the property in advance of formal submission of the tentative plan in order to save the applicant unnecessary delay and cost.

Response: A pre-application conference was held on November 20, 2018.

B. **Application Requirements for a Tentative Plat.** Subdivision applications shall be made on forms provided by the planning department and shall be accompanied by:

1. 20 copies of the tentative plat;
2. Required fee and technical service deposit;
3. 20 copies of all other supplementary material as may be required to indicate the general program and objectives of the subdivision;
4. Preliminary title search;
5. List of affected property owners.



Response: Exhibit B contains the documents listed above. These submittal requirements are met.

- B. **Format.** The Tentative Plat shall be drawn on a sheet 18 x 24 inches in size and at a scale of one inch equals one hundred feet unless an alternative format is approved by the Director at the preapplication conference. The application shall include one copy of a scaled drawing of the proposed subdivision, on a sheet 8 1/2 x 11, suitable for reproduction.

Response: Exhibit A contains the Preliminary Subdivision Plat. This submittal requirement is met.

D. **Data Requirements for Tentative Plat.**

1. Scale of drawing, north arrow, and date.
2. Location of the subdivision by section, township and range, and a legal description sufficient to define the location and boundaries of the proposed tract.
3. A vicinity map, showing adjacent property boundaries and how proposed streets may be extended to connect to existing streets.
4. Names, addresses, and telephone numbers of the owner(s) of the property, the engineer or surveyor, and the date of the survey.
5. Streets: location, names, paved widths, alleys, and right-of-way (existing and proposed) on and within 400 feet of the boundaries of the subdivision tract.
6. Easements: location, widths, purpose of all easements (existing and proposed) on or serving the tract.
7. Utilities: location of storm drainage, sanitary sewers and water lines (existing and proposed) on and abutting the tract. If utilities are not on or abutting the tract, indicate the direction and distance to the nearest locations.
8. Ground elevations shown by contour lines at two-foot vertical intervals for ground slopes of less than 10 percent and at ten-foot vertical intervals for ground slopes exceeding 10 percent. Ground elevation shall be related to an established benchmark or other datum approved by the Director.
9. Natural features such as marshes, rock outcroppings, watercourses on and abutting the property, location of wooded areas.
10. Approximate location of areas subject to periodic inundation or storm sewer overflow, location of any floodplain or flood hazard district.
11. Location, width, and direction of flow of all water courses.
12. Identification of the top of bank and boundary of mandatory setback for any stream or water course.
13. Identification of any associated wetland and boundary of mandatory setback.



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14. Identification of any wetland and boundary of mandatory setback.
 15. Location of at least one temporary bench mark within the tract boundaries.
 16. Existing uses of the property, including location and present use of all existing structures to remain on the property after platting.
 17. Lots and Blocks: approximate dimensions of all lots, minimum lot sizes, and proposed lot and block numbers.
 18. Existing zoning and proposed land use.
 19. Designation of land intended to be dedicated or reserved for public use, with the purpose, conditions, or limitations of such reservations clearly indicated.
 20. Proposed development phases, if applicable.
 21. Any other information determined necessary by the Director at the preapplication conference, such as a soil report or other engineering study, traffic analysis, floodplain or wetland delineation, etc.

Response: The Preliminary Plans and other documentation include the information listed above, as applicable. Therefore, these submittal requirements are met.

E. **Approval Criteria.** The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.12 and the following approval criteria:

1. The proposed subdivision is consistent with the density, setback and dimensional standards of the base zoning district, unless modified by a Planned Development approval.

Response: As shown on the Preliminary Subdivision Plat in Exhibit A and findings provided in the written document, the planned subdivision is consistent with the density, setback, and dimensional standards of the SFR zoning district. The project is not modified by Planned Development standards of approval. The criterion is met.

3. The proposed subdivision is consistent with the design standards set forth in this chapter.

Response: This subdivision application is consistent with the design standards set forth in SD 17.100.70 and in conformance with the applicable SFR zoning district. Therefore, the criterion is met.

4. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy.

Response: As shown on the Preliminary Plans, the intended local street pattern internal to the subdivision is connected and consistent with the Comprehensive Plan. Access from the existing street stub, Melissa Avenue, provides a continuous network through and to the boundaries of the subdivision. Additionally, this standard may not be applied under ORS

197.307(4) because the phrase “connected and consistent” is subjective. Additionally, this standard may not be applied under ORS 197.307(4) because the phrase “City standards” is subjective. Additionally, this standard may not be applied under ORS 197.307(4) because the words “objective” and “necessary” are subjective.

5. Adequate public facilities are available or can be provided to serve the proposed subdivision.

Response: As shown in the Preliminary Plans, public facilities as available will be provided to serve the subdivision, including but not limited to stormwater management, sanitary sewer, municipal water, and franchise utilities. Infrastructure is planned to be completed concurrent with the build out of the associated phase. The criterion is met.

6. All proposed improvements meet City standards.

Response: Sandy Development Code requirements have been reviewed with the intent that all planned improvements meet applicable City standards.

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

Response: As shown on the Preliminary Subdivision Plat in the Preliminary Plans, the subdivision is planned to be completed in three phases and provide necessary public improvements concurrently with each phase. The above requirements are satisfied and support the City’s approval of this Subdivision.

- F. Conditions. The Director or Planning Commission may require dedication of land and easements and may specify such conditions or modifications of the tentative plat as deemed necessary.

Response: It is understood the Preliminary Subdivision Plat may have conditions or modifications required as necessary. The Applicant reserves the right to object to the application of standards or conditions other than those that are clear and objective and does not waive its right to assert that the needed housing statutes apply to this application.

- G. Improvements. A detailed list of required improvements for the subdivisions shall be set forth in the approval and conditions for the tentative plat.

Response: This criterion is understood. No additional response is necessary.

- H. Tentative Plat Expiration Date. The final plat shall be delivered to the Director for approval within one year following approval of the tentative plat, and shall incorporate any modification or condition required by approval of the tentative plat. The Director may, upon written request of the subdivider, grant an extension of the tentative plat approval for up to one additional year.

Response: This criterion is understood. No additional response is necessary.

17.100.70 LAND DIVISION DESIGN STANDARDS



All land divisions shall be in conformance with the requirements of the applicable base zoning district and this chapter, as well as with other applicable provisions of this Code. Modifications to these requirements may be accomplished through a Planned Development. The design standards in this section shall be used in conjunction with street design standards included in the City of Sandy Transportation System Plan and standards and construction specifications for public improvements as set forth in adopted Public Facilities Plans and the Sandy Municipal Code.

Response: This application contains the Preliminary Plans, reports, analysis, calculations, and applicable narrative information to validate conformance with the requirements of the Sandy Development Code. The land division design standards of City Code are satisfied.

17.100.80 CHARACTER OF THE LAND

Land which the Director or the Planning Commission finds to be unsuitable for development due to flooding, improper drainage, steep slopes, rock formations, adverse earth formations or topography, utility easements, or other features which will reasonably be harmful to the safety, health, and general welfare of the present or future inhabitants of the partition or subdivision and the surrounding areas, shall not be developed unless adequate methods are formulated by the subdivider and approved by the Director or the Planning Commission to solve the problems created by the unsuitable land conditions.

Response: As detailed in the Flood and Slope Hazard Analysis (Exhibit H) the project site does not exhibit or contain unsuitable land conditions. This criterion does not apply.

17.100.90 ACCESS CONTROL GUIDELINES AND COORDINATION

- A. Notice and coordination with ODOT required. The city will coordinate and notify ODOT regarding all proposals for new or modified public and private accesses on to Highways 26 and 211.
- B. It is the city policy to, over time, reduce noncompliance with the Oregon Highway Plan Access Management Policy guidelines.
- C. Reduction of compliance with the cited State standards means that all reasonable alternatives to reduce the number of accesses and avoid new non-complying accesses will be explored during the development review. The methods to be explored include, but are not limited to: closure, relocation, and consolidation of access; right-in/right-out driveways; crossover easements; and use of local streets, alleys, and frontage roads.

Response: The above criterion applies to City processes for noticing and coordinating with ODOT, as applicable. This standard is not applicable as the project does not access Highway 26 or 211 and does not require direct action of the Applicant. The criteria do not apply.

17.100.100 STREETS GENERALLY

No subdivision or partition shall be approved unless the development has frontage or approved access to an existing public street. In addition, all streets shall be graded and improved in conformance with the City's construction standards, approved by the City Engineer, in accordance with the construction plans.



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- A. **Street Connectivity Principle.** The pattern of streets established through land divisions should be connected to: (a) provide safe and convenient options for cars, bikes and pedestrians; (b) create a logical, recognizable pattern of circulation; and (c) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

Response: The Preliminary Plans illustrate the street network internal to the subdivision and establish safe, logical circulation throughout the site. The Street Connectivity Principle is met.

- B. **Transportation Impact Studies.** Transportation impact studies may be required by the city engineer to assist the city to evaluate the impact of development proposals, determine reasonable and prudent transportation facility improvements and justify modifications to the design standards. Such studies will be prepared in accordance with the following:

1. A proposal established with the scope of the transportation impact study shall be coordinated with, and agreed to, by the city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. A professional civil or traffic engineer registered in the State of Oregon shall prepare such studies.
2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

Response: The Traffic Impact Analysis prepared by a registered professional traffic engineer (Exhibit F) is included in the application materials. The scope of the analysis was confirmed with the City's traffic engineer consultant. The requirements are met.

- C. **Topography and Arrangement.** All streets shall be properly related to special traffic generators such as industries, business districts, schools, and shopping centers and to the pattern of existing and proposed land uses.

- D. **Street Spacing.** Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.

Response: The Preliminary Plans (Exhibit A) include information which meets the criteria above. The streets are arranged in accordance with existing residential activity and a rectangular grid pattern is generally used. The criteria are met.

- E. **Future Street Plan.** Future street plans are conceptual plans, street extensions and connections on acreage adjacent to land divisions. They assure access for future development and promote a logical, connected pattern of streets. It is in the interest of the city to promote a logical, connected pattern of streets. All applications for land divisions shall provide a future street plan that shows the pattern of existing and proposed future streets within the boundaries of the proposed land divisions, proposed connections to abutting

properties, and extension of streets to adjacent parcels within a 400 foot radius of the study area where development may practically occur.

Response: The Preliminary Plans (Exhibit A) include a Conceptual Future Street Plan which meets the criteria above.

- F. Connections. Except as permitted under Exemptions, all streets, alleys and pedestrian walkways shall connect to other streets within the development and to existing and planned streets outside the development and to undeveloped properties which have no future street plan. Streets shall terminate at other streets or at parks, schools or other public land within a neighborhood.

Where practicable, local roads shall align and connect with other roads when crossing collectors and arterials.

Proposed streets or street extensions shall be located to provide direct access to existing or planned transit stops, and existing or planned neighborhood activity centers, such as schools, shopping areas and parks.

Response: The Preliminary Plans show local street and pedestrian walkway (sidewalk) connections internal to the subdivision. The local streets do not cross any collector or arterial roads and there are no exemptions necessary for the intended street network.

G. Exemptions.

1. A future street plan is not required for partitions of residentially zoned land when none of the parcels may be redivided under existing minimum density standards.
2. Standards for street connections do not apply to freeways and other highways with full access control.
3. When street connection standards are inconsistent with an adopted street spacing standard for arterials or collectors, a right turn in/right turn out only design including median control may be approved. Where compliance with the standards would result in unacceptable sight distances, an accessway may be approved in place of a street connection.

Response: This application does not seek street design exemptions. The criteria do not apply.

17.100.110 STREET STANDARDS AND CLASSIFICATION

Street standards are illustrated in the figures included at the end of this chapter. Functional definitions of each street type are described in the Transportation System Plan as summarized below.

- A. Major arterials are designed to carry high volumes of through traffic, mixed with some unavoidable local traffic, through or around the city. Major arterials should generally be spaced at 1-mile intervals.
- B. Minor arterials are designed to collect and distribute traffic from major and minor arterials to neighborhood collectors and local streets, or directly to traffic destinations. Minor arterials should generally be spaced at 1-mile intervals.



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- C. Residential minor arterials are a hybrid between minor arterial and collector type streets that allow for moderate to high traffic volumes on streets where over 90% of the fronting lots are residential.
 - D. Collector streets are designed to collect and distribute traffic from higher type arterial streets to local streets or directly to traffic destinations. Collector streets should generally be spaced at 1/2-mile intervals.

Response: The project site does not include major or minor arterials, residential minor arterials, or collector streets. These standards do not apply.

- E. Local streets are designed to provide direct access to abutting property and connect to collector streets. A general spacing of 8-10 local streets per mile is recommended.

Response: The subdivision is accessed via Melissa Avenue, a local street section to the north of the property boundary, and a continuous network of local streets allow transportation throughout the site.

- F. Cul-de-sacs and dead end streets are discouraged. If deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length.
- G. Public access lanes are designed to provide primary access to a limited number of dwellings when the construction of a local street is unnecessary.
- H. Alleys are designed to provide access to multiple dwellings in areas where lot frontages are narrow and driveway spacing requirements cannot be met.

Response: The project site does not include cul-de-sacs, public access lanes, or alleys. These standards do not apply.

17.100.120 BLOCKS AND ACCESSWAYS

- A. Blocks. Blocks shall have sufficient width to provide for two tiers of lots at appropriate depths. However, exceptions to the block width shall be allowed for blocks that are adjacent to arterial streets or natural features.
- B. Residential Blocks. Blocks fronting local streets shall not exceed 400 feet in length, unless topographic, natural resource, or other similar physical conditions justify longer blocks. Blocks may exceed 400 feet if approved as part of a Planned Development, Specific Area Plan, adjustment or variance.

Response: As shown on the Preliminary Plans, the residential blocks provide two tiers of lots. Blocks front local streets and do not exceed 400 feet in length, except for one instance. The block for Street A along the north property line boundary west of Melissa Avenue is ±475 feet. This block length cannot be reduced due to the existing adjacent residential block length to the north. There is a pedestrian path planned in this northwestern portion of the site to enhance mobility in this area. The standards are met.

- C. Commercial Blocks. Blocks located in commercial districts shall not exceed 400 feet in length.



Response: This application does not involve commercial districts; the criteria does not apply.

- D. **Pedestrian and Bicycle Access Way Requirements.** In any block in a residential or commercial district over 600 feet in length, a pedestrian and bicycle accessway with a minimum improved surface of 10 feet within a 15-foot right-of-way or tract shall be provided through the middle of the block. To enhance public convenience and mobility, such accessways may be required to connect to cul-de-sacs, or between streets and other public or semipublic lands or through greenway systems.

Response: As shown on the Preliminary Plans, this application does not include any blocks greater than 600 feet in length. The standard does not apply.

17.100.130 EASEMENTS

A minimum eight (8) foot public utility easement shall be required along property lines abutting a right-of-way for all lots within a partition or subdivision. Where a partition or subdivision is traversed by a watercourse, drainage way, channel or stream, the land division shall provide a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse, and such further width as determined needed for water quality and quantity protection.

Response: As shown on the Preliminary Subdivision Plat, easements and dedications required along property lines abutting a right-of-way will be provided as required. The criterion is met.

17.100.140 PUBLIC ALLEYS

- A. Public alleys shall have a minimum width of 20 feet. Structural section and surfacing shall conform to standards set by the City Engineer.
- B. Existing alleys may remain unimproved until redevelopment occurs. When development occurs, each abutting lot shall be responsible for completion of improvements to that portion of the alley abutting the property.
- C. Parking within the alley right-of-way is prohibited except as provided in Section 17.100.140(D) below.
- D. An alley with a minimum width of 28 feet may permit parallel parking on one side of the alley only.

Response: The application does not include public alleys. The criteria do not apply.

17.100.180 INTERSECTIONS

- A. **Intersections.** Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two new streets at an angle of less than 75 degrees shall not be acceptable. No more than two streets shall intersect at any one point unless specifically approved by the City Engineer. The city engineer may require left turn lanes, signals, special crosswalks, curb extensions and other intersection design elements justified by a traffic study or necessary to comply with the Development Code.
- B. **Curve Radius.** All local and neighborhood collector streets shall have a minimum curve radius (at intersections of rights-of-way) of 20 feet,



unless otherwise approved by the City Engineer. When a local or neighborhood collector enters on to a collector or arterial street, the curve radius shall be a minimum of 30 feet, unless otherwise approved by the City Engineer

Response: The Preliminary Plans include information illustrating how the local street system internal to the subdivision meets the design requirements. No more than two streets intersect at any one point and internal streets meet the minimum curve radius at intersections of rights-of-way, as applicable. The criteria are met.

17.100.190 STREET SIGNS

The subdivider shall pay the cost of street signs prior to the issuance of a Certificate of Substantial Completion. The City shall install all street signs and upon completion will bill the developer for costs associated with installation. In addition, the subdivider may be required to pay for any traffic safety devices related to the development. The City Engineer shall specify the type and location of the street signs and/or traffic safety devices.

Response: This statement is understood. No additional response is necessary.

17.100.200 STREET SURFACING

Public streets, including alleys, within the development shall be improved in accordance with the requirements of the City or the standards of the Oregon State Highway Department. An overlay of asphalt concrete, or material approved by the City Engineer, shall be placed on all streets within the development. Where required, speed humps shall be constructed in conformance with the City's standards and specifications.

Response: The statement is understood. No additional response is necessary.

17.100.210 STREET LIGHTING

A complete lighting system (including, but not limited to: conduits, wiring, bases, poles, arms, and fixtures) shall be the financial responsibility of the subdivider on all cul-de-sacs, local streets, and neighborhood collector streets. The subdivider will be responsible for providing the arterial street lighting system in those cases where the subdivider is required to improve an arterial street. Standards and specifications for street lighting shall be coordinated with the utility and any lighting district, as appropriate.

Response: Conceptual locations for street lighting are indicated in the Preliminary Plans. PGE will be contacted, and final lighting design elements will be confirmed during the final design process, as appropriate. The criterion is met.

17.100.220 LOT DESIGN

A. The lot arrangement shall be such that there will be no foreseeable difficulties, for reason of topography or other conditions, in securing building permits to build on all lots in compliance with the Development Code.

Response: The Preliminary Subdivision Plat with Setbacks, included in Exhibit A, demonstrates that all lots in the subdivision can accommodate future homes which meet the minimum setback requirements at the time of future building permit submittal. As shown, each lot meets the 7,500 square-foot minimum lot size requirement. The criteria are met.



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- B. The lot dimensions shall comply with the minimum standards of the Development Code. When lots are more than double the minimum lot size required for the zoning district, the subdivider may be required to arrange such lots to allow further subdivision and the opening of future streets to serve such potential lots.

Response: As shown on the Preliminary Plans, lot dimensions comply with the minimum dimensions and standards of the Development Code. Lots are not larger than twice the minimum lot size. The criterion is met.

- C. The lot or parcel width at the front building line shall meet the requirements of the Development Code and shall abut a public street other than an alley for a width of at least 20 feet. A street frontage of not less than 15 feet is acceptable in the case of a flag lot division resulting from the division of an unusually deep land parcel which is of a size to warrant division into not more than two parcels.

Response: As shown on the Preliminary Plans, each lot complies with the minimum dimensions and standards of the Development Code and have proper frontage on a public street. The criterion is met.

- D. Double frontage lots shall be avoided except where necessary to provide separation of residential developments from arterial streets or to overcome specific disadvantages of topography or orientation.

Response: As shown on the Preliminary Plans, the subdivision does not include double-frontage lots. The criteria do not apply.

- E. Lots shall avoid deriving access from major or minor arterials. When driveway access from major or minor arterials may be necessary for several adjoining lots, the Director or the Planning Commission may require that such lots be served by a common access drive in order to limit possible traffic hazards on such streets. Where possible, driveways should be designed and arranged to avoid requiring vehicles to back into traffic on minor or major arterials.

Response: As shown on the Preliminary Plans, the lot arrangement demonstrates compliance with the requirements of the Development Code. The project site does not contain or connect to major or minor arterial streets. The above criterion is met.

17.100.230 WATER FACILITIES

Water lines and fire hydrants serving the subdivision or partition, and connecting the development to City mains, shall be installed to provide adequate water pressure to serve present and future consumer demand. The materials, sizes, and locations of water mains, valves, service laterals, meter boxes and other required appurtenances shall be in accordance with the standards of the Fire District, the City, and the State.

If the city requires the subdivider to install water lines in excess of eight inches, the city may participate in the oversizing costs. Any oversizing agreements shall be approved by the city manager based upon council policy and dependent on budget constraints. If required water mains will directly serve property outside the subdivision, the city may enter into an agreement



with the subdivider setting forth methods for reimbursement for the proportionate share of the cost.

Response: As shown on the Preliminary Plans, water infrastructure including conveyance mains, lines, and fire hydrants are designed in accordance with applicable standards. This criterion is met.

17.100.240 SANITARY SEWERS

Sanitary sewers shall be installed to serve the subdivision and to connect the subdivision to existing mains. Design of sanitary sewers shall take into account the capacity and grade to allow for desirable extension beyond the subdivision.

If required sewer facilities will directly serve property outside the subdivision, the city may enter into an agreement with the subdivider setting forth methods for reimbursement by nonparticipating landowners for the proportionate share of the cost of construction.

Response: The Preliminary Plans include information illustrating how the project is planned to be serviced with sanitary sewer. This infrastructure is planned in accordance with the standards of the applicable jurisdictions; therefore, the criterion is met.

17.100.250 SURFACE DRAINAGE AND STORM SEWER SYSTEM

A. Drainage facilities shall be provided within the subdivision and to connect with off-site drainage ways or storm sewers. Capacity, grade and materials shall be by a design approved by the city engineer. Design of drainage within the subdivision shall take into account the location, capacity and grade necessary to maintain unrestricted flow from areas draining through the subdivision and to allow extension of the system to serve such areas.

B. In addition to normal drainage design and construction, provisions shall be taken to handle any drainage from preexisting subsurface drain tile. It shall be the design engineer's duty to investigate the location of drain tile and its relation to public improvements and building construction.

C. The roof and site drainage from each lot shall be discharged to either curb face outlets (if minor quantity), to a public storm drain or to a natural acceptable drainage way if adjacent to the lot.

Response: The Preliminary Plans (Exhibit A) and Preliminary Stormwater Report (Exhibit G) include information illustrating how stormwater runoff is planned to be managed. The criteria are met.

17.100.260 UNDERGROUND UTILITIES

All subdivisions or major partitions shall be required to install underground utilities (including, but not limited to, electrical and telephone wiring). The utilities shall be installed pursuant to the requirements of the utility company.

Response: The Preliminary Plans include information illustrating how the project is planned to be provided with underground utilities. This infrastructure is planned in accordance with the standards of the applicable jurisdictions; therefore, the criterion is met.

17.100.270 SIDEWALKS



Sidewalks shall be installed on both sides of a public street and in any special pedestrian way within the subdivision.

Response: The Preliminary Plans show compliance with the local street typical sections in City Code. The standard is met.

17.100.280 BICYCLE ROUTES

If appropriate to the extension of a system of bicycle routes, existing or planned, the Director or the Planning Commission may require the installation of bicycle lanes within streets. Separate bicycle access ways may be required to reduce walking or cycling distance when no feasible street connection is available.

Response: The project site does not include any existing or planned bicycle routes. The criterion does not apply.

17.100.290 STREET TREES

Where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved by the Director. The street tree plan shall provide street trees approximately every 30' on center for all lots.

Response: As shown in the Preliminary Plans in Exhibit A, the appropriate number of trees are provided on the Street Tree Plan. The criterion is satisfied.

17.100.300 EROSION CONTROL

Grass seed planting shall take place prior to September 30th on all lots upon which a dwelling has not been started but the ground cover has been disturbed. The seeds shall be of an annual rye grass variety and shall be sown at not less than four pounds to each 1000 square feet of land area.

Response: The requirement is understood. No additional response is necessary.

17.100.310 REQUIRED IMPROVEMENTS

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

- A. Drainage facilities
- B. Lot, street and perimeter monumentation
- C. Mailbox delivery units
- D. Sanitary sewers
- E. Sidewalks
- F. Street lights
- G. Street name signs
- H. Street trees
- I. Streets
- J. Traffic signs



-
- K. Underground communication lines, including broadband (fiber), telephone, and cable. Franchise agreements will dictate whether telephone and cable lines are required.
 - L. Underground power lines
 - M. Water distribution lines and fire hydrants

Response: The above listed improvements are planned to be included in the project design as required. The criteria are met.

CHAPTER 17.102 - URBAN FORESTRY

17.102.20 APPLICABILITY

This chapter applies only to properties within the Sandy Urban Growth Boundary that are greater than one acre including contiguous parcels under the same ownership.

- A. **General:** No person shall cut, harvest, or remove trees 11 inches DBH or greater without first obtaining a permit and demonstrating compliance with this chapter.
 - 1. As a condition of permit issuance, the applicant shall agree to implement required provisions of this chapter and to allow all inspections to be conducted.
 - 2. Tree removal is subject to the provisions of Chapter 15.44, Erosion Control, Chapter 17.56, Hillside Development, and Chapter 17.60 Flood and Slope Hazard.

Response: As detailed in the Preliminary Plans, the application includes tree removal subject to the exception criteria below. Thus, the application is demonstrating compliance with this chapter. Tree removal is planned to comply with erosion control provisions of Chapter 15.44. As documented in the FSH Analysis (Exhibit H), the provisions of Chapters 17.56 and 17.60 are not relevant to the site and do not apply. The applicable criteria are understood.

- B. **Exceptions:** The following tree removals are exempt from the requirements of this chapter.
 - 1. Tree removal as required by the city or public utility for the installation or maintenance or repair of roads, utilities, or other structures.

Response: As detailed in the Preliminary Plans, the application includes tree removal for the installation of roads and utilities, including four off-site trees located in the existing public right-of-way for Melissa Avenue. Such tree removal is exempt from the requirements of this chapter as stated above. As shown on the Preliminary Plans, a tree in the existing public right-of-way could potentially be retained upon acceptance of fee-in-lieu for improvements to east SE Ponder Lane.

- 2. Tree removal to prevent an imminent threat to public health or safety, or prevent imminent threat to public or private property, or prevent an imminent threat of serious environmental degradation. In these circumstances, a Type I tree removal permit shall be applied for within seven days following the date of tree removal.

Response: The application does not involve tree removal subject to the exception criteria above.

IV. Conclusion

The required findings have been made and this written narrative and accompanying documentation demonstrate that the application is consistent with the applicable provisions of the City of Sandy Development Code. The evidence in the record is substantial and supports approval of the application.

SE Ponder Lane/Future SE Gunderson Road Extension



- 1. Existing Intersection Location
- 2. TSP-Identified Alignment

1. Existing Intersection Location



- Intersection not usable for new development given available width, very flat skew angle of approach, and topography.
- Rebuilding a new street and intersection in this location would involve properties that are not under control of the applicant or the City of Sandy

2. TSP-Identified Alignment



Looking North



Looking South



- Sight distance limited by horizontal and vertical curves in both directions. Sight distance is particularly poor for the future south leg, which would connect to Cascadia Village Drive.
- Superelevation (banking of the roadway around the curve) is very steep and makes this location problematic for an intersection due to difficult turning and crossing movements across the steep curve.

November 25, 2019

Michael C. Robinson
Admitted in Oregon
T: 503-796-3756
C: 503-407-2578
mrobinson@schwabe.com

Mr. Kelly O'Neill, Director
City of Sandy Planning & Building Department
Sandy City Hall
39250 Pioneer Boulevard
Sandy, OR 97055

RE: City of Sandy File No. 19-203 SUB/VAR/TREE; Application by Allied Homes and Development, LLC for Approval of Bailey Meadows Tentative Subdivision Plan Application

Dear Mr. O'Neill:

This office represents the Applicant. I am sending this letter following my discussion with City Attorney David Doughman on Friday, November 22, 2019.

The purpose of this letter is to confirm the Applicant's intention, if the Sandy Planning Commission, or the Sandy City Council on appeal, approves the Bailey Meadows Tentative Subdivision Plan Application with the condition of approval discussed below, to apply for an amendment to the City of Sandy Urban Growth Boundary (the "UGB") in order to extend Gunderson Road, an Arterial Street shown on the City's Transportation System Plan (the "TSP"), from the termination of Melissa Avenue on the proposed Tentative Subdivision Plan to Oregon Highway 211 in order to provide a second way in and out of the Bailey Meadows Subdivision. While the Applicant's offer is contingent on several occurrences, this letter is intended to demonstrate the Applicant's intention to carry out this plan should the contingencies be fulfilled.

The purpose of these efforts by the City and the Applicant is to provide a second way in and out of the Bailey Meadows Subdivision. While the Applicant's opinion is that a second way in and out is not legally required for approval of the Bailey Meadows Tentative Subdivision Plan Application, the Applicant also recognizes that providing a second way in and out of the Subdivision is a benefit to the public and the community to the north of the proposed subdivision. Further, the Applicant appreciates the City's willingness to attempt to resolve the disagreement over the second way in and out of the Subdivision by cooperatively working with the Applicant on the Gunderson Road extension.

1. **Exhibit 1** is a drawing showing the possible extension of Gunderson Road from the terminus of Melissa Avenue to Oregon Highway 211. **Exhibit 2** is the City's TSP map showing Gunderson Road. In the event the Applicant is able to extend Gunderson Road as explained below, the City will eventually extend Gunderson Road from its connection with the Bailey Meadows Subdivision west as shown on the TSP.

Mr. Kelly O'Neill, Director
November 25, 2019
Page 2

The TSP shows Gunderson Road connecting to Oregon Highway 211. However, the Applicant's traffic engineer Todd Mobley of Lancaster Engineering has prepared a memorandum explaining why the location of the connection between Gunderson Road and Oregon Highway 211 as shown on the TSP is not feasible. This is not only Mr. Mobley's conclusion but also the conclusion of the Oregon Department of Transportation ("ODOT") Region 1.

2. The Applicant and the City Attorney will jointly draft a proposed condition of approval to be adopted with the approval of the Bailey Meadows Tentative Subdivision Plan Application providing that the approval is subject to approval of the UGB expansion under certain circumstances allowing the Applicant to construct the Gunderson Road extension. As you know, the Gunderson Road extension is outside of the UGB and requires a UGB amendment for the extension.

3. The Applicant has previously examined whether an exception to Statewide Planning Goals (the "Goals") 3, 12 and 14 to allow the Gunderson Road extension is feasible. It concluded that it is not for several reasons, most importantly, that a Goal exception begins with an application with Clackamas County ("County") rather than the City. However, in consultation with the City Attorney and City staff, the Applicant believes that it is feasible to have approved a UGB expansion because it begins with the City's approval even though the Joint Management Agreement (the "UGMA") requires the Board of County Commissioners to approve the City's UGB approval. Based on my discussions with the City Attorney, we believe that this is feasible.

4. The City and the Applicant have met with ODOT, the Oregon Department of Land Conservation and Development ("DLCD") and Clackamas County. DLCD is not opposed to the UGB expansion application and believes that it is feasible to be achieved, subject to demonstration of compliance with the applicable approval criteria. ODOT had no substantive comments on the UGB expansion but reminded the City and the Applicant of the necessity to obtain ODOT approval for the Gunderson Road connection with Oregon Highway 211. This is why the Applicant believes that the Gunderson Road extension is possible only in the event the City takes jurisdiction of Oregon Highway 211. Finally, the County noted several procedural issues that need to be addressed but did not indicate that the UGB expansion was infeasible.

I hope this information is helpful to you in demonstrating the Applicant's good faith intent to proceed with the UGB expansion assuming that the conditions precedent can be satisfied. As you know, the City and the Applicant have expended considerable time and effort to come this far.

Thank you again for your efforts to work with the Applicant on this matter. Please place this letter in the official Planning Department file for this Application and before the Sandy Planning Commission at the initial evidentiary hearing on December 17, 2019.

schwabe.com

Mr. Kelly O'Neill, Director
November 25, 2019
Page 3

Very truly yours,



Michael C. Robinson

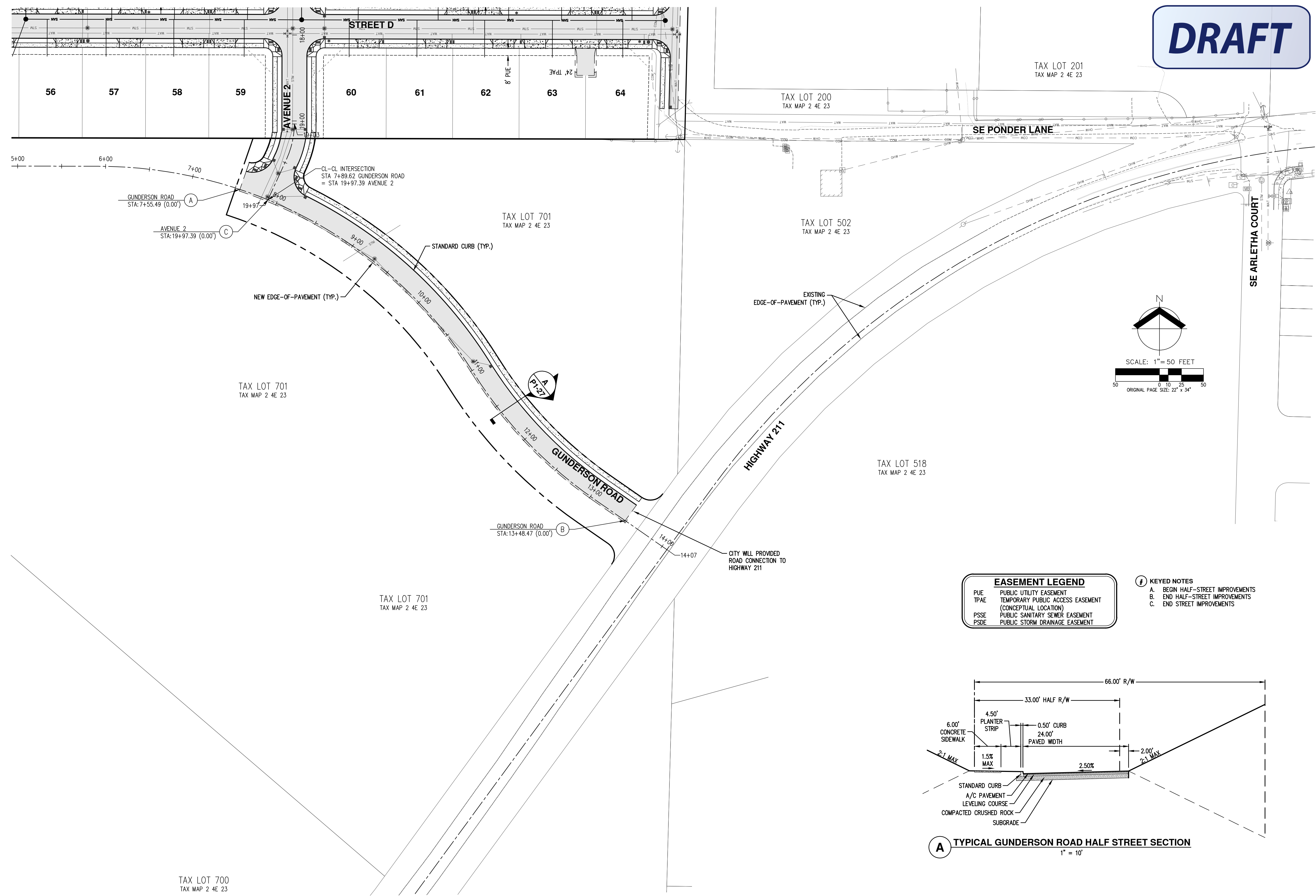
MCR:jmhi
Enclosures

cc: Ms. Emily Meharg (*via email*) (*w/enclosures*)
Mr. Cody Bjugan (*via email*) (*w/enclosures*)
Mr. Monty Hurley (*via email*) (*w/enclosures*)
Mr. Chris Goodell (*via email*) (*w/enclosures*)
Mr. Todd Mobley (*via email*) (*w/enclosures*)
Mr. David Doughman (*via email*) (*w/enclosures*)

PDX\133569\245146\MCR\26652984.1

DRAFT

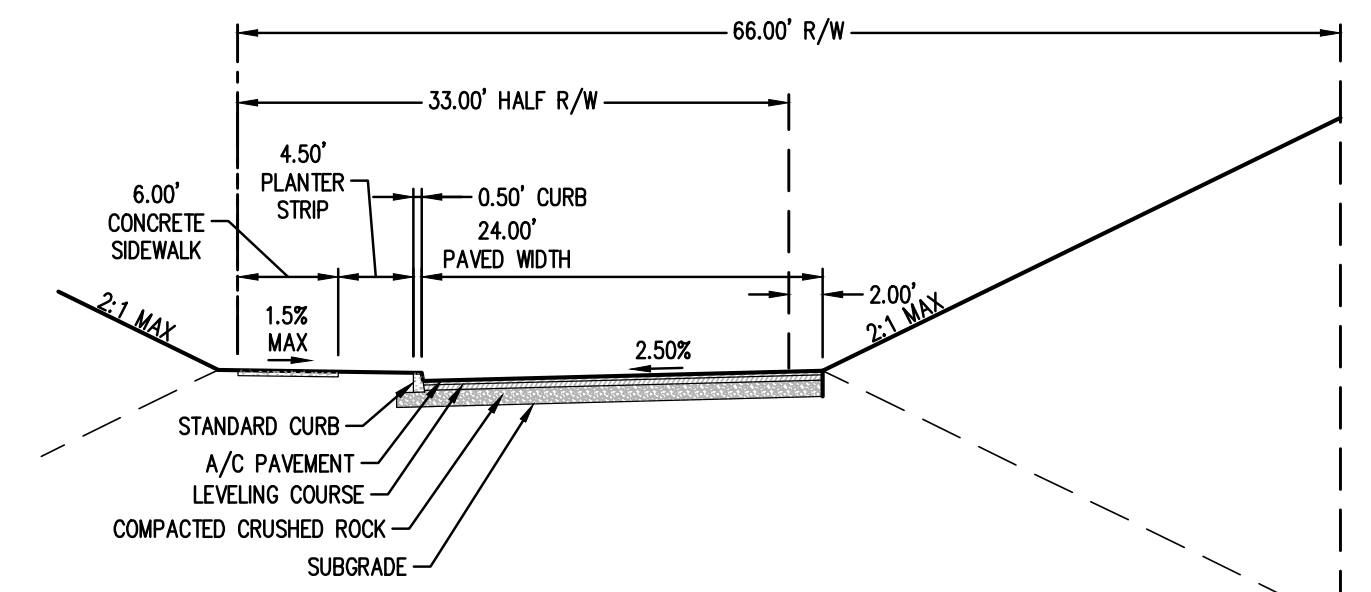
AKS
 AKS ENGINEERING & FORESTRY, LLC
 12905 SW HERMAN RD, STE. 100
 TUALATIN, OR 97062
 503.563.6151
 WWW.AKS-ENG.COM
 ENGINEERING - SURVEYING - NATURAL RESOURCES
 FORESTRY - PLANNING - LANDSCAPE ARCHITECTURE



EASEMENT LEGEND

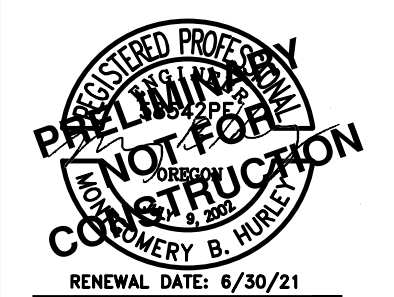
| | |
|------|--|
| PUE | PUBLIC UTILITY EASEMENT |
| TPAE | TEMPORARY PUBLIC ACCESS EASEMENT (CONCEPTUAL LOCATION) |
| PSSE | PUBLIC SANITARY SEWER EASEMENT |
| PSDE | PUBLIC STORM DRAINAGE EASEMENT |

- KEYED NOTES**
- A. BEGIN HALF-STREET IMPROVEMENTS
 - B. END HALF-STREET IMPROVEMENTS
 - C. END STREET IMPROVEMENTS



A TYPICAL GUNDERSON ROAD HALF STREET SECTION
 1" = 10'

PRELIMINARY OFFSITE STREET IMPROVEMENTS BAILEY MEADOWS SANDY, OREGON



RENEWAL DATE: 6/30/21
 JOB NUMBER: 7107
 DATE: 10/15/2019
 DESIGNED BY: VN
 DRAWN BY: CL
 CHECKED BY: RSW

P1-27

Exhibit 1
 Page 1 of 1

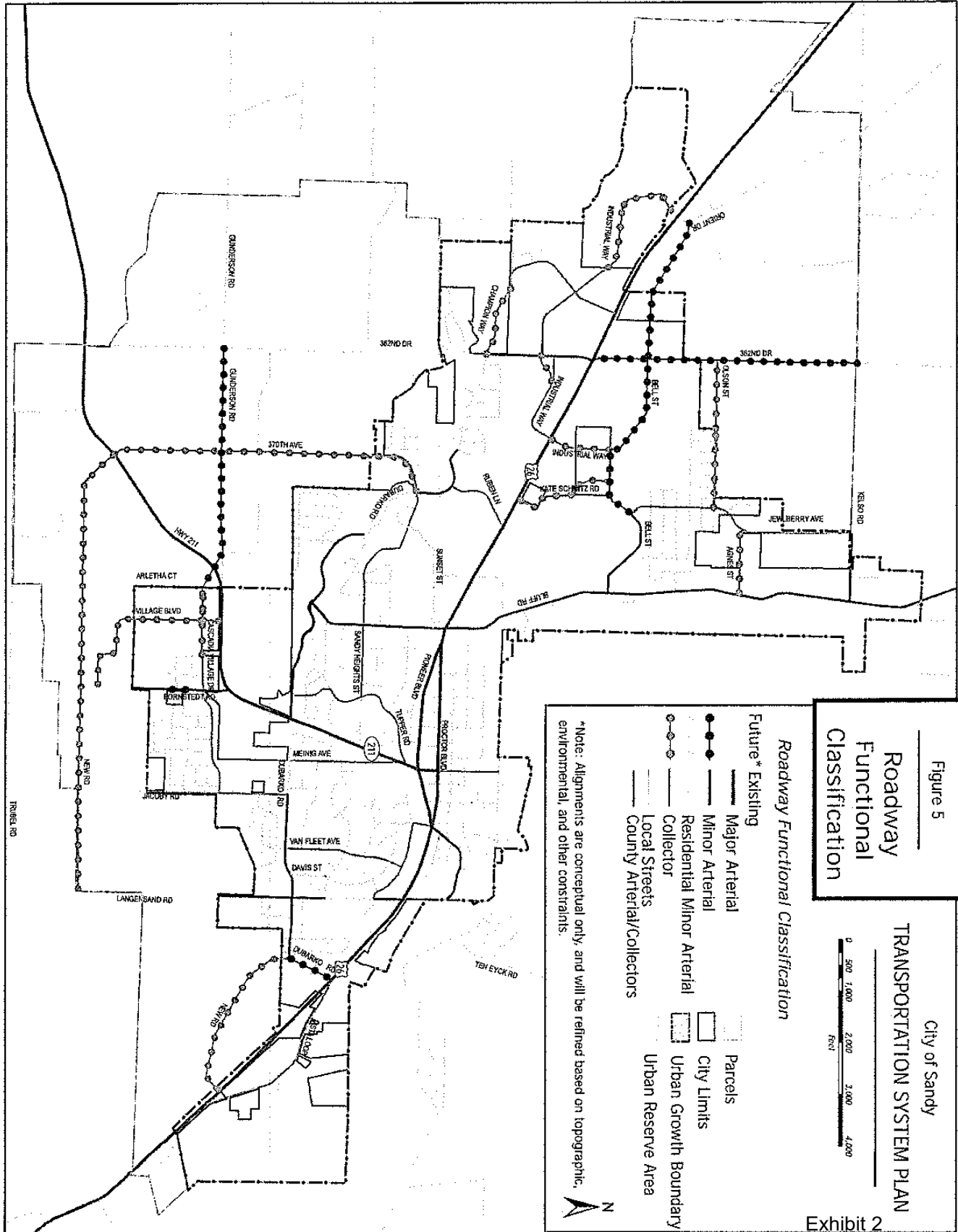


EXHIBIT X



Todd Moblely <todd@lancastermoblely.com>

Bailey Meadows - Trip Distribution w/ Gunderson Connection

Todd Moblely <todd@lancastermoblely.com>

Thu, Dec 5, 2019 at 10:10 AM

To: "Robinson, Michael C." <MRobinson@schwabe.com>

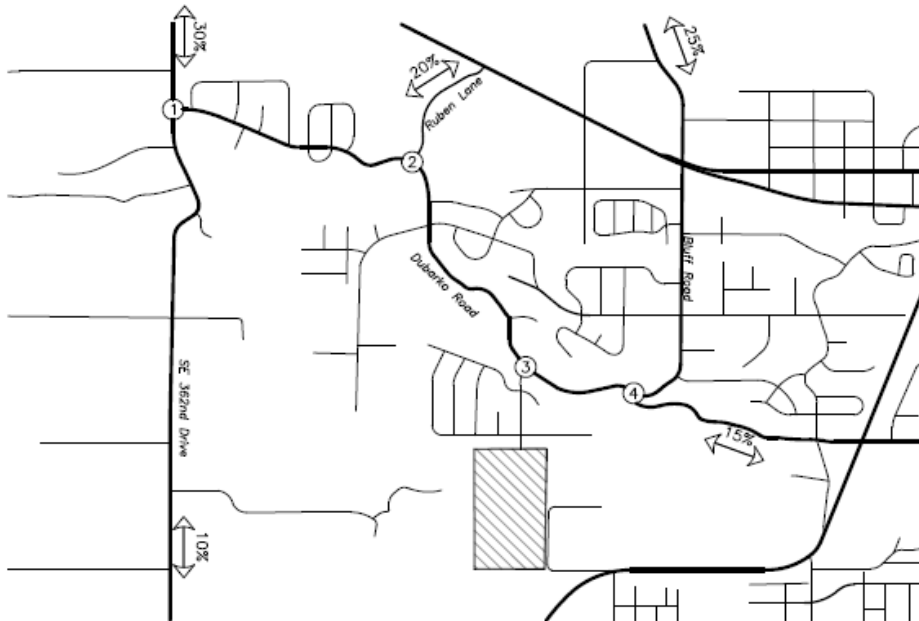
Cc: Cody Bjugan <cody@investpdx.com>, Monty Hurley <monty@aks-eng.com>, Chris Goodell <chrisg@aks-eng.com>, Marie Holladay <holladaym@aks-eng.com>

Mike,

This email is to explain the changes in trip distribution that we expect to see as a result of the Gunderson connection. A full TIS addendum is currently being prepared and will be submitted as part of the UGB expansion application.

The Gunderson connection to Highway 211 is expected to serve trips to and from the east, south, and west. Trips to and from the north are not likely to use the new connection. In addition, some of the existing neighborhood traffic from Melissa will divert to the south, through the Bailey Meadows site, to Highway 211.

Below is an excerpt from Figure 2 of the TIS, which is already in the record for the subdivision application. It shows the overall trip overall distribution pattern and is referenced in the sections below:



To & From the East

It is expected that the 15% of site trips previously assigned to Dubarko Road to the east will all use the Gunderson connection. Turning left onto Highway 211 at the new intersection will have significantly lower delay than turning left or crossing Highway 211 at Dubarko.

Contribution: 15% via Gunderson

To & From the South

A total of 10% of the trips are expected to be to and from the south, and all of these trips will use the Gunderson connection to Highway 211, since that will be a much more direct route.

Contribution: 10% via Gunderson

To & From the West

Trips to and from the west (30%) were assigned primarily to 362nd, as this is the quickest route to shopping destinations as well as Highway 26 west of Sandy. Travel time studies show that the route using Dubarko Road to 362nd Avenue is identical in time to the route using Highway 211 to 362nd Avenue. Therefore, the 30% is split evenly via Melissa to the north and Gunderson to the south.

Contribution: 15% via Gunderson

Total percentage of site trips using Gunderson = 40%, or 378 of the site's 944 trips per day

Rerouted Existing Trips

Since 40% of the Bailey Meadows trips are expected to use the Gunderson connection to Highway 211, it is expected that a similar, although slightly lower percentage of the existing neighborhood traffic would also use Gunderson. Since the existing neighborhood is north of the project site, the use of Gunderson could decrease from 40% to approximately 30%.

30% of the existing 1160 ADT on Melissa would reroute via Gunderson, or 348 trips per day.

In summary, the table below shows the total daily traffic volumes to the north (via Melissa Avenue) and to the south (via Gunderson Road) with the new street connection in place.

| | Daily Traffic Volumes | |
|--|-----------------------|----------------|
| | Melissa Avenue | Gunderson Road |
| Existing neighborhood traffic | 1160 | 0 |
| Existing neighborhood traffic w/ Gunderson | 812 | 348 |
| Bailey Meadows site trips with Gunderson | 566 | 378 |
| <i>Total Daily Volume with Gunderson</i> | <i>1378</i> | <i>726</i> |

It should also be noted that we know from traffic count data, that the existing neighborhood served by Melissa Avenue generates 27% fewer trips than the standard ITE trip rates. It is expected that Bailey Meadows will have similar trip characteristics, but for a worst-case analysis, it was assumed that Bailey Meadows trips would be generated at the higher ITE rate.

-Todd

Todd E. Mobley, PE

Principal



We have a new name and a new look, but we are still the most *effective* consulting team you've ever worked with.

321 SW 4th Avenue, Suite 400 | Portland, OR 97204

P: 503-248-0313 C: 503-319-9811

Website: lancastermobley.com

Offices: Portland, OR | Bend, OR

EXHIBIT Y

**CURRAN-McLEOD, INC.
CONSULTING ENGINEERS**

6655 S.W. HAMPTON STREET, SUITE 210
PORTLAND, OREGON 97223

September 27, 2019

Ms. Emily Meharg
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

**RE: CITY OF SANDY
BAILEY MEADOWS SUBDIVISION (FILE NO. 19-023 SUB/VAR/TREE)
PRELIMINARY REVIEW**

Dear Emily:

We have reviewed the submittal preliminary plans and supporting documents for the above noted development and have the following comments:

1. We have briefly reviewed the "Geotechnical Engineering Report" prepared by Geopacific Engineering, Inc., dated June 18, 2019 and recommend that the developer retains appropriate professional geotechnical services for observation of construction of earthwork and grading activities. The grading setbacks, drainage and terracing should comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report. When the grading is completed, a final report should be submitted to the City by the Geotechnical Engineer stating that adequate inspections and testing have been performed on the lots and all of the work is in compliance with the above noted report and the OSSC.
2. We have reviewed the preliminary stormwater calculations that was provided with this submittal. The calculations are found to meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards, that were adopted by reference into the Sandy Development Code. However, a detailed final report stamped by a licensed professional shall be submitted for review with the final construction plans.
3. We have reviewed the "Traffic Impact Analysis" prepared by Lancaster Engineering dated June 20, 2019. The study doesn't identify any concerns as a result of this development.

PHONE: (503) 684-3478

E-MAIL: cmi@curran-mcleod.com

FAX: (503) 624-8247

4. 3/4 Improvements should be required on Ponder Street north-south between Gunderson Road and the most northerly east-west street to include 28-foot wide paved surface, curbs on both sides, 5-foot planter strip with street trees, street lighting and 5-foot wide sidewalks on the west side of the roadway.
5. All interior streets to include the east-west Ponder lane should be constructed to local street standards (28-foot wide paved surface, curbs on both sides, 5-foot planter strips and 5-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.
6. Gunderson Road is classified in the City of Sandy Transportation System Plan (TSP), figure 5 as a minor arterial street. A minimum of 34 feet of right of way dedication will be required along the entire site frontage as per City of Sandy Development Code, chapter 17.84. This roadway will be extended in the future as the surrounding properties develop around this site.

A half Improvements would be required on Gunderson Road to include 22-foot wide paved surface, curbs on one side, 5-foot planter strips and 6-foot wide sidewalks along the south plat boundary line as per the TSP. At the request of the City, we have developed a layout of this site and came up with 98 lots including a 34-foot of right of way dedication along Gunderson Road.

7. Melissa Avenue is classified in the City of Sandy Transportation System Plan (TSP), figure 5 as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No. 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations.

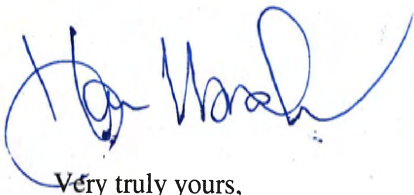
We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case an evacuation is needed. A review by the Fire Department is needed to confirm whether an additional emergency access is needed or not. However, we recommend as a minimum a temporary/ emergency access to Hwy 211.

8. The developer's engineer should provide a profile design for a minimum of 200 feet for all future street extensions stubbed streets past the project boundary to ensure future grades can be met.

Mr. Emily Meharg
September 27, 2019
Page 3

9. All ADA ramps shall be designed, inspected by the design engineer and constructed by the contractor to meet the most current PROWAG requirements.
10. All public sanitary sewer, waterline mains to be a minimum of 8-inches in diameter and a minimum of 12-inches in diameter for storm drains and be extended to the plat boundaries where practical to provide future connections to adjoining properties. All utilities are extended to the plat boundary for future connections.
11. The new site layout eliminated the detention pond and a detention tank can be used in lieu of a pond meeting the requirements of the 2016 City of Portland StormWater Management Manual (SWWM).

We have no concerns about the proceedings with this project subject to the above stated comments.

A handwritten signature in blue ink, appearing to read "H. Ibrahim", is written over the typed name "Hassan A. Ibrahim, PE".

Very truly yours,

CURRAN-McLEOD, INC.

Hassan A. Ibrahim, PE

cc: Mr. Mike Walker, City of Sandy



EXHIBIT Z

Emily Meharg <emeharg@ci.sandy.or.us>

Re: Bailey Meadows Subdivision (File No. 19-023 Sub/Var/Tree)

1 message

Kristine Hendrix <Kristine.Hendrix@pgn.com>
To: "emeharg@ci.sandy.or.us" <emeharg@ci.sandy.or.us>

Wed, Sep 18, 2019 at 7:43 AM

Dear Emily,

We haven't found any conflicts related to your project. There is a PGE project located on SE Ponder Ln. When the developer is ready to start the project please have them call PGE Service Coordinators at 503.323.6700.

Thank you,


Kristine Hendrix | Sr. Design Coordinator

Work Hours 6:30 am to 4:00 pm M – TH & 6:30 am to 10:30 am Fri

Portland General Electric

1705 NE Burnside, Gresham, OR 97030

| 📞: (503) 669-5214 | 📠: (503) 669-5229 | ✉️ kristine.hendrix@pgn.com

 **Bailey Meadows Subdivision (File No 19-023 Sub-Var-Tree - City of Sandy).pdf**
356K





Oregon

Kate Brown, Governor

EXHIBIT AA

Department of Transportation

Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

October 4th, 2019

ODOT #8702

ODOT Response

| | |
|--|--|
| Project Name: Bailey Meadows Subdivision - Ponder Lane | Applicant: Allied Homes & Development |
| Jurisdiction: City of Sandy | Jurisdiction Case #: 19-023 SUB/VAR/TREE |
| Site Address: No situs SE Ponder Lane, Hwy 211, Sandy, OR | Legal Description: 02S 04E 23 Tax Lot(s): 00800 |
| State Highway: OR 211 and US 26 | |

The site of this proposed land use action is in the vicinity of OR 211 and US 26. ODOT has permitting authority for these facilities and an interest in ensuring that this proposed land use is compatible with their safe and efficient operation.

COMMENTS/FINDINGS

The application is for a 100 lot subdivision just west of the Ponder Ln intersection with OR 211. The applicant proposes to gain emergency access to Ponder Ln with gates located at the access points. ODOT recommends that the city require emergency vehicle turning templates for the Ponder Ln/OR 211 intersection. Based on ODOT review of the turning templates, there may need to be modifications to the intersection to accommodate emergency vehicles.

ODOT anticipates that traffic from the development may have an impact on the following intersections: OR 211/Dubarko Rd, US 26/Rueben Ln and US 26/362nd Ave. The traffic analysis for the subdivision did not include these intersections, so ODOT is unable to evaluate the impact the development would have on the state highway system. In order to determine if state highway facilities are adequate to serve the proposed development, ODOT recommends the city require the applicant to update the traffic analysis to include the above referenced intersections.

ODOT RECOMMENDED LOCAL CONDITIONS OF APPROVAL

- The applicant shall submit a traffic impact analysis to assess the impacts of the proposed use on the State highway system. The analysis must be conducted by a Professional Engineer registered in Oregon. **Contact the ODOT Traffic representative identified below for scoping.**
- The applicant shall provide emergency vehicle turning templates for the OR 211/Ponder Ln intersection. Improvements to the intersection will be required if necessary as determined by ODOT.

Please send a copy of the Notice of Decision including conditions of approval to:

ODOT_R1_DevRev@odot.state.or.us

| | |
|---|---|
| Development Review Planner: Marah Danielson | 503.731.8258, marah.b.danielson@odot.state.or.us |
| Traffic Contact: Avi Tayar, P.E. | 503.731.8221 Abraham.tayar@odot.state.or.us |

EXHIBIT BB

CITY OF SANDY PARKS AND TRAILS BOARD MEETING MINUTES OCTOBER 9, 2019

Present: Susan Drew, Don Robertson, Michael Weinberg, Kathleen Walker. Makoto Lane – park board member - to be.

Staff: Sarah Richardson, James Cramer

No public comment

Review of Meeting Minutes:

Correction: Don Robertson's comment regarding "national" parks should be "Ashland" Parks.

Noxious "weed" instead of "week".

Mike moved to approve the minutes as corrected and Don seconded. Minutes approved unanimously.

Bailey Meadows Presentation – James Cramer

Need a recommendation from Parks Board on park land dedication verses fee-in-lieu of land dedication. This plan is being presented to Planning Commission November 14th. We reviewed this development preliminarily last year and recommended that they incorporate the park land that was identified in the 1997 Master Plan. The development proposes to construct 100 single family homes. If we were to accept the in-lieu fee, it would be \$310,000. Land dedication would be 1.29 acres.

The board discussed the existence of community park in the area in the 1997 Parks Master Plan. A community park land is intended to have things like ball fields and this parcel has relatively flat ground that would meet this need. A walk to the closest park for most of the development property is over ½ mile (Knollwood) which does not meet our Master Plan intent of providing a park within ¼ to ½ mile of developments. Access to Bornstedt requires crossing a highway and is about ½ mile away. There is also concern that we do not have a nearby willing seller to acquire park land for this development. In addition, land acquisition is generally a 10 year undertaking, assuming we can find a willing seller.

Don moved to remain with the Board's original position of land dedication of 1.29 acres because we are deficient in parkland in this area. 100 houses would put undue strain on existing facilities and create unsafe routes to Bornstedt Park. We don't have a willing seller to use the fee in lieu of, to buy land for the park. Mike seconded the motion. Unanimous vote yes.

Discussion about the proposed development on existing trees. Most of the trees on the north and south side would remain except for Melissa access and some R/W for Gunderson where trees would have to be taken.

Park SDC fees are \$3,717 per house. \$2500 per apartment unit.

This development has no immediate connections to Tickle Creek – those would come off of end of Rachael and off of Solso.

Sandy Crest Presentation: This is a preliminary proposal stage for a Planned Unit Development (PUD). A PUD requires 25% open space. James explained that the land is zoned for single family (7500 ft² lots) and instead they are proposing much smaller lots. One option is for them to provide inlieu fee rather than dedicate the land. Criteria for park or open space land dedication like slope exist. Developers can do an HOA that maintains the park property, dedicate the park and open space to the City, or the developer can take care of it or deed restricted private easement for the homeowner. Lots of discussion about PUDs as it related to parks and open space. Discussed concerns about HOA's folding after awhile

and the City having to acquire the property. Also concerned that private easements for homeowners can get fenced off, or get developed with outdoor facilities, gardens, sheds, gazebos, etc. instead of being public open space.

- Propose they give us developable park property.
- Need to have trail development and trail access to the Tickle Creek Area.
- Consider giving land on east end adjacent to undevelopable open space along Tickle Creek.

Motion made by Don to move the three points forward to planning in pre-app process. Susan seconded motion. Motion carried unanimous.

Proposed Jewelberry Meadows

Proposed 20 units along Jewelberry east of Penny Avenue. The development would have access from Agnes. Park would be at Sandy Bluff which is less than ½ mile away. This would give us \$62,600 of fee in lieu of or 0.26 acres parkland dedication. Conceptual future park location is further north. Don motioned to accept fee in lieu of and Michael seconded it. Motion carried unanimous.

Old Business: No old business.

Staff Updates: Parks Master Plan was signed by both parties and next stage is gathering documents. There will be a technical advisory board formed. The Parks Board will be involved as stakeholders. Nancy is asking for two park board members to be part of the Technical Advisory Committee. Mike moved that Kathleen and Don be the two members. Susan seconded it. Motion carried unanimous.

Shade Structure Update: Bids for shade structures came in. Bid for two covered shade structures at Bornstedt Park is \$60,591. Need input on stain colors, roof color and stone type. Propose using similar materials to the Meinig Park project same rock and same wood stain – if they used forest green roof, instead use hunter green.

Bids for dog park \$25,000 for larger and \$23,000 for smaller one. Still need engineering costs. Sarah will meet with contractor for next meeting. We have about \$21,000 in the donation account. Suggest we consider using interest funds from Parks SDC and fee in-lieu of accounts. Sarah will check with Kelly, Jordan and Tyler on that. If we cannot do both, the consensus was to do the larger one where we already have seating.

To Do: Sarah will ensure Makota’s assignment is on the Council agenda.

We need to clarify that planning proposals are going directly to Sarah (in addition to Tanya) to ensure timely communication.

9 pm end of meeting.



Exhibit CC

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey's Meadows Possible Gunderson Rd Connection to OR 211

DANIELSON Marah B <Marah.B.DANIELSON@odot.state.or.us>

Tue, Nov 19, 2019 at 11:13 AM

To: "Emily Meharg (emeharg@ci.sandy.or.us)" <emeharg@ci.sandy.or.us>, "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, "monty@aks-eng.com" <monty@aks-eng.com>

Cc: TAYAR Abraham * Avi <Abraham.TAYAR@odot.state.or.us>, BOLEN Glen A <Glen.A.BOLEN@odot.state.or.us>, RODRIGUEZ Myriam * Marcela <Marcela.RODRIGUEZ@odot.state.or.us>, LAM Canh T <Canh.T.LAM@odot.state.or.us>, ODOT_R1_DevRev <ODOT_R1_DevRev@odot.state.or.us>

Hi Emily, Kelly and Monte,

I wanted to follow up on our meeting last month regarding to possible Gunderson Rd connection to OR 211 for the proposed Bailey's subdivision. After following up with the ODOT R1 Technical Center, ODOT has determined that the applicant can use 50mph as the design speed. At our meeting, ODOT may have given the impression that we would be willing to process design exceptions prior to the land use application being submitted to provide the city with some confidence that the highway improvements would be able to be permitted by ODOT. Given the amount of effort and time the design exception will take for the applicant as well as ODOT staff, ODOT will not be able to process the design exceptions before a land use application has been submitted to the city. Instead, the applicant can work with ODOT staff to obtain "design concept acceptance" for the proposed highway improvements. As Avi and I will be on vacation from November 20th to December 5th, please contact Marcela Rodriguez if you have any technical questions for ODOT staff. I don't anticipate that the land use application will be submitted during this time, but if it does as part of our regular land use review process the land use application should be sent to odot_r1_devrev@odot.state.or.us.

Thank you,

Marah Danielson, Senior Planner
ODOT R1 Development Review Program
(503) 731-8258
marah.b.danielson@odot.state.or.us



EXHIBIT DD

Emily Meharg <emeharg@ci.sandy.or.us>

File Number - 19-023 SUB/VAR/TREE

Paul Owen <paul.owen@vanport-intl.com>

Sat, Sep 14, 2019 at 7:16 PM

To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

Cc: "jandpowen@yahoo.com" <jandpowen@yahoo.com>, "pauldownen65@outlook.com" <pauldownen65@outlook.com>

Comments on File Number – 19-023 SUB/VAR/TREE

Comments:

1. Pleased with the lot size of 7500' or larger.
2. Pleased with road size of 50' and set backs.

Concerns:

1. Only 1 access point on Melissa Avenue.
 - a. Melissa is already a busy street, steep, and limited sightlines at Dubarko due to trees and parked cars.
 - b. Melissa should be considered a secondary access.
 - c. A primary access to Hwy 211 is needed, for emergency vehicles and access during imclement weather.
 - d. Melissa is steep with limited sightlines and dangerous during bad weather. Adding 1000 cars per day is asking for multiple accidents per day.
 - e. If the city is to approve this without concern for our comments we suggest connecting Solso drive to add another access point, and put a 3 way stop at the bottom of Melissa and Dubarko. Otherwise you will see car and pedestrian accidents increase.
2. With the addition of 100 homes plus the existing Nicholas Glen homes, where are the community parks.
 - a. The city has required Sandy Bluff, Idleman, and other developments to add parks. I see nothing here.
 - b. Highly recommend a park be added in some form.

Without a secondary access road and additional park land we are not in agreement of this development.

If the solution is to reduce lot size, we against this as well.

Sandy has to much high density housing at this time.

Cordially,

Paul and Jolette Owen

37189 Rachael Drive

EXHIBIT EE

City of Sandy
Planning Division
Sandy, OR

Re: Proposed Bailey Meadows Subdivision

City of Sandy,

I own the home located at 37506 Rachael Drive (re: tax lot 6100). I purchased the home in early 2018 knowing full well someday there would be homes built on the property behind my home. The proposed Bailey Meadows appears to be an ill-conceived subdivision created with no regard to the impact of the surrounding existing homes or community. I did attend the AKS meeting held on September 18, 2018. I have the following concerns.

Melissa Avenue the only access in or out of the development

As proposed the development is an island of approximately 100 homes to be built with only a single existing residential street (Melissa Ave) to access the subdivision. This means approximately 200 automobiles enter/leave the subdivision using an existing residential street not designed for additional traffic. With automobiles parked in front of the homes on Melissa Ave, the street is not wide enough to safely allow 2 way traffic. When two opposite direction automobiles meet one moves over to allow the other auto to proceed. The street is marginally designed to accommodate the traffic of the current homes it was built to support, again it is the only access in or out of our neighborhood.

A major additional safety concern is all construction vehicles will only have access the subdivision using Melissa Ave.

Sandy is a bedroom community with a large percentage of its working population commuting out of the town to work. Not only will Melissa Ave be impacted with the additional traffic, Dubarko will be significantly impacted by the additional traffic. Melissa or Dubarko are not designed to accommodate more than the current traffic they support.

Plans to extend the Melissa Avenue into the subdivision

This impacts me personally. My property is at the corner of Melissa Ave and Rachael Dr. The person I talked to at the AKS meeting, could not provide me with a concept plan of how Mellissa Ave will be "punched" through into the development. He said the construction and plans would be by the City of Sandy.

My home/property (and the home across from me on Mellissa) is on a hill as is where Mellissa Ave will go into the subdivision. The subdivision property is substantially drops lower just at my home's property line, hence when Melissa Ave goes into the subdivision it will be considerably lower than my property. I would like to see a concept plan of the extension of Melissa into the subdivision to understand its impact to my property. This includes where my property line actually is on Melissa Ave as it appears this was not a concern of AKS.

Thank you,
Paul Savage

EXHIBIT FF

September 25, 2019

City of Sandy Planning Division
ATTN: Emily Meharg
39250 Pioneer Blvd
Sandy OR 97055

RECEIVED
SEP 26 2019
CITY OF SANDY

RE: File Number 19-023 SUB/VAR/TREE

My name is Sarah Bettey and my husband and I are homeowners in the Nicholas Glen neighborhood off Melissa Ave and Dubarko Rd. As a member of the community, I am writing to you to express my apprehension about the potential planned project for the Bailey Meadows subdivision. We hope you will keep our concerns in mind when it comes time for you to review the proposal.

As a life long resident in this area, I oppose the building of the subdivision without serious changes to the developer's plans. In particular, I was stunned by the proposal that the new subdivision would only have access through our existing Nicholas Glen neighborhood via Melissa Ave. This suggestion would have a severely negative and likely dangerous impact upon this area. The traffic on Melissa and Dubarko are already a safety concern. Cars speed up and down the hill on Melissa Ave too fast for a residential street. Dubarko has become a fairly heavily traveled bypass and the number of cars going through our area has increased over the years due to the major traffic problems in the downtown portion of Sandy.

If the new subdivision is given access to enter and exit only using Melissa Ave, this will increase traffic flow significantly. The addition of 90+ homes will add nearly 1000 car trips per weekday on our quiet neighborhood streets. Increased traffic flow coming from this development causes a higher risk for safety of drivers and pedestrians as well as delays and backups along the surrounding residential streets (i.e. Bluff, Sandy Heights, Ruben). This inevitable increase of traffic by at least a third also brings forward the obvious concern with the value of the residential property surrounding the development and affected streets dropping dramatically.

I feel a reasonable and safer alternative would be to also require direct access to Hwy 211 via Ponder Road to the south. That the applicant has rejected this suggestion from the city staff as part of their planning just goes to show how they do not have the existing neighborhood's best interest at heart. This would decrease the need for cars in Bailey Meadows to head through Nicholas Glen at all. It also will give both Bailey Meadows and Nicholas Glen a 2nd access point, which is safer in case of emergencies and inclement winter weather. I would also highly recommend speed bumps be installed on the Melissa Ave hill to help keep speed down and discourage drivers from cutting through the neighborhoods from Hwy 211 to Dubarko.

In addition, according to information given during the September meeting, if this proposal is approved Melissa Ave will be torn apart to run additional sewer, electricity, etc. instead of accessing these and other utilities via Hwy 211. Melissa Ave is currently the only access point for the entire existing Nicholas Glen neighborhood. Also taking into consideration the burden that months or years of large trucks and other machinery needed to complete the building project driving through to access the property location, the disregard for the current residents of the area is totally unacceptable.

Myself and my family have a vested interest in our community and hope that its quiet character and charm will remain intact. I am sure I do not need to mention in this letter the need for a bypass around town and concerns about overcrowded schools as the city is well aware that these problems continue to grow with the addition of more residents to our city population. My husband and I chose to raise our young son here in my hometown of Sandy and selected the Nicholas Glen neighborhood specifically because of its beauty, its quiet, its safety, and its proximity to the woods and the mountain. Sandy residents like us want the community to grow and thrive; we just want it to be done in a way that protects the small town feel and our quality of life. This project as it stands does not have the best interests of the adjoining neighborhoods in mind. It threatens to bring a slew of negative side effects to Nicholas Glen and our Tickle Creek area/Dubarko Road neighbors.

I hope you will hear my concerns and take them into consideration as you make decisions on this matter in the future.

Thank you for your time,

Sarah Bettey
18195 Melissa Ave
Sandy OR 97055
Sarahbettey2978@hotmail.com
971-246-2974



EXHIBIT GG

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey meadows

1 message

Tiffany Harris <tiffyann18@gmail.com>
To: emeharg@cityofsandy.com

Fri, Sep 27, 2019 at 8:43 AM

Good morning. I just wanted to reach out and be heard like a lot of my neighbors. I live off of Melissa road, on Rachael drive. I have a major concern with all the traffic coming up Melissa road. My family and I love to go for walks and bike rides almost daily. With all that extra traffic on Melissa, I won't feel safe having my kids and myself doing these walks anymore. This project is a safety issue for my family. On another note my kids play out front of our home. If the entrance to your project is blocking one way out of Rachael, the cars will have to go the other way on Rachael. More traffic on my road. Still putting my kids at risk of getting hit, by unhappy neighbors, angry, late to work. Anger makes people speed more. So please reconsider this project or find a different route. The safety of children is truly the most important thing.
THANK YOU FOR LISTENING
HAVE A GREAT DAY.



EXHIBIT HH

Emily Meharg <emeharg@ci.sandy.or.us>

MELISSA AVENUE

Todd Cooper <OREGONTCS@live.com>
To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Fri, Sep 27, 2019 at 1:36 PM

Dear Ms. Meharg,

I am writing to you as a concerned home owner located at [18190 Melissa Avenue](#), in Sandy Oregon. I am extremely concerned for what will certainly be a public traffic safety issue on the road here.

Currently there are many speeding vehicles that fly up and down the road here....as there is a steep hill.

I have been employed in the business of Traffic Control for what is now 23 years. Melissa Avenue is a very steeply inclined roadway, and sadly many current residents put their feet to the floor and speed UP the hill to get to their homes---and they are in violation of posted speeds as it is. I have seen and experienced this since residing here about ten years now. There are currently several young families with children and pets residing on Melissa Avenue currently. Many drivers race down the hill as well....and the cross street of Solso exists as well.

I am hoping that the proposal to make Melissa Avenue the ONLY access point to a new subdivision will be reconsidered and summarily dismissed. Perhaps other access points to this new subdivision could be more safely utilized? I will suggest either a "LOOP" onto and off of 211, or on out to 362nd; thereby maintaining public safety.

Has anyone used any traffic engineering volume studies onto Dubarko? There might well be a need to install a traffic light on Dubarko if the current proposal is allowed to go through. I'm sure there is a better solution to use other than Melissa Avenue. Adding 1,000 vehicles daily on Melissa Avenue is simply a very bad idea.

Thank you for your time and attention in this matter.

Sincerely,

Todd Cooper

oregontcs@live.com

[18190 Melissa Avenue](#)

[Sandy, Oregon 97055](#)

Sent from [Mail](#) for Windows 10



EXHIBIT II

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows Subdivision

1 message

Tom Newell <tom.newell@live.com>

Fri, Sep 27, 2019 at 4:17 PM

To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Hi Emily.....

I would like to add my concern regarding the above proposed project.

WOW, I had no idea that Melissa Avenue would be the main arterial street used by these (? 100 ?) homes. I thought for sure Ponder would be developed for that load.

Also, is it correct that Solso Drive will also be 'punched' through to provide emergency services access ? And would it then become a through-street ?

I could not attend the 9/18 meeting, but hope to be at the 10/28th.

Is there a way for me to formally file my objections to this proposed subdivision ?

Thank You,

Tom Newell

[18007 Rachael Dr](#)

[Sandy](#)

503-477-2911

tom.newell@live.com

Sent from [Mail](#) for Windows 10



EXHIBIT JJ

Emily Meharg <emeharg@ci.sandy.or.us>

Proposed "Bailey Meadows" development

1 message

Cary Mallon <cary.mallon@gmail.com>
To: emeharg@cityofsandy.com

Sat, Sep 28, 2019 at 10:06 AM

Hello Emily,

My name is Cary Mallon and am writing in opposition to the proposal of the Bailey Meadows development. I have lived at the corner of Melissa and Rachael since 2007. While we have recognized that the future might mean development to the south of us, we have never imagined the specifics proposed in this project.

Mainly, my objection is adding 100 homes to be served by a road system that is already (by city standards) overloaded. The plans here basically call for the world's biggest cul de sac, which is a design now disdained by many planners because of it's dead end nature. The only conduit to reach this area for cars, school buses, emergency vehicles, and construction equipment is Melissa Ave. Melissa Ave, which I know the city would say is wide enough for two way traffic, really functions like a one lane logging road with turnouts. Drivers do not feel comfortable passing each other there when there are cars parked on both sides of the road. We routinely wait for each other to pass through the spots with cars on both sides.

It is my opinion that the property in question should be denied development approval without access to Hwy 211. Really, the 'emergency' access should be Melissa ave, and the main access should be Hwy 211. I understand that there are complications making that access difficult, but the project should not be approved until that way is cleared. AND, then it is on. the city to improve access to other residential areas along 211 for travelers who are not in cars!

A secondary objection is allowing the project to go forward without park space included. The city should not allow any project to 'buy off' the park requirement.

To conclude, I am vehemently opposed to Bailey Meadows.

Thanks for reading,

Cary



EXHIBIT KK

Emily Meharg <emeharg@ci.sandy.or.us>

extension of melissa ave to proposed sudivision

1 message

Lonnie McVey <lonniemcvey@gmail.com>
To: emeharg@cityofsandy.com

Sat, Sep 28, 2019 at 10:48 AM

This is unacceptable for many reasons. As a resident of this neighborhood for over 15 yrs I believe this is not safe. Melissa is closed due to weather occasionally. Should we add more homes and traffic that would be impacted by this. No police or fire access during slick conditions? Does this sound like proper planning. The safety of kids walking up, down and across our streets with 900 more car trips per day to deal with. Picture dump trucks, equipment, paving contractors etc using Melissa to access this development causing congestion, road damage [etc.as](#) well as safety problems. Please access this site from the hiway only. An extension of Melissa will be used as a bypass as well as access to the site.
thanks Lonnie Mcvey



EXHIBIT LL

Emily Meharg <emeharg@ci.sandy.or.us>

RE: New proposed Bailey Meadows Subdivision

1 message

john.caroldick <john.caroldick@gmail.com>
To: emeharg@cityofsandy.com

Sun, Sep 29, 2019 at 5:45 PM

Hello Emily ,

We are among many neighbors in the Nicholas Glen Subdivision that are very concerned about the new proposed subdivision Bailey Meadows. Nicholas Glen has only one access in and out of the area, which is Melissa ave. If this new subdivision goes in, the developers plan to use Melissa for entering and exiting. This will add approximately 944 additional car trips a day . We feel that adding any traffic to Melissa ave will be too much. It will need to handle cars from 170 homes in Nicholas Glen and 100 homes in Bailey Meadows. This arrangement would be very unsafe for children living on Melissa and impossible for all residences to leave the area in an emergency. We are very upset that Nicholas Glen has only had one access in and out of our area as long as we have lived here (12years). This may be a good time to look into this problem also.

John and Carol Dick

[18255 Grey Ave](#)

[Sandy or 97055](#)

503-449-0927

Email- john.caroldick@yahoo.com

Sent from my Verizon, Samsung Galaxy smartphone



EXHIBIT MM

Emily Meharg <emeharg@ci.sandy.or.us>

Use of Melissa Street in Nicholas Glen neighborhood.

1 message

Marilyn Siewell <oreborn36@gmail.com>
To: emeharg@cityofsandy.com

Tue, Oct 1, 2019 at 1:53 AM

Dear Emily Meharg:

I am very concerned as is my daughter, who recently moved in with me, on go do not want this to happen. Our neighbors are a mixture of young children who ride their bikes , parents with baby strollers and elderly who go for walks each day, feeling safe when doing so. This lifestyle would be gone for us, who are home owners and love our space, peace, and quiet and safety factors. If used for your proposal, the street would only go to Debarko and then you would have to turn West or East , through two more neighborhoods before getting to town. Please rethink this plan. There must be a better solution suich as via 211.

Thankyou,

Marilyn Siewell
Treena Siewell

COMMENT SHEET for File No. 19-023 SUB/VAR/TREE:

Our City is big enough
 We DO NOT need
 any more homes!
 The traffic is B.D enough!!
 we do not need more
 cars going through our
 Beautiful City!!

Marguerite Wadkins 503-668-6763
 Your Name Phone Number
 18291 Myra Ct - Sandy, OR 97055
 Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.66 Adjustments and Variances; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; and 15.30 Dark Sky Ordinance.

EXHIBIT OO

COMMENT SHEET for File No. 19-023 SUB/VAR/TREE:

"To Whom it may Concern"
I live up off of Melissa Ave.
Rachael Dr.

With 944 vehicle's going on
Melissa ave. It will be too much,
for this new home development.

When the cold weather comes with
all that snow, it will be bad.

The buses and parents meet
down below Melissa hill. Just not
safe for the kids.

Definitely should be another
way out of this development.

It will be a mess for
Bailey Meadows and Nicholas Glen.

Doris E Rooney 503 804 4542
Your Name Phone Number
37214 Rachael Dr Sandy, OR 97055
Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.66 Adjustments and Variances; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; and 15.30 Dark Sky Ordinance.

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OCT 01 2019
CITY OF SANDY



EXHIBIT PP

Emily Meharg <emeharg@ci.sandy.or.us>

New Subdivision Concerns

1 message

Susan Hebb <susan.hebb@yahoo.com>
To: emeharg@cityofsandy.com

Tue, Oct 1, 2019 at 7:27 PM

Hello - my name is Susan Hebb and I am a homeowner on Reich Ct., off Dubarko in Sandy. I recently became aware of the proposed new subdivision of 100 homes being built nearby. I wanted to share some concerns that I have in regards to this new development.

While the development itself is probably not up for approval or debate with the public, I want to share my concerns about the size of a new subdivision being built. Sandy is a wonderful small city and I'd like to keep it that way. There has already been a tremendous amount of growth and change that has occurred with housing as well as businesses over the last few years in Sandy. While I realize it's not in the best interest of cities to remain stagnant, it's critical to look at the growth carefully so the City of Sandy does not lose it's special small town feel. I specifically do not live in Gresham because it's become way to big. In addition, I'm concerned about the impact this development will have on our already stretched infrastructure of water and sewer services, schools, and fire and police departments.

It's my understanding that the entrance and exit to this subdivision has been proposed to be solely through Melissa Avenue. This is not a safe or satisfactory consideration. It's been estimated that an additional 944 car trips per day will be created from this new subdivision. Dubarko is already a busy street. Many Sandy citizens walk, run, bike, hike and enjoy the quiet beauty of this neighborhood. I'm very concerned about the safety of individuals, families, pets, and wildlife with the proposed amount of additional cars going by every day. Additionally, that amount of traffic would create pollution and health concerns for those walking and enjoying the Tickle Creek Trail.

It makes much more sense for cars to enter this new subdivision off Highway 211. Using Highway 211 would allow cars to get to the subdivision quickly since the speed limit is higher than it would be using Dubarko and Melissa. If Melissa Avenue is the main access, I'm concerned about individuals being frustrated with how long it takes to get to the new subdivision and the low speed limit. This may cause some to speed on Dubarko and up Melissa. In addition, having cars use Highway 211 would create less pollution for those enjoying walking and The Tickle Creek Trail. Also citizens would feel safer continuing to walk and exercise along Dubarko and off Melissa with the cars using Highway 211 instead of Melissa as the entry point.

I plan to attend the planning meeting on October 28th to continue to share my concerns over the proposal of using Melissa Avenue as the access point for this new subdivision. Please consider using Highway 211 as the entry for this new development.

Thank you for your consideration.



EXHIBIT QQ

Emily Meharg <emeharg@ci.sandy.or.us>

Proposed Subdivision off Melissa Ave

1 message

Dawn Allen <wunderwuman1022@gmail.com>
To: emeharg@cityofsandy.com

Tue, Oct 1, 2019 at 8:06 PM

To Whom it May Concern:

We currently live on Melissa Ave and have concerns with the addition of the new homes while only having Melissa Ave as the only access point into both the current neighborhood as well as the proposed additional neighborhood. With the current neighborhood population, each day we hear and witness multiple vehicles driving at high speeds both up and down Melissa Ave and an increase of homes and drivers would only make this worse. We have witnessed multiple near collisions at Melissa Ave and the stop sign at Solso Dr. Additionally, our house has already been hit several times by out of control drivers. We are also concerned about an increase of traffic noise that would be caused by an increased number of vehicles driving up and down Melissa Ave each day and by the decrease in home value, for those of us that live on Melissa Ave, that is likely to follow the building of the new neighborhood.

We are also concerned about the neighborhood children. When it snows or is icy and school buses are on Snow Routes they do not drive up the hill on Melissa Ave, which means children would be required to walk up/down Melissa Ave to the snow route bus stop on Dubarko or their parents would have to risk the drive. This is dangerous for the children as well as the drivers that are already on a treacherous hill. Another dangerous issue is each year when it snows or is icy we witness many abandoned cars at the bottom of the hill being left on Dubarko. With more traffic means the likelihood of more cars being abandoned and risk being hit.

In the last decade in the City of Sandy we have seen the congestion increase exponentially as our roads have become overwhelmed with traffic. An increase of homes and no new additional roads is only going to compound this issue.

If this new development does go forward we would suggest a minimum of one more road in to and out of the neighborhood be added to account for the increase in traffic. In addition to this, installing speed bumps on Melissa Ave to slow down speeding traffic.

Thank you for your time and consideration.

Dawn and Jordan Allen



EXHIBIT RR

Emily Meharg <emeharg@ci.sandy.or.us>

Baily Meadows Subdivision concern

1 message

Dave Meeker <meekerd1@hotmail.com>

Tue, Oct 1, 2019 at 8:35 PM

To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

As a 20 year resident in Nicolas Glen neighbor hood I think this new subdivision on Ponder lane should in no way come through Melissa Ave. I think all traffic for this new 100 home subdivision should only inter and exit on Highway 211. I also think if they had both Melissa and 211 access that most people in the new subdivision would use Melissa as the shortest way to highway 26. This would overload our neighbor hood. I could not imagine the construction trucks (Cement trucks as worst case) going up and down Melissa (Very steep road) to begin with, then the traffic would double the capacity that the local neighbor hood roads they were designed for. Is that developer going to come back in 10-15 years and maintain our overloaded streets.....I don't think they care! What about the traffic on Dubarko Rd, going right past the play ground every day, with the kids playing there. Our neighbor hood is fairly quiet and the Tickle creek trail system extremely pleasant to walk our dog and for others to walk, jog, kids ride bikes on the trail. I don't want to lose the small town feel that we have in our neighbor hood. All the extra traffic will ruin our neighbor hood. I strongly say NO Melissa Ave access.

Dave Meeker
18198 Grey Ave
Sandy OR

Sent from [Outlook](#)



EXHIBIT SS

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows subdivision

1 message

Carol Hassebroek <kingfritz1@live.com>

Tue, Oct 1, 2019 at 10:53 PM

To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Letter of concern,

Please dont let this subdivision go forward.

The traffic impact will make this side of Sandy miserable. I live further south on Trubel rd, & traffic is already terrible. 211 has backups almost to Dubarko now at peak times, holiday weekends etc.. It is not uncommon to wait thru 3 or 4 light cycles at 26 & 211 from the south.

Many people bypass the 211 hill into town,& drive thru 25 mph neighborhoods on Dubarko. Tupper, Sandy Heights, Bluff. Your making my hometown dangerous, & unattractive to spend time in. I'm only 2 miles from Town,& prefer to drive 10 to Estacada , for dining, shopping, & entertainment . It's a much nicer drive, not sitting at backups.

There needs to be a bypass installed or 4 lane roads with turn lanes, to keep drivers from using neighborhoods as detours around 211, 26, Bluff, Kelso, Trubel, etc..

Come up with a solution BEFORE anymore homes, townhouses, apts,are built . Fix the infrastructure , widen 211.

I went to high school in Sandy in the 70s. Same roads as now. The population has more then doubled. Recreational traffic is heavy from Thurs. - Sunday. Fix the flow, stop the backups, then add more developments. If developers had to fix the current problem before 1 more dwelling is built, the city would be better off.

Sincerely,

Carol Hassebroek
39400 SE TRUBEL RD
Sandy,Or.

Sent via the Samsung Galaxy S8+, an AT&T 5G Evolution capable smartphone



EXHIBIT TT

Emily Meharg <emeharg@ci.sandy.or.us>

Objection to proposed residential subdivision plans-Ponder Lane and Melissa Ave.

1 message

karen higgins <khiggins.chwb@hotmail.com>
To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Wed, Oct 2, 2019 at 10:16 AM

Dear City of Sandy Planners,

I am writing to voice my objections to the proposed plans for the residential subdivision and the developers proposition to use only Melissa Ave as a mean of entrance and exit for the additional 100 households with the estimate of 944 car trips per day.

My house is located one house off Melissa Ave and I have lived here for 15years. The traffic both on Melissa Ave. and on Debarko streets have increased dramatically. These streets are not designed for mass amounts of traffic, nor the effects on the safety of children, school bus stops and parking. Having lived here through many winters, the icy roads , especially the steep Melissa Ave. would cause ridiculous traffic jams and possible accidents. This is an absurd plan! In the case of snow or emergency,these households would be unable to exit!

The plans for stormwater detention tract are ridiculous without any thought given for the rights of the Nicholas Glen residents and their safety, ability to exit their neighborhood, along with the accomodation for construction vehicles rights-of-way!

Along with many of my neighbors, we plan on attending the meeting Oct 28th to adamantly voice our opposition to this plan. Realizing the fact, that Sandy is a growing community with need for expansion, I believe the Planning Commission needs to take the present homeowner's concern for safety, for the ongoing natural beauty of living in a rural community, and the honest look at the effects of corporate greed into account in making the correct decisions regarding this proposition.

Sincerely,

Karen Higgins
37487 Rachael Dr.
Sandy, Or.



EXHIBIT UU

Emily Meharg <emeharg@ci.sandy.or.us>

Nicholas Glen/Letter of Concern

1 message

Brian molcany <bmolcany@gmail.com>
To: emeharg@cityofsandy.com

Wed, Oct 2, 2019 at 10:37 AM

Ms. Meharg,

My wife and I would like to voice our concerns regarding the proposed residential subdivision, and Melissa Ave. being the sole point of access.

First off, we find it odd that the letter regarding the proposed project did not go out to all residents of the neighborhood, and that, from what I understand, the letter eluded to this project already being approved.

Doubling the amount of traffic on Melissa will have a negative impact on the entire neighborhood, especially in the winter as Melissa is very steep. We also have deep concerns in the event of an emergency or disaster that exiting the neighborhood will be a safety hazard.

Additionally, the construction process will effect everyone as the needed utilities upgrades will presumably make travel on Melissa a challenge during the construction process.

We also have concerns over what this will do to home values and property taxes. Also, it is our understanding that this project will affect property lines on Rachel Dr., which would be unfair to the current residents.

The general consensus is that, if approved, this subdivision will have a negative impact on the residents of Nicholas Glenn and we ask the city to stand by it's residents and not allow the developer to proceed.

Sincerely,

The Molcany Family
Wewer Ave

COMMENT SHEET for File No. 19-023 SUB/VAR/TREE:

9/29/2018

This is my response + concern re. the Bailey Meadows proposed development. My main concern is that Melissa Ave is the only access planned for the new development as well as ^{the} Nicholas Glen neighborhood. In addition, it came to our attention that some of the residents of the Nicholas Glen neighborhood had not been notified of the proposed Bailey Meadows development. While notifying residents within 500 ft. of a possible new development may meet the minimum "requirements" of notification, it does not meet the requirement that all residents of Nicholas Glen need to use Melissa as the only access to their homes & should have notification also.

Esther Naomi Quick

Your Name

503-482-0255

Phone Number

18214 Grey Ave, Sandy, OR 97055

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.66 Adjustments and Variances; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; and 15.30 Dark Sky Ordinance.

RECEIVED

OCT 02 2019

CITY OF SANDY

I hope you read what we send you.

EXHIBIT WW

COMMENT SHEET for File No. 19-023 SUB/VAR/TREE:

I am disappointed with the City of Sandy! First the apartments at Bluff Rd and Dubarke. I think it was unfair to the people already living there with the apartments so close and so high.

Now adding a 100 home subdivision behind our neighborhood, Nicholas Glen, with only one way in and out of them. If there was some kind of catastrophe and we need to get out or help was needed in but Melissa wasn't usable, what then??

I am amazed that this has progressed as far as it has. Why didn't you say "NO" until there is another road in and out??

It seems to me those of you making these decisions care nothing for People, only for money!

RECEIVED

OCT 02 2019

CITY OF SANDY

Edith Newton

503-668-3429

Your Name

Phone Number

18246 Grey Ave. Sandy, OR. 97055

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.66 Adjustments and Variances; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry, and 15.30 Dark Sky Ordinance.

EXHIBIT XX

COMMENT SHEET for File No. 19-023 SUB/VAR/TREE:

For the new residents to use Melissa as their only access ~~to~~ would be hazardous to the Children of the Nicholas Glen neighborhood.

The traffic would be horrible for this neighborhood & also on Dubanko. If ~~were~~ we were to have an emergency + in need of evacuation, it would be impossible to get everyone out of here. The narrow streets as of now are hard to travel during adverse weather conditions.

At the meeting ~~our~~ it was mentioned about our sewer system and how it is lacking. This needs a new system before anymore homes are added. Some neighbors have complained of low water pressure what will another 100 homes do to our pressure? I also believe that in addition to the homes there should be a park.

Lori Graham

Your Name

503 819-5202

Phone Number

31322 Rachael Dr

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SFR); 17.66 Adjustments and Variances; 17.80 Additional Setbacks on Collector and Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Required with Development; 17.86 Parkland and Open Space; 17.92 Landscaping and Screening; 17.98 Parking, Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; and 15.30 Dark Sky Ordinance.

RECEIVED

OCT 03 2019

CITY OF SANDY



EXHIBIT YY

Emily Meharg <emeharg@ci.sandy.or.us>

Proposed Bailey Meadows Subdivision Concerns

Jeff Conder <conder100@gmail.com>
To: emeharg@cityofsandy.com

Thu, Oct 3, 2019 at 9:15 AM

Hi Emily,

I've lived in Sandy since 2002. We've seen Fred Meyers come to our community and watched as Dubarko has become a major thoroughfare. We live near 362nd on Dubarko and now see that Dubarko is used by a large number of people to avoid hwy 26.

I can get from Bluff to 362nd with only one stop sign in between. This makes Dubarko a better choice over hwy 26 to get through town for many residents.

It's dangerous to cross 26 from side roads without a stop light. I could go on about 26 but my focus here is about having an additional ~1000 cars on Dubarko. A high percentage of those will use Dubarko to reach 362nd ave.

I recall many years ago after Dubarko opened up between Bluff and 362nd that the city stated it was capable of handling ~10,000 cars a day. I call BS on that capability, but the point is that another ~10% increase in traffic is going to have a significant impact on the safety of residents.

This could be alleviated by 1) not adding a new subdivision or 2) make west bound Dubarko exit to hwy 26 at Ruben Lane.

It's not in my best interest to add the subdivision without additional actions to lower the traffic impact in our neighborhood. Let's come up with a win-win proposal.

Best Regards,

Jeff Conder
36345 Dubarko Rd.



EXHIBIT ZZ

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows Subdivision

1 message

Bj Schonek <bjschonek@yahoo.com>

Thu, Oct 3, 2019 at 6:27 PM

To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

RE: Bailey Meadows Subdivision

We believe the proposed entrance being only Melissa Ave would create too much traffic for the one steep entrance.

The proposed Bailey Meadows Subdivision we believe should have its own ingress and egress. As does the Nicolas Glen Subdivision.

Concerned Neighbors,

Belus and Juanita Schonek
18102 Wewer Ave
Sandy OR 97055
bjschonek@yahoo.com



EXHIBIT AAA

Emily Meharg <emeharg@ci.sandy.or.us>

Proposed residential subdivision Bailey meadows

1 message

Danielle Raines <drainesrun@yahoo.com>
To: emeharg@cityofsandy.com

Thu, Oct 3, 2019 at 6:49 PM

Comment sheet for File no. 19-023 sub/var/tree

Hello Emily Meharg,

I am writing you to let you know my thoughts on the new proposed subdivision. My family and I live off Myra ct, so when we heard about this new subdivision, we didn't mind. However, when we found out more information on this subdivision, we quickly changed our minds and now DO NOT WANT IT TO GET BUILT! I am not one of those people from sandy who just don't want people moving in, I want sandy to expand. With more people means more opportunities for local businesses and more groups or activities for families. I just hope sandy is thinking long term and planning on changing the roads and adding more schools.

First of all, Melissa being the only entrance is going to change traffic. And not for the good, it is going to be absolutely horrible. Melissa cannot be the only entrance to this neighborhood. When it's icy, one car goes up and one car goes down. Having 800-1000 more cars driving up and down that street is going to be a disaster. It also changes the whole feel of our perfect little neighborhood. I worry for the safety of our kids in our neighborhood because of all these hundred of cars going up and down that huge hill (Melissa st.).

-Find a way to create a main entrance off 211!

Second, with every new subdivision that moves in, they build an awesome new park. So me being a mom of 2 kids under 4, I was really excited for a park that's within walkable distance, that's not on a huge hill or busy road like Dubarko. Something with some play equipment, or a pump track. However, I was informed that there will not be a park and that the contractor will instead give money to the city of sandy to build a park elsewhere. This really upsets me, we have no walkable parks, the one on Dubarko is terrible and you constantly have to hawk eye your children so they don't run into the road. With all these new houses being built (most people buying them will be families with young children) WE NEED A PARK OR OUTDOOR AREA FOR THE KIDS TO PLAY. We don't need it somewhere else in sandy we need it in our area.

-So the contractor needs to incorporate a park into this new subdivision.

And last, the city of sandy needs to think about all this growth and new traffic and start building new schools. The schools we have are already starting to get crowded. I want my children to actually get a good education with smaller numbers per classroom. I just don't think the city of sandy is thinking long term here.

We bought our house almost 3 years ago, and have put so much time, love and money remodeling it ourselves, while raising our sons and if this proposed subdivision gets approved. You can definitely expect us to be putting our house on the market and moving. So please, figure out another way to make a main entrance off of 211, think long term about schooling for our children and please put in a walkable, decent park (preferably with a pump track) in.

Thank you

-Danielle Mullan
Off of Myra ct.



Emily Meharg <emeharg@ci.sandy.or.us>

neighborhood expansion

1 message

Oliver Mullan <chipsandsalsa1416@gmail.com>
To: emeharg@cityofsandy.com

Thu, Oct 3, 2019 at 6:57 PM

Hello Emily Meharg,

I am writing you to let you know my thoughts on the new proposed subdivision. My family and I live off Myra ct, so when we heard about this new subdivision, we didn't mind. However, when we found out more information on this subdivision, we quickly changed our minds and now DO NOT WANT IT TO GET BUILT! I am not one of those people from sandy who just don't want people moving in, I want sandy to expand. With more people means more opportunities for local businesses and more groups or activities for families. I just hope sandy is thinking long term and planning on changing the roads and adding more schools.

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-Find a way to create a main entrance off 211!

Second, with every new subdivision that moves in, they build an awesome new park. So me being a mom of 2 kids under 4, I was really excited for a park that's within walkable distance, that's not on a huge hill or busy road like Dubarko. Something with some play equipment, or a pump track. However, I was informed that there will not be a park and that the contractor will instead give money to the city of sandy to build a park elsewhere. This really upsets me, we have no walkable parks, the one on Dubarko is terrible and you constantly have to hawk eye your children so they don't run into the road. With all these new houses being built (most people buying them will be families with young children) WE NEED A PARK OR OUTDOOR AREA FOR THE KIDS TO PLAY. We don't need it somewhere else in sandy we need it in our area.

-So the contractor needs to incorporate a park into this new subdivision.

And last, the city of sandy needs to think about all this growth and new traffic and start building new schools. The schools we have are already starting to get crowded. I want my children to actually get a good education with smaller numbers per classroom. I just don't think the city of sandy is thinking long term here.

We bought our house almost 3 years ago, and have put so much time, love and money remodeling it ourselves, while raising our sons and if this proposed subdivision gets approved. You can definitely expect us to be putting our house on the market and moving. So please, figure out another way to make a main entrance off of 211, think long term about schooling for our children and please put in a walkable, decent park (preferably with a pump track) in.

Thank you

-Oliver Mullan



EXHIBIT BBB

Emily Meharg <emeharg@ci.sandy.or.us>

Concerns regarding Nicholas Glen neighborhood and proposed new development

1 message

Corri Baldwin <corri.baldwin@gmail.com>
To: emeharg@cityofsandy.com

Thu, Oct 3, 2019 at 7:06 PM

Corri Baldwin
37524 Rachael Drive
Sandy, OR 97055
503-860-9398
corri.baldwin@gmail.com
10/3/2019

Emily Meharg
Associate Planner
City of Sandy
emeharg@cityofsandy.com

Dear Emily Meharg:

I am a resident of the Nicholas Glen Neighborhood and have some concerns regarding the potential new development that would be located off ponder lane north of 211.

My first concern with the proposal is that Melissa Ave would be the only road that would be connected to the new subdivision. I live on top of Melissa and see the traffic that is already there, it is concerning that the residents of a hundred more houses will be using this street as well. There is only one stop sign currently for a three way, to be four way intersection. There was no plan to make any traffic changes when I attended the meeting with the developers. I do not see how that would be a safe intersection with the addition of 944 car trips a day.

My second concern regarding Melissa Ave being the only road is weather conditions. Winters in Sandy can be icy/snowy. Melissa Ave is a good size hill, which is already a concern with the amount of traffic that is present now, adding more car trips during hazardous driving conditions is a major safety concern. I am also concerned that the road is not wide enough to accommodate the additional 944 car trips. Residents of Melissa park on the side of the street and depending on vehicle size, a car going up the hill the same time as one going down the hill cannot pass each other. Adding more traffic on Melissa would be a nightmare for all residents.

Another concern that I have is the fact that in case of an emergency, or natural disaster, it would be unsafe to evacuate or have emergency personnel safely get to where they need to go.

Another concern that I have is that there have been inconsistencies with property line surveys. The two that were marked are varied in where it says our property line is behind our house. We are Also worried that the sewer system in place would not be able to handle to new development as well, without an upgrade.

Sincerely,

Corri Baldwin



EXHIBIT CCC

Emily Meharg <emeharg@ci.sandy.or.us>

Safety Concerns about possible new housing development

1 message

Michael S. <mschell78@hotmail.com>
To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Thu, Oct 3, 2019 at 7:31 PM

Mike Schell
37524 Rachael Drive
Sandy, OR 97055
503-200-9230
mschell78@hotmail.com
10/3/2019

Emily Meharg
Associate Planner
City of Sandy
emeharg@cityofsandy.com

Dear Emily Meharg:

I am a resident of the Nicholas Glen Neighborhood and have some concerns regarding the potential new development that would be located off ponder lane north of 211.

My first concern with the proposal is that Melissa Ave would be the only road that would be connected to the new subdivision. I live on top of Melissa and see the traffic that is already there, it is concerning that the residents of a hundred more houses will be using this street as well. There is only one stop sign currently for a three way, to be four way intersection. There was no plan to make any traffic changes when I attended the meeting with the developers. I do not see how that would be a safe intersection with the addition of 944 car trips a day.

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Another concern that I have is the fact that in case of an emergency, or natural disaster, it would be unsafe to evacuate or have emergency personnel safely get to where they need to go.

Another concern that I have is that there have been inconsistencies with property line surveys. The two that were marked are varied in where it says our property line is behind our house. We are Also worried that the sewer system in place would not be able to handle to new development as well, without an upgrade.

Last but not least there was no mention of trees being cut down at the meeting, but yet the developer had people come out to do "a tree health inspection" of all the trees that border our property. In the event the other trees are cut to make room for a new walk way and road. We have one giant tree in our back yard that even if left would be affected by this action, and pose a very large safety hazard for our selves and neighbors if the other trees are taken near it.

Sincerely,

Mike Schell

EXHIBIT DDD

Ashley Parrish
37356 Rachael Drive
Sandy, Or 97055
503-440-5496
Ashleyparrish22@gmail.com

October 3, 2019

Emily Meharg (via email: emeharg@cityofsandy.com)
City of Sandy, Planning Division
39250 Pioneer Blvd. Sandy, OR 97055

To Ms. Meharg,

I am writing you to express my concern about the proposed Bailey Meadows development behind my neighborhood, Nicholas Glen. I have been receiving information about the Bailey Meadows subdivision, and I do not think it is safe or appropriate to have access to the new development solely through Melissa Ave.

We moved to this neighborhood in 2018, and although we fell in love with our house because of the beautiful view from the back yard, we knew it would someday be developed. I am not opposed to the new development behind my home. It is only a matter of time before the city keeps expanding and new developments are built, but to have all the new homes accessed only through a steep hill that is already overcrowded is poor planning and unsafe. Cars already go one at a time in the ice and snow, and I can't imagine what it would be like if the traffic is doubled.

My son is in Kindergarten at Kelso Elementary school, where I would assume the students of the new subdivision would attend as well. The classrooms and school are already at capacity, which is another reason I cannot support a new subdivision knowing it would cause our current students' experience to suffer. Until the city can support new growth, Sandy should not allow more developments to happen.

Sandy is an incredible city. It has so much to offer, and if we fight for proper growth, it will continue to thrive. More people will want to move here for the right reasons, not just because it is "cheaper" to live. That will create a positive community culture, with residents proud and desiring to take care of Sandy.

I know there are many concerned neighbors, and I hope that the city and its current residents can partner together to keep our neighborhood safe and make the inevitable future growth of Sandy reasonable and appropriate.

Thank you,
Ashley Parrish



EXHIBIT EEE

Emily Meharg <emeharg@ci.sandy.or.us>

Proposed neighborhood

1 message

Guimar D.D. <gddevaere@gmail.com>
To: emeharg@cityofsandy.com

Thu, Oct 3, 2019 at 11:38 PM

City of Sandy Planning Commission,

Hello

I live in the Nicholas Glen neighborhood next to the proposed development off of Ponder lane and Hwy 211. I am concerned for my family my home and my neighborhood with this proposal. This development would drastically change our quiet close knit neighborhood.

Right now we have minimal traffic because we only have one road in and out. Our kids are able to play outside without having to worry about the traffic racing down our streets. The new neighborhood would add another 100+homes with all that traffic coming through our neighborhood. The developers want to use Melissa Ave as the only road in and out of the new development. This would also add extra traffic to Dubarko Rd. Since the only road Connecting through our neighborhood to the proposed neighborhood will be Melissa Ave
Our Children will no longer be safe playing outside with all the extra traffic.

Our home values will go down. We would be connected to this large development by just one access road. The developers have stated that they will not be adding a park to this subdivision. Instead they want to pay a fee to the city of Sandy. This will be adding to the decline of our property values. When buying our home we were told that we had farm land behind our neighborhood so there would be no developments.

We are opposed to the building of this new development.

Thank you,

Guimar and James DeVare
18176 Rachael Drive
P.O. Box 331
Sandy, OR 97033.

EXHIBIT FFF

Erin Findlay

37616 Rachael Drive
Sandy, OR 97055
(503) 312-2608
stewstac@hotmail.com

October 3rd, 2019

Emily Meharg (via email: emeharg@cityofsandy.com)

City of Sandy, Planning Division
39250 Pioneer Blvd.
Sandy, OR 97055

Dear Ms. Meharg,

I am writing this letter as a concerned resident of the Nicholas Glen Neighborhood in Sandy, Oregon.

When we chose our home in Sandy, we very much expected growth and development. It was one of the reasons we chose Sandy. We knew that we could enjoy a rural landscape within a city that was guaranteed to grow and thrive -- rather than grow stagnant. Our downtown is truly thriving. Our infrastructure, however, can not keep up.

Having researched information about our current mayor (at that time), we felt certain that any new growth would be supported with careful planning for city infrastructure. Linda Malone understood "sprawl" on a personal level. She was born and raised in that environment. She knew what to look for in advance of problems developing. When cities outgrow their infrastructure and fall victim to private development, "city planning" becomes an obsolete term.

I believe that this proposed development provides us with an excellent opportunity. We can stand as neighbors and as a city, to bring the term "city planning" back to its true intent. I ask that until necessary infrastructure is in place, we as a city adamantly oppose new construction.

Bailey Meadows gives us an opportunity to set a precedent in our city.

Of greatest concern and specific to Bailey Meadows:

- We are ignoring the spirit and intent of our existing motor vehicle system plan if we allow Melissa Avenue to be the only vehicle access for this new development. 944 additional car trips per day is not acceptable.
- We are disregarding the safety of Nicholas Glen residents and future residents of Bailey Meadows if we allow this development be built with only one access point through Melissa. This shows complete disregard for public safety as it pertains to emergency response and evacuation. In consulting with our local fire and police entities, we know that they share this concern.

Of course, there are so many concerns to list -- both in regards to this specific subdivision and our general approach to new development in Sandy, OR.

When we met with the developers and their lawyer, I was enlightened. It occurred to me that the residents of Sandy are not being properly represented in this situation. Developers have a great deal of money, the ability to “lawyer up”, and for lack of a better term, they will typically “steamroll” your average voter/tax-payer. The lawyer representing this developer is well-known in land use. His ability to pick apart the intent of our city codes and change the purpose in which they were written -- is simply appalling.

We can not stand for this.

Our family is consulting with a land use lawyer who specializes in opposition work. We will be writing additional letters under his advisement. You can expect those letters to arrive after October 4th. We understand that it is our right to continue opposition in the form of writing and in person through October 28th, 2019.

We intend to do so.

Sincerely,

Erin Findlay

EXHIBIT GGG

Krista and Gabriel Stone
18111 Rachael Dr.
Sandy, OR 97055
503-312-0669/ 503-970-3037
mumbuns@yahoo.com/gpstone@acm.org
10/4/2019

Emily Meharg
City of Sandy, Planning Division
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055
emeharg@cityofsandy.com

Dear Emily Meharg:

This letter is to show my concern for the proposal of a new subdivision Bailey Meadows. I have read the proposal and the intent of where the subdivision is proposed to be located, as well as the entrance to the subdivision. My husband and I own and reside in the house 18111 Rachael Dr. which is in the subdivision Nicholas Glen.

The concerns I am about to address, concern not only my family, but all the families who reside in our neighborhood. I first would like to explain why 4 years ago, to this month, my husband and I decided to purchase our house in this neighborhood. We were a newlywed couple, and a blended family. I grew up in Brightwood, and after 12 years of being away from Oregon due to the military and previous marriage, myself and my two children moved back to Sandy, to be close to family and have a fresh start in the safe small town that I knew well. When I met my husband, I told him that in order to be with me and my kids, he would need to realize that I will not move out of Sandy. I felt that is the best for my kids and the best way for them to grow up surrounded by family and friends, safety of a small town, and good up bringing by being raised in such town. He agreed right away, which started our relationship off well, and ended up getting married at Timberline Lodge. As you can see, I have an extensive history and love of our area. We search and search for the right neighborhood that all of us could feel safe in. I at the time lived in the Cascadia Village subdivision, which did not have the safe feeling to it, as when I first moved into that area. So we were really looking for a quiet neighborhood with kids and low traffic. When we found the house, it was perfect. Low traffic, so much that most don't realize we have a whole subdivision there. Since my cousin also lived in the same neighborhood, I already knew what traffic was like and also was Melissa was like during the winter months. Being a born and raised Oregonian and resident of the area since birth, I felt I could handle Melissa just fine, and we have. For four years, we have enjoyed our neighbors, the children, and the feeling of letting our kids go to their friend's house, playing in the

Emily Meharg
10/4/2019
Page 2

streets with their trikes, scooters, and more. We have neighborhood block parties where our children can run and play in safety. Cars drive slowly and everyone knows to watch out for our little ones. We now have 4 children, one of which is a 3 year old. He loves playing with his friends on the street and riding bikes. Only traffic really we have, is those who live in our neighborhood. There is no through street, and this is one of the main reasons, why we purchased the home we did. Now, the uneasy feeling of thinking of Melissa becoming a through street, adding almost another thousand vehicles of just people who live there, plus visitors, more mail trucks, construction, and more, is just too much to handle. It is taking away the way of life we who live in our neighborhood have come to love and embrace. Below, I would like to take a few specifics of my concerns, and talk about them more in detail. These are in no particular order, but safety for our families is always the main priority.

1. Way of life:

- a. Our way of life is calm, comfortable, and untouched by passing traffic and strangers. I do not have to worry about someone breaking into my car if I left something in it, packages being stolen off of my porch, my dog being struck by a fast moving car because she ran out the front door, kids riding bikes and always having to get off the street because of so many cars or that those cars are driving so fast, that they can no longer play on the street, or random people checking to see if my front door is unlocked and wanting to break in. Our way of life is what we are trying to preserve. By introducing a new subdivision so close to our own, and having the main/only access through our ONLY access in and out of our own subdivision, will drastically change our way of life. I also live on a street at the very side of our neighborhood which people might think that it won't affect us over there. That's where they'd be wrong. More traffic, means more people. It draws attention to where it doesn't need to be drawn too. Strangers who have no business in either places, will now know about it and will turn our quiet safe neighborhood into a new crime streak. Fast moving cars who want to cause havoc because they can, people trying to go around Melissa when it is icy, and more. That would be the end of the way of life as we know it, thus our quality of life. It will become more stressful, neighbors will not know each as well if at all, because everyone will have to remain in their homes or backyards, because of the traffic, they cannot hear nor feel safe to venture out, and so on. Noise levels decrease value to our homes, because the quality of life for that much noise pollution, is not attractive to buyers. Not to mention to the residents there. Just because I'm on Rachael drive, doesn't mean I will not hear it. I hear the traffic now, even on Dubarko, which is at a minimal. I cannot imagine what Dubarko will be like with such an increase of traffic, and how those residents feel about it.

2. Melissa Ave.

- a. Winter Months are not easy for our single street in and out of our neighborhood. It becomes icy, no matter the attempts of the city to help it. It can be quite dangerous, so much that most neighbors do not attempt to go up or down this road until it starts to melt, unless they have 4x4, AWD, or studs on their vehicles. Those who are moving to Sandy, most likely from the PDX area, or out of state, will not understand how to drive on it, and they will be definitely starting on the top of Melissa. If they then figure out that other streets are less steep, then we will now increase dangerous traffic on smaller side streets where kids are playing in the snow. Stationary vehicle damage will increase, safety for family will decrease, and once again, our quality of life, things that we treasure in our neighborhood will cease to exist.
- b. There is a grassy hill towards the bottom of Melissa, off of Solso. This hill has traditionally been the "sledding hill" for kids of all ages, even adults. It has always been a fun family activity that is safe and brings our entire neighborhood together. It is such joy watching my children sled down the hill laughing and cheering on their siblings and neighbors. Not only will the uneasy feeling of an additional 900 cars trying to get up and down this icy road of Melissa, the accidents it will cause, and the pure fact that our kids will not feel safe either, destroys our tradition and brings sadness to our community. The amount of added children to this hill, will make it so that the current resident children may no longer to enjoy the hill they've come to love and is such an integral part of their childhood. Forced to leave the hill by hundreds of other children. They will just have to go back home and remember the days that they go have fun on their "sledding hill".
- c. My children and I have a tradition of walking in the snow when the first snow starts to stick. We walk down the street and enjoy the quiet and falling snow. We have done this for years before even moving to our area, and continue to do so. That tradition will not exist anymore will the increase of traffic and people. We won't feel safe being able to walk and enjoy the falling snow. Another quality of destroyed because Sandy no longer wants to be a small town.
- d. The residents on Melissa deal with minimal traffic as is. Most traffic is on Solso to reach the other streets to their home. Most residents who drive up Melissa either live on Melissa, or are doing to the homes up the street. I can't imagine how unsafe these families feel knowing that 900+ vehicles will be traveling up their street, where their children, pets, and families are. Especially during the winter. That must be very scary for them. If they want to sell their home, they will have more difficulty because they will now be on a primary busy street. When I was looking for our home, I refused to look at any on a main street, like what Melissa will be. They prices for their homes will drastically decrease and will be harder to sell. All because of the quality of life will decrease and noise pollution will increase.

- e. Vehicle pollution. Why is this an issue you may ask? Because tires are made of rubber and oil, they end of up the streets, which is why it is always the most slippery with the first rain after summer. We add 900+ vehicles through our neighborhood, you are adding more pollution that will end up in the beloved Trickle Creek. This will also cause it to be slippery which will make it hard for vehicles to stop at the bottom of the hill, which could cause cars to slide across Dubarko and if not hit or hitting another car, end up on Tickle Creek Trail on the other side of the road. More accidents with more vehicles in inedible. Making to be nearly 2000 cars combined, on a single street, connected two neighborhoods, is not only just a bad idea, it is a safety issue and irresponsible idea by not only the developers, but also the City of Sandy if they grant this subdivision. The solution other than denying a development in its entirety, is to have the road connect with highway 211. It is already set up for more traffic and will also decrease the traffic coming into town. Residents of the new subdivision have multiple options to reach their homes via Hwy 211, which has connecting roads to it. Bringing that many vehicles into side roads, like the way I typically go home, Hwy 26, Ruben Ln, Dubarko, then to Melissa, is all side roads. Connecting the new subdivision, does not use side roads that are neighborhoods in itself, but uses only one highway which is equipped to take on the increase of traffic. Thus creating a new safe entrance and exit for the new subdivision. Families who purchase those home will thank the City of Sandy to ensure their children's safety by not having them travel down a steep hill onto more side neighborhood roads. They also will have a sense of being close to town, without having the town traffic.
3. Hwy 211 and a site distance issue. This is absolutely ridiculous. There are so many ways to solve this tiny issue. On Melissa, I have an issue seeing around parked cars on Dubarko. The City didn't seem to have a problem with that when approving to have our subdivision there. The issue so much that I have had to stop in the middle of the road because I could not see an oncoming car. To think that this is safer then adjusting where the road will connect to Hwy 211, is extremely irresponsible. There will be an added almost 1000 vehicles blocking Dubarko because they will not be able to see around the parked cars, causing more accidents. Developers can design a way to where the road connects Hwy 211 at an appropriate angle to solve this issue. The City can slow the speed limit there to allow more time for distance with cars, so those can turn safely. There are other Subdivisions that are along 211 that have had the same issue and has successfully solved them.
- a. If the purchase of property to the south is purchased and granted an access from the City to create a road, that allows the developers multiple options for the Hwy entrance and exit. If they push through Melissa Ave now, and wait for the allowance to be granted to Hwy 211, the City has now accepted that Melissa will be turned into a new through street from Hwy 211, down to Melissa Ave, and dumping on to Dubarko. Thus increasing traffic into the thousands, on to a single road, through a neighborhood that

was quiet and peaceful. Increasing the accidents, safety concerns, crimes, and more. At the expense of the residents. The entire neighborhoods home values will drop. Quality of life, will be horrible. The feeling of being forced to move, is greater than ever.

4. Schools. Where would the increase of children go? Our children, who live within the City of Sandy limits, are having to go to Boring Schools. They are over capacity as is, and the proposal of this subdivision will overrun those school. If the zones are re drawn, will those children be in the Sandy area schools along with our own? So then we overrun the schools in Sandy? This again would be an irresponsible decision on the City of Sandy if they were to consider this, and push the subdivision anyway. What confidence will the residents of Sandy have in its leaders? What about the new developments already that have yet to sell those homes? Those children will be over running the schools, and the City is proposing yet another development without building new schools to support the influx of children, fixing up the old ones, or even the traffic of parents driving their children to school. This will decrease the good scores that our OTSD has been receiving recently. We would not be able to provide that amount of classrooms and teachers to facilitate the amount of children in them.
5. Where is the parks? Our city was known at the "Gateway to Mt. Hood". Since the Mayor or City itself, has changed our town into "Where innovation meets elevation". What a stupid thing to say about our town. We are not that at all. The City changed this without discussing it with over half the population. I come home one day to find the sign changed to that. It broke my heart. Everything our town stood for, for so long, has changed into yet, another Portland mindset. Tree City, we were known for our trees. Well, we are quickly cutting them down for row housing, and housing that you can touch your neighbor's house while touching your own. Change can be good, but not at a growth that not only our roads and neighborhoods cannot handle, but the city itself cannot handle. The amount of fatal accidents on Hwy 26, is astounding. To propose 250 more homes, that fatality rate will increase considerably. Their deaths will not be on my hands, but on the hands of those we appointed to run our small City, who desperately want to become a large city.
 - a. Wildlife will decrease, but welcome more dangerous wildlife. They will be pushed out of their habitats and moved into the neighborhoods. Domestic animals will be hunted as the wildlife try to survive. Farms and ranches will be threatened by the influx of wildlife as well. Our ecosystem will not be as good as it was, it already has effected the town.
6. I feel the need to sell my house and move out of the town I grew up with. I grew up 15 minutes east, but my family and church was in this town. Sandy High School is where we all came to go to school. I played Volleyball for Sandy when I was kid, many of my cousins, and even my aunt went to Sandy. I have roughly 30 family members in this community, friends I grew up with still live here. Sandy was my second home and it is a shame where it has evolved. I would like to take a piece out of page 19 of the Sandy, OR BrandPrint Creative Report and Implementation Plan and quote it for you at this time. "... Staying small is a big deal to our community." With all these new developments, why is the City of Sandy ignoring their own quote? Staying small IS a

Emily Meharg

10/4/2019

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huge deal to our community. I absolutely love going to the Oregon Coast. I however, am not moving there nor would I expect their residents wanting me to build a whole subdivision so that "others may enjoy the same beauty as they do". As I've heard so many tell me. In order to keep our town the small down we all love. We have to stop developing. I work in transportation in the City of Portland. The main public transportation resource Portland has. Portland is growing at a rate that we cannot keep up. It is causing a break down in our system and our own growth system. It is an uncontrolled grows and increasing violence that is not controlled. Portland has brought in homeless from all over the country. That is uncontrolled. When things are out of control, chaos exists. I live in Sandy for the peace of mind that my family is safe. I desire the small town feeling. I dream of walking down the main streets and knowing the business owners and residents. Sandy is not that anymore. Not like when I was a kid. Growth was bound to happen yes, but the rate it is happening and the uncontrolled ways the City is allowing, what comes next is crime. I see it every day. The time is now to take control. To lead our "small town" into the future of still being a "small town" that is loved and desired. People are moving out of Sandy all the time. Those who want to live here, can buy those homes. Thus, keeping our town, the desirable town we all love.

7. Small businesses. I am also a small business owner here in Sandy. I own BarcStone Photography. I have found out that I am running out of outdoor locations to take photos. Our downtown area is small and has not changed much which is great. But these neighborhoods are taking away our forests and fields. I am now competing with more "photographers" moving into the area. I am finding that I am having to find my clients elsewhere than in the same town I reside in. This is taking revenue out of Sandy. I am having to rent studios in Portland so that I can have a studio near where my clients are. I am spending money out of our town, so that I can keep my small business going. The new residents here are not spending money in Sandy either. They are going back to Portland to get what they need because that is closer to their work and what they are familiar with. Why spend money with small business that have to increase their prices due to the fact that residents do not spend money in town, when they can purchase their products and services elsewhere and bring it to our town. My son plays football for Sandy High School. When he played youth football, I learned a lot of sandy residents have their children playing for other areas instead of our own. If our own residents are not spending money in our own town, why would we think that new subdivisions will create more work and more revenue for the City and the business owners here? The City allowed a new chain of farm equipment into the town, Tractor Supply Co. which is taking revenue from Garens Feed, Dolly's Pet Shoppe, even the local chain of Bi-Mart. The new residents are not farmers, and most likely not want to purchase clothing from this store, so they will take their money into Gresham and Portland and purchase their items there. A short term influx of income from development does not secure long term revenue.

Emily Meharg

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In conclusion, the proposed subdivision has so many negatives to it, that this proposal should never have gone as far as it has. The City of Sandy should care more about its current residents and put more restrictions to keep such developments from our small town. The urban growth in our town, is substantial, so much that our town cannot handle it. The traffic during the tourist months is extreme and unpleasant. In non-tourist months, the traffic is still way to high for our town to handle. My teenage kids walk around town and visit the small shops. They cannot even cross the street without feeling scares because our own police do not have enough resources to keep vehicles from speeding, running red lights, or driving unsafely. Even with our traffic lights, they are unsafe. Our community first responders are not large enough to handle the size of the town as is, let alone increasing the size. I have talked with the Supervisor of the Police Department, and he said they are extremely understaffed and they cannot respond to every call. When I had an emergency, an officer had to call me on the phone, instead of coming to their citizen's home to respond to it, they called me. This is not how a city is ran. I pay high property tax, and pay City taxes, and I am considering leaving my own town, because I feel that the City of Sandy would rather make money from development and could care less about our historical town. That is not a City I want to live in. It is a horrible feeling and to uproot my children from their friends and school is not a good thing. But I need to preserve our quality of life and have to take it into my own hands, since our leaders of our town, do not care about preserving it.

I ask that the City of Sandy carefully reads each and every letter it receives from not only out subdivision, but those that are presented from any current resident in Sandy. If any Council member grew up in Sandy and remembers what it used to be, please remember it. Please don't let the temptation of money skew your beliefs of what our town should be. It should be a small town, and not a City. It should be a town where people recognize each other and say hi. A town where we love to call home and feel safe. A town where neighborhoods are kept and not destroyed and made unsafe. A town that is loved by its leaders who control the growth and understand why the citizens live here, and preserve that. I ask that you consider keeping our town a family town and consider our children, and our children's, children.

Sincerely,

Krista and Gabriel Stone

10/04/2019

EXHIBIT HHH

October 4, 2019

Emily Meharg

City of Sandy

Planning Division

39250 Pioneer Boulevard

Sandy, OR 97055

RE: 19-023 SUB/V AR/TREE (Bailey Meadows)

Dear Emily Meharg,

I live at 37708 Rachael DR. I attended the Nicolas Glen Neighborhood meeting on September 18, 2019 regarding the new subdivision, (hereinafter) Bailey Meadows. It was informative and upsetting. I understand the Sandy area is going to continue to grow as people want to move out of the "City" life and into the "country", that's just the reality of our growing world. I feel like the City of Sandy should properly prepare for this growth, by expanding our water/sewer treatment, our grade schools, and our traffic control prior to allowing/approval of the multiple subdivisions being added to our city. I understand we need to have the growth to have our city continue to be a thriving community but, the city planning division is already aware of what constraints and over capacity our utilities, grade schools, and roads have as of this moment without adding in any other developments or finishing uncompleted developments.

My concern for the approval/development of Bailey Meadows is safety for the Nicolas Glen Neighborhood. I have many other concerns for Bailey Meadows development but, I am only going to focus on my main concern. Our neighborhood has one main entrance, Melissa AVE, and the amount of traffic traveling through our neighborhood at its current state is over the projected safe amount of traffic. Bailey Meadows is projected to add 100 homes. If approved its going to add more cars to travel up/down Melissa. That is if the developer projects households having 1 car per household. Most household have multiple cars and that does not include visitors. Melissa at its current state is narrow. If the residents who live on Melissa have parked on the street or parked on both sides of the street, you need to wait and let one car down/up at a time. Melissa in inclement weather is not safe traveling up or down with more than one car at a time, many people park along Debrako in inclement weather to avoid traveling up/down the hill of Melissa. The developer plans to add more cars to this road in inclement weather.

What if there was a disaster or emergency and the Nicolas Glen neighborhood and Bailey Meadows needed to be evacuated, Melissa being our only exit, how will all the residents get out safely? I know Ponder Lane is available for "emergency" use per the developer, but Ponder Lane has not been properly

maintained by the county or city to handle the potential “emergency” traffic. This is very poor emergency planning for both residents and first responders.

I understand development is going to happen as our community continues to grow. I have lived in the Sandy community for 40 years and watched it grow at an exponential rate that has been too fast, unsafe, and ill prepared by the city. Please consider not allowing this development to continue until there has been better planning on safety. I feel like the developer is rushing to make this happen at the cost of both current and future residents’ safety. As I have stated above, I have many other concerns with Bailey Meadows, but I feel safety is of the utmost importances.

Thank You

Faith Egli

503-804-9214

Faithy30@hotmail.com



EXHIBIT III

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE - Letter of Concern

1 message

Tim Sellin <tim.sellin@gmail.com>
To: emeharg@cityofsandy.com

Fri, Oct 4, 2019 at 4:57 PM

Dear Mrs. Meharg,

I'm a resident at [18256 Melissa Ave, Sandy, OR 97055](#)... on the 'main feeder' street into the proposed Bailey Meadows Subdivision. My wife Nicole, has spent numerous hours organizing our neighborhood and researching the project, herself. I echo each and every one of her written concerns. We've done our best to not 'stoke the fire', but instead... organize and inform those in our neighborhood that cannot attend the information meeting or haven't received the information we've been provided.

Though neither of us is inherently against the growth of the City of Sandy, in this case... it seems the 'cart is before the horse' on three key features of infrastructure build-out [schools, streets and safety].

Schools - in this expected development of 100 homes, I believe it's fair to assume that the vast majority of the homes will be purchased by young families. I'm certainly no census-worker, but if 100 more children were to join the community... that would equate to between three or five classrooms-worth of attendance at local schools. I know that ages will vary, but the fact is... at Kelso Elementary and Boring Middle, classes are already at capacity. It seems prudent to staff and have classroom space for the growth versus packing in more children to already taxed facilities.

On top of 'weather-related' street and safety concerns mentioned herein... on 'snow route' days for school buses... are the new families' children of Bailey Meadows supposed to congregate at the base of Melissa and Dubarko as is standard now? Channeling future home-owning parents' minds, "No thank you".

Streets - possibly our greatest concern is how new residents would enter/exit the neighborhood. Again, I'm no transportation researcher, but I see the speed and rate of vehicular egress on a daily basis. Honestly, it's not horrendous right now, but I can only imagine another 800-1000 trips a day. It will become a highway. The three-way intersection at the top of the hill will become a four-way and likely require a light. I'd imagine a light at the bottom of Melissa and Dubarko would be required. All that to be said, I can't imagine the developer or the City is going to put in a light at either spot.

The fact that no other access into the development is being proposed and/or explored seems a bit ludicrous to me. Or maybe it is, but it is being presented as an impossibility to us residents. I know there are future transportation projects that may remedy this... but to my above point in 'Schools', maybe we wait... get the new vehicular infrastructure in place... THEN build the development.

Another curiosity of ours is how we're expected to access our property when/if development were to commence? As we understand it, a 22 foot [deep or wide, I'm not sure] trench will be dug down the middle of Melissa Avenue for sewer connection, power, water, etc. Are the 35 homes that either dwell on Melissa, or use Melissa exclusively for access to their homes [the dead-end of Rachel Drive to the East] supposed to park at the bottom of the hill and walk home? No.

Safety - Off the top of my head, since we moved into our residence in the Summer of 2011... we've had a handful of snow/ice events that affected our neighborhood. Knowing that the Public Works Department at the City is limited, I've personally shoveled the hill myself, a multiple occasions. Though it seems to be in vain a bit... as cars still slide through the stop at the bottom of the hill on a regular basis. A former neighbor actually snapped their axle of their Subaru on the curb at the bottom of the hill, not being able to stop. When roads are plowed in such weather events, Melissa Avenue is significantly 'narrowed' by the plowed snow. I cannot fathom how another 100 homes [800-1000 trips per day] would be able to get into and out of the neighborhood as such.

I also worry for the safety of the children of the neighborhood. Currently, they congregate at any 'level section' and ride their bikes, throw a ball, etc. The most popular of sections seems to be the top of Melissa Ave. where Rachel Drive bisects.

There are also about 1/3 of the homes in the current Nicolas Glen neighborhood that collect their mail at the same Melissa/Rachel intersection. I'm sure tensions will rise when the 'dead end' area where the proposed road would be punched through to Bailey Meadows... as it's a fantastic temporary parking area for neighbors looking to retrieve their mail on a rainy day.

Though my individual concerns are not exhaustive... again, I echo my wife, Nicole Sellin, and her much-better-written letter. There are code compliance concerns, common-sense red flags and the like that beg the question, "Why not wait, address the infrastructure [schools, streets, safety] issues first... THEN build?"

Thank you for taking the time in reading my email,

Tim Sellin

503.799.7195

tim.sellin@gmail.com

[Facebook](#) | [Twitter](#) | [LinkedIn](#)

EXHIBIT JJJ

Nicole Sellin
18256 Melissa Ave
Sandy, Oregon 97055
503.887.6284
nicole.sellin@gmail.com
October 4th, 2019

Emily Meharg
City of Sandy, Planning Division
39250 Pioneer Blvd.
Sandy, OR 97055
emeharg@cityofsandy.com

Re: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

Dear Mrs. Meharg,

I am writing this letter in regards to the newly proposed subdivision, Bailey Meadows, and its possible impact on our Nicholas Glen community, as well as the city of Sandy. As a resident of Nicholas Glen, and specifically a resident on Melissa Avenue, I am quite concerned with the proposal.

Nicholas Glen has been my home for over 8 years and it is truly a great place to live. My husband and I carefully chose Sandy to raise our family because of the small town atmosphere where neighbors are like family and community is important. We picked our home in Nicholas Glen because it is a small, quiet neighborhood that is nestled on the outskirts of several other neighborhoods, rural farm land, and natural areas (Tickle Creek.) My husband and I knew that growth would happen, especially when looking at neighboring communities like Happy Valley, where growth is exploding. However, we are concerned with the growth in the city of Sandy and its lack of infrastructure to not only accommodate such growth, but to thrive with the growth. We are concerned with the city's lack of ability to meet the needs of its residents in terms of safety and education with the increase in population. We are concerned with the city losing its unique, coveted, small town atmosphere as a place where neighbors are like family because of the idea that growth is the way to progress (i.e. the branding "where innovation meets elevation.").

When I first received a letter from the City of Sandy Planning Department about the proposal, I was in shock. How could another 100 homes (with 944 additional car trips per day) use Melissa Avenue as the only access in and out? Fortunately, I was able to attend the Neighborhood Meeting with AKS, the developer, and his lawyer on September 18th, 2019. I went into the meeting with the purpose to hear and understand what their plan is, then relay the information to neighbors who could not make it. The meeting was an eye-opening experience, to say the least. I knew our neighborhood would be upset about the proposal, but I did not expect the amount of people and the level of frustration that I saw; there was standing room only. I knew that the developer and his crew are interested in this neighborhood for one purpose, to make money, but I was appalled by the lack of care and concern they had. Even when asked, there was no regard to what impact this new subdivision will have on our neighborhood, our schools, or our city. I left that meeting more concerned than before it started.

These are my specific concerns with regard to the proposal of the Bailey Meadows subdivision:

- Traffic: One way in and one way out, using only Melissa Avenue, is going to cause a huge increase in traffic for our neighborhood, the surrounding neighborhoods, and the entire city.
 - According to the City of Sandy's Transportation plan, local streets have the typical capacity of 800-1000 average daily car trips. The new development of 100 proposed homes would add approximately 944 additional car trips on Melissa Avenue. Since the current Nicholas Glen neighborhood has over 100 homes already, it is safe to say that the traffic on Melissa Avenue will be double the typical capacity of a local street. Double the traffic is not conducive to a safe, enjoyable neighborhood. City Code 17.100.100 states the pattern of streets should be connected in such a way will spread traffic over many streets so that key streets are not overburdened. With only one access point Melissa Avenue will be overburdened and this overburden will sprawl onto Dubarko and the other arterial streets with major connections to US 26.
 - An additional 944 car trips per day will increase drive time not only on Melissa Avenue, but also on Dubarko, Bluff, Ruben, and 362nd. The intersections of Dubarko/OR 211, Dubarko/362nd, 362nd/US 26, Ruben/US 26, and Bluff/US 26 are currently rated as a C or D for their level of service according to our transportation plan mobility standard. With added development that has no other alternative route, those intersections will become much more overwhelmed and their level of service will decrease, most likely reaching the point of failing mobility according to the city standard. More drive time means wasted time and wasted fuel while stuck in congestion.
 - More cars brings the possibility of more accidents. Cars already drive with excessive speed up and down the hill of Melissa Avenue. Children will no longer be safe enough to walk, ride their bikes, and play in the streets of our community, as there is a possibility of more pedestrian-involved accidents with increased car traffic. Increased traffic leads to frustrated drivers, who take more risks and drive faster. According to the city's traffic plan, there was a study that stated two accidents happened on Melissa Avenue between 2005 to 2007, one occurring at the intersection of Melissa/Rachael and the second occurring at the intersection of Melissa/Solso. The same study also mentioned that the intersection of Dubarko and OR 211 had a crash rate of 1.08 MEV, which is a relatively high crash rating, and it said that the intersection is in the top 10% of hazardous ODOT SPIS locations. The new development proposal's traffic study did not include the intersection Dubarko and OR 211 in their study, which raises the concern on how the new development would affect that already questionable area.
 - More traffic will cause an increased noise level in our quiet neighborhood. Increased noise will change the quality of life in our neighborhood because it affects the ability to sleep, causes anxiety, and decreases overall health.
 - As traffic volume increases, air quality will diminish and more pollution could enter Tickle Creek, contaminating it.
 - Extra noise and traffic will lower property value, especially to those homes on Melissa.
 - Developers were requested to have a second access connecting the new neighborhood to OR 211. However, they fully intend to continue their proposal of only one access. This shows a disregard for our city's planning division in terms of the transportation system. It shows a disregard for the quality of life for the residents of both Bailey Meadows and Nicholas Glen. It shows a disregard for the congestion for the entire city of Sandy including its residents and tourism traffic. The reasoning behind not having a second access point, in my opinion, is mediocre at best and shows a lack of care for the immediate future in our city.

- Developers claim there are site distance problems and the existing road, Ponder, hits OR 211 at an oblique angle. This seems to be illogical, considering that at the exact same spot where Ponder meets OR 211, on the eastern side of OR 211, there is already a new development with access using Arletha Court. If site distance and the oblique angle are an issue for the Bailey Meadows development, why would another development, using that exact same spot of intersection, be allowed a point of access?
 - Developers mentioned that they have an agreement with the landowner to the south of the newly proposed development to purchase their property, with the purpose of future access to OR 211. However, that property is outside the Urban Growth Boundary currently. Because of this, even if that property were to be entered into the Urban Growth Boundary (which takes time), it will be years down the road that their idea of accessing OR 211 will even be feasible. According to these developers, they would need to an exception from the county to put a road through rural property to access OR 211 and from their talks with county planning, the staff would most likely not support that needed exception.
 - Kelly O'Neill mentioned in the September meeting that Gunderson Road connects to 362nd and is a possible second access point to the neighborhood. It is also a part of the future city transportation plan. According to Kelly, the developer's application did not touch on this. In the meeting, developers said that it is not a possibility because Gunderson would have to cut through rural land.
- Safety: A cluster of 250+ homes in a small area, with one way in and one way out, will decrease the safety and security of our neighborhood.
 - Police, Fire, and Ambulance response time will be prolonged with only one main, well kept access street. The second access off Ponder will be available, but it is not ideal and probably not as safe for a quick response.
 - In the event of a natural disaster, Melissa Avenue would be an evacuation nightmare because it is the only way out for over 250 families.
 - Crime rates may increase with more people; even if the rate does not change, the amount of incidents will increase because of the population increase, which puts us more at risk for being the victim of a crime. Also, according the website (<https://www.neighborhoodscout.com/or/sandy/crime>), Sandy is only safer than 27% of U.S. cities; meaning 73% of US cities are safer than we are. It also mentions that our city already has a high rate of crimes per square mile (80.) Comparatively, we are higher than the State of Oregon (60) and the National Median (31.1). When compared with cities the same size, Sandy's crime rate is quite a bit higher. Increased development could increase this rate even higher.
- Education: Adding more homes in the city of Sandy would cause a decrease in educational effectiveness within our school district.
 - Kelso Elementary, Boring Middle, and Sandy High School are the three schools affected by this proposed new development, as the new neighborhood would be in their school boundaries as it is currently drawn. Kelso Elementary and Boring Middle are already over 100% capacity. In a meeting with school parent groups, the Superintendent of Oregon Trail School District stated that Kelso is at 134% capacity. Even if boundaries change, Sandy Grade and Naas are over 100% capacity, and Firwood is at 98%. Our children will suffer.

- There are currently new homes already being built within the boundary of these schools and several others that are tentative. If we add yet another development, it would cause a catastrophe as far as classroom size, space for classrooms, effectiveness in the classroom, mental health of students, safety of students and staff, and teacher burnout due to increased capacity and lack of resources.
- Parks: Developers, as I understand the city code 17.86, should have a parkland dedication of 1.29 acres (using the formula given $100 \times 3 \times 0.0043$.) In the meeting, they made it perfectly clear that they will not dedicate any land for parks; it is not negotiable for them. They will simply just pay a fee instead. To me, this again shows the lack of care and regard for our city planning and for the future of the area.
- Wildlife: With the development of rural land, wildlife will be threatened. They will be pushed out of their homes. Vehicle collisions with wildlife might increase as these animals venture through neighborhoods as they move south. Increased amounts of pollution could harm remaining wildlife.
- Construction: A new development will cause a long-term disturbance on our neighborhood community, though the plan for construction has yet to be discussed.
 - When asked at the September meeting, developers would not explain their plan for construction because “it was not part of this step in the process.” As a resident of the adjoining neighborhood, and a resident on Melissa Avenue, the plan for construction is a major concern and something that should be shared at this step because it will impact our quality of living as the developer completes each phase.
 - One part of the construction mentioned was that the new development would tie into our neighborhood wastewater system. To do this, the developer would have to tear up Melissa Avenue, putting in a 20+ foot trench down the middle of Melissa Avenue. Since Melissa is the only access into the neighborhood, and part of the neighborhood can only access their homes at the top of Melissa Avenue, this trench is a major concern. Of course, no plan was shared on how access will be given to residents on Melissa Avenue, nor to the residents on Rachael, east of Melissa.
 - Sandy’s wastewater system capability is another concern. Despite improvements to the 20 year old system, it is consistently failing to meet permit requirements. According to the city’s website (<https://www.ci.sandy.or.us/wastewater-system-improvements>), our wastewater treatment system does not have the capacity to service our current population. Increasing the population will further tax this system until it can be remedied, which will take time and money. Of course, the cost is being passed on to current residents by raising our bills almost \$23 a month, which is a significant amount for families. Even though the plan is almost finished, it will still take time and it sounds like this development may start as early as next fall, which is probably much sooner than we can fix our wastewater system.

Our city has the opportunity to show its residents and the state of Oregon where our priorities are with the decision on this proposed development. Our city branding is, “Where Innovation Meets Elevation.” How does this new development show innovation? The answer is, IT DOES NOT. There is nothing innovative about creating more traffic within a limited infrastructure that is already taxed. There is nothing innovative with increasing class sizes in our schools, decreasing classroom effectiveness, risking the safety and health of our students and staff, and putting more classrooms in portable buildings because we cannot afford to fix our current schools, let alone build another. There is nothing innovative with taking away the safety of our

families by only having one main road in and out for over 250 homes, a road that is dangerous in ice and snow because of the slope and would have poor access for police, fire, and ambulance. Is our priority growth above all else, no matter the cost it has on our safety, our city infrastructure, our schools, our Sandy way of Life? Is another new development good for Sandy right now, as our city currently exists? Do we have the infrastructure, the schools, the first responders to effectively serve more people at the current moment, or even in the near future? Myself, and many others, do not believe we are ready for this new development in our city right now. You can simply look on Facebook, in the Sandy Neighborhood Watch and Sandy Community Information groups, where you will see several posts and hundreds of comments not in favor of more development.

I love Sandy and the Nicholas Glen neighborhood. Our community is like no other that I have lived in. People actually care about each other. On page 19 of the Sandy, Or BrandPrint Creative Report and Implementation Plan, it states,

“...an intuitive few made Sandy their home. They heard the call of the mountain. They wanted to build their town, their way. More than a century later, people with that same vision and grit come in search of The Sandy Way. They see a forward-thinking infrastructure to support their life and business. They see that majestic, snow-capped mountain in the distance. They want to be where innovation meets elevation. Innovation. Elevation. Location. Sandy is perfectly positioned between two Oregon icons. Right next door, Mt. Hood National Forest puts 50-foot trees in our backyard and postcard views of the region's tallest mountain at every turn. Just 25 miles to the west is Portland, a city close enough to share its culture and conveniences —restaurants, shopping and higher education —and far enough away to keep the sprawl at bay. Staying small is a big deal to our community. We make the most of our notable neighbors, but have an identity all our own. I guess you could say that in Sandy, we're worth more than a peak.”

Some key points that we are failing at, if we were to approve this proposal, are “They see a forward-thinking infrastructure to support their life and business” and “Staying small is a big deal to our community.” We have a transportation plan to update and build infrastructure for growth, but no time frame for that plan to start. We are facing limits due to the Urban Growth Boundary and rural land. Our school district is working on a plan to meet the growth, but time and money are factors. By allowing yet another new development, we will just overburden our current transportation system and educational systems. Sandy is simply not ready for the proposed new Bailey Meadows development yet. It may be feasible years down the road, once we fix the current issues, but it just does not make sense in the present time, with the present conditions, for the current residents of our city.

I ask you to carefully consider my concerns, and the many others that will be presented to you. I ask you to think about our city brand and if this new development will be innovative, or destructive. I ask you to imagine that you lived on Melissa Avenue and how it would affect your way of life, others, and the city.

Thank you for your consideration.

Sincerely,

Nicole Sellin



EXHIBIT KKK

Emily Meharg <emeharg@ci.sandy.or.us>

Concern regarding over use of Melissa Ave.

1 message

Barbara Coutts <lostdimond@aol.com>
To: emeharg@cityofsandy.com

Fri, Oct 4, 2019 at 5:19 PM

~ Hope this letter of concern isn't too late....I thought the deadline was today, not before today...my mistake. □
~ So, briefly, not only the estimated 944 ADDITIONAL vehicles traveling through our family oriented streets, but the COLLATERAL vehicles (friends, relatives, FEDEX, UPS, Maintenance workers, buses, etc....) MUST also be taken into account.... !!
~ Please take these concerns into account; there is no reason, another one or two solution roads cannot be built . Safety and sensibility must rule.

Thank you ~~~~
barb coutts.....37265 Solso Drive.

Sent from my iPad



EXHIBIT LLL

Emily Meharg <emeharg@ci.sandy.or.us>

Letter of Concern

1 message

Shelly Evett <shelly.evett@gmail.com>
To: emeharg@cityofsandy.com

Fri, Oct 4, 2019 at 8:05 PM

Emily,

I was out of town, so I was unable to attend the meeting on the 18th of October about the new development going in behind my neighborhood, and just saw the flyer on our mail box the other day about voicing my concerns related to the increase in traffic related to the new neighborhood, so I am hoping this email will be included with others. I have lived in the Nicholas Glen neighborhood for 17 years and am the original owner of my home. This neighborhood is a quiet neighborhood, has block parties, everyone watches out for each other, and has the right amount of traffic in the neighborhood to keep it safe for all. I am concerned about the proposal of using Melissa as the only access point in and out for the new community. Melissa is a neighborhood road that was not built to be a main thoroughfare for traffic. There are families that live on Melissa, kids play in the street, and families also park cars on that street. Adding more cars will increase the risk for accidents because cars often have to pull to the side to let cars pass before continuing on, and as we know when a road becomes a thoroughfare drivers often drive faster than the posted speed limit and I feel this will put kids playing at risk.

One of my main concerns is the fact that there is only one way in and out of the neighborhood. If there is an emergency how would all these people get out safely and in a timely manner, in addition how would emergency people get in. Another concern is that the increase in traffic will hinder getting on to Melissa from the side streets Rachel and Solso.

I am not opposed to developers wanting to develop a new neighborhood, that is how our neighborhood was started, I just feel that the new neighborhood should have its own access roads to maintain livability for both neighborhoods.

Thank you,
Roberta (Shelly) Evett
18192 Rachel Dr.



EXHIBIT MMM

Emily Meharg <emeharg@ci.sandy.or.us>

Letter of concern about the proposed new development on Ponder

1 message

Laura Kvamme <notellk@yahoo.com>

Fri, Oct 11, 2019 at 12:39 PM

Reply-To: "notellk@yahoo.com" <notellk@yahoo.com>

To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

I Have deep concerns about the proposed development on Ponder Lane North of 211.

Chief among those concerns are the desire by the developer to use Melissa Avenue as the only entrance or exit to that development. I also have concern about the construction vehicles that will be going up through Melissa during the process of development and the closure or partial closure of Melissa to increase the water and sewer capacity going to that development.

I want to know when the next city meeting will be held.

Thank you for your attention,

Laura Kvamme

37438 Rachael Dr

Sandy Or

Sent from Yahoo Mail on Android













EXHIBIT NNN

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows Subdivision

1 message

Kelli Acord <kacord@ridesta.com>
To: "emeharg@ci.sandy.or.us" <emeharg@ci.sandy.or.us>
Cc: Kevin Moody <kmoody@ci.sandy.or.us>

Fri, Oct 18, 2019 at 9:26 AM

Good morning Emily,

I just received notice about the proposed subdivision addition for 100 potential homes in the Baily Meadows Subdivision. I wanted to reach out and give you feed back from the bus transportation side, in hopes that you can take this into consideration.

We currently pickup nearly 20-30 students for elementary and then another 20-30 for high school and middle school. By adding an additional 100 homes, that adds the possibility of 200 students. That would mean that a bus need would be greater and would need to be able to go down the proposed 25 foot road (Melissa Ave). Our buses are 11 ft wide plus 1 ft on each side for mirrors (13 ft), that's more than half the street width. Melissa Ave wouldn't be connected without having a jog in the road and that space is only 24 ft wide on one side and 26 ft wide on the other side of the intersection. Another concern would be that the city typically allows cars to park on both sides of the road and at the stop signs. If this is the case, a bus (small or large) would not be able to safely maneuver through the neighborhood. If the buses cannot maneuver, a firetruck or ambulance would have the same concern.

Approving this neighborhood as it is currently platted would be absurd for the safety of everyone.

If you have any further questions, please do not hesitate to contact me.

Kelli Acord

Operations Manager

36366 Industrial Way Ste B

Sandy, OR 97055

503-668-8855

503-662-7290 (Fax)

EXHIBIT OOO

Elizabeth A. (Libby) Burke
37412 Rachael Drive
Sandy, OR 97055
503-668-8553 (home)
808-756-3066 (mobile)
Email: libby@briodzn.com

City of Sandy
Development Services
39250 Pioneer Blvd
Sandy, OR 97055-8001
Attn: Kelly O'Neil, Planning and Building Director

October 20, 2019

Dear Kelly,

I am a homeowner on Rachael Drive in the Nicolas Glen subdivision along the boundary of the proposed Bailey Meadows subdivision inside the new UGB. Having attended the public meeting held by the developers at the Sandy Library in September (which you also attended), I would like to voice my concerns about the proposed opening of Melissa Avenue to the new subdivision, and state some impacts I see in this matter.

There are several reasons I feel this is a very bad solution to the 90+ home development, starting with the use of Melissa Avenue, our subdivision's only egress, for land-moving heavy equipment and construction materials coming up that steep hill where we have many children playing, waiting for the school buses, riding their bikes, and where our community members walk their dogs and stroll with their babies. The traffic that would ensue for this use would greatly disturb the quiet neighborhood and endanger our community members, pets and others. And the later impact is just as bad.

Melissa Avenue is only two blocks long and ends at the bottom of the hill where the other road, Dubarko, runs along the bottom of our hill. Dubarko has traffic-routing curved sidewalks to encourage slow driving. I am concerned that if that road has a lot of large trucks bringing in equipment and materials as stated above, this would endanger not only our quiet road's sidewalks but also those living there who walk, run and play safely on Dubarko now. We have a children's playground on that street as well as many entrances to Tickle Creek Trail.

Another concern is that this hill is very slippery in cold weather; we all have to drive out of our roads and on to Melissa Avenue to get down the hill. When I drive down the hill during icy conditions, I wait until the car in front of me has cleared the intersection of Dubarko and Melissa, before continuing down myself, with concern for slipping. Adding the cars from the 90+ new homes will greatly impact the ability for everyone in both subdivisions to drive safely.

I would like Development Services and the Planning Commission to review the plan for this subdivision and consider the impact these new homes will have on our small, quiet, middle-income community. Also, I understand that the new sewer lines that will have to be laid will be also going down Melissa, which obviously will be dug up for that project. Again I would like to remind you that tearing up the one road that is the egress for Nicolas Glen would greatly

inconvenience those of us who have lived here for many years. I have lived here for 9 years and have come to love our quiet neighborhood. With all these new proposed vehicle trips daily both in the construction and residential phases, our quality of life will be damaged beyond what we can do anything about. We have lived here and paid our taxes all these years, and although I know that the subdivision itself will likely go ahead, I would really like you to consider creating egress to Highway 211.

Other subdivisions have been built recently across from where this one is planned: Arletha Court, the Cascadia Village Annex and before that the larger Cascadia Village. Bornstedt Road had to be routed on to the highway. Those others also enter and exit by the highway. I would like to have the egress for Bailey Meadows considered as Highway 211, with perhaps a gated emergency access down Melissa if need be. The impact to the highway would be much less than Melissa Drive. The highway can be slowed down a bit at that point, and it wouldn't hurt to have it slowed down right before it gets to the slowdown past Bornstedt anyway. I know that you are the City of Sandy and not ODOT, but all the agencies have to work together to make sure that our Oregon, Clackamas and Sandy citizens are safe and that this very large subdivision does not negatively impact our community in Nicolas Glen. Am I wrong?

I was very surprised to learn that the residents of Nicolas Glen did not all receive invitations to attend that Library meeting, but only those on Rachael Drive who are directly on the property line and whose properties had been surveyed. The whole subdivision would be impacted if the egress on Melissa were allowed to go through, so everyone should have been notified and informed, not just Rachael Drive residents. I feel like the Bailey Meadows developers are acting inconsiderately, only doing the minimum rather than taking our subdivision's community into consideration. These people do not live in Sandy; they just want to make money here. The water system is already under duress and rates will soon double, the school system is already impacted by the growth that has taken place in the last two years including our new high school already out of room and elementary classes having to be combined, and it doesn't seem like planning is really being done to consider all these impacts that new subdivisions will create in our once live-able city. To go from under 10,000 to over 12,000 in such a short time is a lot of growth, and this new 90+ houses will only serve to increase the stress on all our systems.

Also I want to put in a word for the trees and wildlife living in the trees (owls and many other birds) that will be impacted by disturbance of their habitat. No one can speak for them, but they are part of our community too and they may be driven out or their habitats damaged.

I will be attending the next Planning meeting on Oct. 28th in hopes that you will be discussing the Bailey Meadows/Nicolas Glen situation then. Please keep me informed, and thank you for your attention and consideration in all these matters of concern to the tax-paying resident citizens of Sandy.

Sincerely,

/s//Libby Burke

Elizabeth A. Burke

EXHIBIT PPP

October 20, 2019

Brad Robison
37412 Rachael Drive
Sandy, OR 97055
808.756.3444 (mobile)

Kelly O'Neill, Jr.
Planning & Building Director
City of Sandy

Regarding: BAILEY MEADOWS SUBDIVISION
TAX MAP/LOTS T2S R4E SECTION 23 TAX LOTS 800, 801, 802, 803, 804
aka: STURM ANNEXATION - ORDINANCE NO. 2017-11
17.78.60 ANNEXATION CRITERIA

Comment:

The proposed development plan for the BAILEY MEADOWS SUBDIVISION fails to take into consideration several issues that will have a detrimental impacts on the existing NICHOLAS GLEN SUBDIVISION.

- The current AKS Engineering & Forestry plan states that all residential traffic will be routed through the Melissa Avenue and will, by estimate, be nearly 1000 trips per day.
- To connect the new subdivision to the existing sewer system will require that a trench over 20 feet deep by cut into Melissa Avenue to reach the proper elevation for sewage flow. This will have an impact on over half of the population of the existing Nicholas Glen subdivision. School busses will need to be re-routed, and the trench work will need to be covered every day at the end of work for safety. Vehicle access to residents with homes on Melissa will be restricted. Emergency vehicle access will be hampered as well.
- Melissa Avenue is a steep hill and during winter months can become very slippery. An additional 1000 trips per day during icy conditions will only increase the probability of severe accidents and possible blockage of Debarko Road as cars or truck slide through the intersection unable to stop.
- Traffic impact studies were limited to what was required by law. This did not take into account traffic impacts to exit the residential community to Highway 26. Ruben Lane access to Highway 26 currently allows 5-6 vehicles (max) for the duration of the green signal light. Additional traffic will increase the wait at this light to 2 or 3 signal changes. This will also impact traffic at 362nd and Highway 26.

In a previous letter submitted by myself and Libby Burke (attached), the problem of construction traffic and general traffic control for safety through the Nicholas Glen subdivision was addressed. The original STURM ANNEXATION documents stated that he proposed

subdivision would also connect to Highway 211. The current AKS Engineering & Forestry plan stated that all access would be via Melissa Avenue only with emergency access only gates to be provided at for access to Highway 211. There issue of construction traffic routing via any route other than Melissa Avenue as not addressed.

The general impression to most of the attendees of the September 18, 2019 AKS Engineering & Forestry “meeting” was that this was a presentation of subdivision plan that was already decided and that any changes to that plan, as explained by their lawyer, would not be possible. In short, they knew what they were doing within the letter of the law, and as far as they were concerned there would be no changes. Traffic studies were limited to what was required by law.

Development is inevitable, population keeps growing and the City of Sandy needs to grow to remain a vital community. However, growth without consideration of impact on the greater community as a whole is short sighted. The additional population will impact not only basic infrastructures such as water and sewage, but schools (already overcrowded), roads, and the general quality of life.

The ordinances that allow for the developer to pay into a “park fund” as opposed to developing community parks is the construction industry’s version of NIMBY.

The city of Sandy needs to weigh carefully the need for growth versus the impact on existing communities. Furthermore, recognizing that growth without quality is essentially cancer and will eventually decrease the quality of life for all residents.



EXHIBIT QQQ

Emily Meharg <emeharg@ci.sandy.or.us>

19-023 SUB/VAR/TREE BAILEY MEADOWS SUBDIVISION HEARING INPUT

1 message

Laurie Gilbert <g.lauriegilbert@gmail.com>
To: emeharg@ci.sandy.or.us
Cc: Laurie Gilbert <g.lauriegilbert@gmail.com>

Mon, Nov 4, 2019 at 4:00 PM

CITY OF SANDY
PLANNING COMMISSION

EMILY MEHARG
emeharg@ci.sandy.or.us

RE: 19-023 SUB/VAR/TREE BAILEY MEADOWS SUBDIVISION

I'm writing to ask The Planning Commission to intercede on behalf of the current and future residence of Sandy regarding the decrease in safety and livability that will result from the current plans for Bailey Meadows. Though I realize change and growth is inevitable, the lack of an emergency evacuation route other than Melissa Avenue from the proposed Bailey Meadows subdivision is a disaster waiting to happen. With the ever increasing fire danger there needs to be a second exit from this new subdivision directly to Hwy 211 via Ponder Lane. Anything else is an unacceptable risk to our community.

After visiting the developers website I learned that they have shown much greater care and respect to the communities of Happy Valley and Hillsboro in their developments of Pleasant Valley and Butternut Creek respectively. Not only did they provide more than one entry and exit road, but included parks and green spaces(images below). We are all counting on our Planning Commission to protect us from those who want only short-term profit at the expense of our communities' safety and livability.



Pleasant Valley Villages is a 13-phase, 1,155-unit residential development on 187 acres in Happy Valley, Oregon. Over the next 10 years, single-family homes, multifamily buildings, 35 acres of parks and open space, trails, and amenities will be built. AKS has addressed zoning challenges, land use approvals, transportation connectivity, wetlands and natural resources, and utilities, and is working on the final design of infrastructure, including streets, utilities, and parks.

OWNER
The Holt Group, Inc.

LOCATION
Happy Valley, OR

SERVICES PROVIDED
Civil Engineering
Surveying
Planning
Landscape Architecture
Natural Resources
Consulting Arborist



AKS' design of this 576-lot Hillsboro community incorporated 40 acres of open space; a central mixed-use village; a community center; a transportation network to connect existing and planned features; and a community park, all tied to trails and sidewalks that link the community to a regional trail system. One project challenge was adding the Bonneville Power Administration corridor, located next to the park, into the village and residential layout. AKS successfully met this challenge and played a key role in obtaining land use approvals and zone changes, all of which helped to make this project a success.

OWNER
Hagg Lane LLC
Lennar Corporation
Pahlsh Homes
Quadrant Homes

LOCATION
Hillsboro, OR

SERVICES PROVIDED
Civil Engineering
Planning
Landscape Architecture
Natural Resources
Consulting Arborist

Thank you very much.

G. Laurie Gilbert

18392 SE 370TH Ave.

Sandy, OR 97055

g.lauriegilbert@gmail.com



Oregon

Kate Brown, Governor

Department of Transportation

Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

Exhibit RRR

December 17, 2019

ODOT Case No: 8702

To: Emily Meharg, City of Sandy Planner
From: Marah Danielson, ODOT Planner
Subject: 19-023 SUB/VAR/TREE: Bailey Meadows Subdivision - Ponder Lane

We have reviewed the applicant's proposal to subdivide 23.42 acres into a 100-lot residential subdivision with a new proposed public road connection to OR 211 at Gunderson Rd. At this time, OR 211 through the City of Sandy is under ODOT jurisdiction. As such, the connection of Gunderson Rd to OR 211 requires approval from ODOT. ODOT requests that the City add a condition of approval stating that the applicant be required to obtain all ODOT permits prior to issuance of a building permit.

In a letter dated November 25th, 2019, from the applicant's attorney, it is stated that "the Applicant believes that the Gunderson Road extension is possible only in the event the City takes jurisdiction of Oregon Highway 211."

ODOT and the City of Sandy have discussed the potential jurisdictional transfer of OR 211 in the past. There is a meeting scheduled in January between the two jurisdictions to discuss the possibility of a jurisdictional transfer. While ODOT is committed to working with the City as it strives to reach its community goals, we also want to share that in past experience with other jurisdictional transfers, this legal process requires substantial effort and time. If the subdivision is conditioned to make the Gunderson Rd connection to OR 211 via a jurisdictional transfer, it may create uncertainty relating to the timing of the proposed subdivision.

The original land use submittal did not have a Gunderson Rd connection to OR 211 and the Traffic Impact Analysis (TIA) does not reflect the new street connection. It is our understanding that the applicant is preparing an updated TIA with the Gunderson Rd connection. ODOT has not received an updated analysis for review. Additionally, in previous comments submitted on October 4th, 2019, ODOT requested that the following intersections be included in the analysis: OR 211/Dubarko Rd, US 26/Rueben Ln and US 26/362nd Ave.

ODOT requests the Planning Commission refrain from making a decision at the December 17th, 2019 hearing, providing time for ODOT and City staff to evaluate the requested Traffic Impact Analysis and craft conditions of approval to be included with the decision relating to the Gunderson Rd connection to OR 211.



Oregon

Kate Brown, Governor

Department of Transportation

Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

Exhibit SSS

January 15th, 2020

ODOT Case No: 8702

To: Emily Meharg, City of Sandy Planner

From: Marah Danielson, ODOT Planner

Subject: 19-023 SUB/VAR/TREE: Bailey Meadows Subdivision - Ponder Lane

Since the first Planning Commission hearing last month on the land use application for the Bailey Meadows Subvision, ODOT and the City of Sandy have met to discuss the jurisdictional transfer of OR 211. ODOT supports the jurisdictional transfer and is working with the city to transfer the highway. It is our understanding that as part of the subdivision approval, the Gunderson Rd connection to OR 211 will only occur under the circumstance that the highway has been transferred to the city. In our December 17th, 2019 comment letter, ODOT had requested a condition of approval that the applicant be required to obtain all ODOT permits prior to issuance of a building permit for the Gunderson Rd connection. This request is no longer applicable since the applicant will only be constructing the Gunderson Rd connect to OR 211 if the highway is transferred to the city.

We appreciate the city's efforts to work towards the jurisdictional transfer of OR 211 and implementing the transportation network improvements identified in the Sandy Transportation System Plan.

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January 20, 2020

Mr. Kelly O'Neill
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

**SUBJECT: REVIEW OF TRANSPORTATION IMPACT ANALYSIS – BAILEY MEADOWS
SUBDIVISION**

Dear Kelly:

In response to your request, I have reviewed materials submitted in support of the Bailey Meadows Subdivision. The materials consisted of the Transportation Impact Analysis (TIA) for the Bailey Meadows Subdivision and TIA Addendum #1. The TIA is dated June 20, 2019 and Addendum #1 is dated January 6, 2020. Both were prepared under the direction of Todd Mobley, PE of Lancaster Engineering.

The TIA and Addendum describe a proposal to construct a 100-lot subdivision of single-family dwellings. The site is in the southwest part of Sandy, south of Dubarko Road and north of Highway 211. The proposed accesses are Melissa Avenue to the north and a new extension of Gunderson Road to the south. The original TIA evaluated access to the north only; the Addendum provides additional information including an analysis dependent on an extension of Gunderson Road and a new intersection with Highway 211.

The comments below focus on the revised proposal with the new extension of Gunderson Road and the connection with Highway 211 as described in the Addendum.

Overall

I find the TIA and Addendum address the city's requirements and provide an adequate basis to evaluate impacts of the proposed development.

Comments

1. Study Area. The study addresses the appropriate intersections. It includes analyses of:

- SE 362nd Drive at Dubarko Road
- Ruben Lane at Dubarko Road
- Melissa Avenue at Dubarko Road
- Bluff Road at Dubarko Road
- Gunderson Road at Highway 211

- 2. Traffic Counts.** The AM and PM peak hour traffic counts for the first four intersections listed above were conducted on April and May 2019. The counts for Highway 211 were conducted in December 2018. The engineer adjusted the December traffic counts on Highway 211 to account for seasonal variations according to the procedures defined by the Oregon Department of Transportation (ODOT). The Highway 211 counts were also adjusted to reflect 2019 base conditions by applying an annual growth factor of 2.8 percent. The counts and adjustments appear reasonable.
- 3. Trip Generation.** The TIA uses trip generation for single-family houses from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The calculations of trip generation were based on 100 single-family dwellings. The engineer calculates that the 100-unit subdivision would produce 74 new AM peak hour trips; 99 PM new peak hour trips; and 994 new daily trips. The calculation of trips generated by the subdivision appears reasonable.
- 4. Trip Distribution.** The TIA and Addendum provide information about trip distribution from the site. As described above, the original proposal relied upon Melissa Avenue for the exclusive access to the site; the Addendum describes the subdivision with both a north and south access. As described in the Addendum, the engineer assumed 30 percent of the traffic would travel to and from the north on 362nd Drive via Dubarko Road; 20 percent would travel to and from the north on Ruben Lane via Dubarko Road; 25 percent would travel to and from the north on Bluff Road via Dubarko Road; 15 percent would travel to and from the east on Dubarko Road; and 10 percent would travel to and from the southwest on Highway 211.

As described in detail in the Addendum, the engineer also accounted for changes in travel patterns because of the new connection provided using Melissa Avenue and Gunderson Road through the subdivision. Traffic generated by existing developments north of the new subdivision would have the option of connecting with Highway 211 via Melissa Avenue and the new Gunderson Road extension. Likewise, traffic traveling into Sandy from the southwest on Highway 211 could use the new Gunderson Road extension to access Dubarko Road, Ruben Lane and other destinations to the north. The engineer specifically accounts for the rerouting of existing traffic due to the new connections as well as the traffic from the proposed development and use of Melissa Avenue and the new Gunderson Road extension.

The trip distribution and rerouting due to new connections seem reasonable.

- 5. Traffic Growth.** The TIA uses a 2 percent annual increase for facilities under the jurisdiction of the City of Sandy. For Highway 211, the engineer used a 2.8 percent annual growth rate based on ODOT's Future Volume Tables. In addition, the TIA specifically accounts for the recently approved Sandyplace apartment complex on Dubarko Road. Background volumes

Mr. Kelly O'Neill
January 20, 2020
Page 3

were prepared for 2022, the year in which the development is expected to be completed. These assumptions account for future traffic and appear reasonable.

- 6. Analysis.** Traffic volumes were calculated for the intersections cited in #1, above. Intersection level-of-service (LOS) and the volume-to-capacity (v/c) ratio were provided. ODOT uses the v/c ratio for its standard of intersection performance. Performance of the intersections was calculated for existing 2019 conditions; 2022 background conditions; and 2022 conditions with the proposed subdivision.

All five study area intersections are calculated to meet applicable City and ODOT performance standards. The intersections are calculated to operate at level of service (LOS) "C" or better during both the AM and PM peak hours. The new intersection of Gunderson Road at Highway 211 is calculated to operate at LOS "B" with a volume to capacity (v/c) ratio of 0.08 during the AM and PM peak hours. This easily meets ODOT's performance standard.

The engineer recommends no mitigation for traffic from this proposal. I concur.

- 7. Crash Information.** The TIA provides information on crashes for the most recent available five-year period (2012 through 2016). For the five-year period, 1 crash was reported at the SE 362nd Drive/Dubarko Road intersection. Two crashes were reported at the Melissa Avenue /Dubarko Road intersection. The calculated crash rate at both intersections is low and the engineer determined that the crash rates are not indicative of safety deficiencies or design flaws. He did not recommend mitigation for safety issues. I concur.

- 8. Subdivision Access.** The site plan provides for two access points: Melissa Avenue to the north and an extension of Gunderson Road connecting to Highway 211 to the south.

The Addendum provides a detailed discussion of the concept described in the Transportation System Plan (TSP) that provides for an extension of Gunderson Road an intersection with Highway 211 and an extension to the east to connect with Cascadia Village Drive. As described in the Addendum, the TSP "shows a planning-level depiction of the Gunderson Road extension." The Addendum further explains that "upon closer investigation and engineering analysis, it was determined that the alignment shown on the TSP was not feasible for construction of an intersection with Highway 211, primarily due to poor sight distance, the need for a perpendicular intersection, and a very steep super-elevated roadway section."

The Addendum describes the selection of a suitable location for a new intersection on Highway 211 to the southwest that was far enough from the curves on Highway 211 to provide adequate sight distance and avoid the super-elevated roadway section. As noted in the Addendum, the selected location is outside the current City of Sandy urban growth boundary (UGB). The Addendum further describes the proposal to expand the UGB to

Mr. Kelly O'Neill
January 20, 2020
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include the proposed roadway. The Addendum notes that a remnant parcel of approximately 2.38 acres would thus be included in the UGB. The applicant proposed this remnant be utilized as a neighborhood park with no parking facilities. As such, it would produce no new traffic, but would be accessed by walking and bicycling.

9. Left-Turn Lane and Signal Warrants. The engineer analyzed the subject intersections for left-turn lanes using standard methods based on traffic volumes, travel speeds, and lanes.

For the new, proposed intersection Highway 211 and Gunderson Road, the engineer concludes that a left turn lane was warranted. He notes that a left-turn lane is a safety consideration because it removes left-turning vehicles from the through traffic lane. He recommends that a left-turn lane be constructed in connection with the Gunderson Road/Highway 211 intersection. I concur.

He also analyzed traffic signal warrants at the study area intersections. Traffic signal warrants are not met at any locations including the new, proposed Gunderson Road/Highway 211 intersection.

10. OAR 660-12-0060 Transportation Planning Rule (TPR). The engineer provides a detailed response to the criteria specified in the TPR. He explains that the proposed amendment to expand the UGB does not change the functional classification of any transportation facility and does not increase developable property that will increase trip generation. He concludes that the proposal helps to implement a project specified in the TSP. I think his argument is sound and supported by the analysis.

11. OAR 660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB. The Addendum provides a detailed analysis of this section of the OAR's. The engineer argues that the location proposed for the new intersection is "dictated by engineering standards that must be satisfied for a safe and efficient intersection location." I think the engineer provides a reasonable explanation and justification for the UGB expansion.

12. Conclusions and Recommendations. The engineer concludes that traffic operations will be acceptable at all study area intersections. The southern access to the subdivision is dependent on constructing a segment of Gunderson Road, which is specified in the TSP. The engineering analysis described in the Addendum explains why the location for the proposed Gunderson Road/Highway 211 intersection was selected. The Addendum provides justification for an expansion of the UGB and explains that the proposal complies with the TPR. The engineer recommends the installation of a left-turn lane on Highway 211 for the new intersection of Gunderson Road and Highway 211. I concur with these conclusions and the engineer's recommendations.

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Conclusion and Recommendations

I find the TIA and Addendum meet City requirements. The TIA and Addendum demonstrate that the development can be accommodated with a north access using Melissa Avenue and a south access using a new extension of Gunderson Road with an intersection with Highway 211.

I recommend approval of the subdivision with conditions that assure the dedication of all appropriate rights-of-way and the construction of the Gunderson Road extension and the intersection of Gunderson Road and Highway 211, with a left-turn lane on Highway 211. Furthermore, all construction involving facilities under the jurisdiction of the Oregon Department of Transportation shall be performed to ODOT standards and specifications.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,



John Replinger, PE
Principal

BaileyMeadowsSubdTIA012020

December 11, 2019

Exhibit VVV

City of Sandy Planning Division
ATTN: Emily Meharg
39250 Pioneer Blvd
Sandy OR 97055

RE: File # 19-023 SUB/VAR/TREE

My name is Sarah Bettey and my husband and I are homeowners in the Nicholas Glen neighborhood off Melissa Ave and Dubarko Rd. As a member of the community, I am writing to you to express my apprehension about the potential planned project for the Bailey Meadows subdivision. We hope you will keep our concerns in mind when it comes time for you to review the updated proposal.

I appreciate the developer has modified their plan to include a 2nd point of entry into the new subdivision via Hwy 211. It would give both Bailey Meadows and Nicholas Glen a 2nd access point, which is safer in case of emergencies and inclement winter weather. However, I have deep concerns that the new road will expand the urban growth boundary, making even more development possible than what is currently proposed. Also, if the road is punched through, it is likely that this new route will become a thoroughfare for traffic coming to and from the busy highway to Dubarko. In approving the road, I would highly recommend speed bumps be installed on the Melissa Ave hill to help keep speed down. I would also hope that it is required that stop signs be installed at most intersections throughout Bailey Meadows and Nicholas Glen to decrease speed and discourage drivers from cutting through the neighborhoods.

In addition, if this proposal is approved Melissa Ave will be torn apart to run additional sewer, electricity, etc. instead of accessing these and other utilities via Hwy 211. Melissa Ave is currently the only access point for the entire existing Nicholas Glen neighborhood and will remain so until an additional road off Hwy 211 is finished. Recently we had slurry seal applied the streets of Nicholas Glen and it was just a taste of what it will be like having construction on the only way in and out of the neighborhood. Taking into consideration the burden that months or years of large trucks and other machinery needed to complete the building project driving through to access the property location, the plan to dig a deep utility trench down the entirety of Melissa Ave is totally unacceptable. I do hope that the majority of the construction traffic and utilities can be run off the highway instead of interrupting our quiet neighborhood and making Melissa Ave unpassable.

The Nicholas Glen children primarily attend Kelso Elementary and Boring Middle School. Both schools are grossly in need of upgrades. They are outdated and already above capacity. This year alone Kelso School had to add teachers and take away classrooms from secondary classes such as music and other arts programs. My child is currently in the 2nd grade at Kelso. His classroom is in an unattached modular unit located out back near the sports fields due to lack of classrooms in the actual school building. The addition of 90+ homes worth of children – likely hundreds of additional students - to schools that are already overwhelmed is not in the best interests of our children's future. The overcrowding and expansion of our district schools needs to be addressed before another development of new homes are added to the community or the UGB is expanded further.

Sandy has been talking about the pre-planning stages of a bypass around town for many years now. This bypass plan needs to be approved prior to continuing to add more residences within the city limits or expanding the UGB further to allow this growth. Traffic backs up at nearly every intersection through the center of town, impacting safety, local business and small town feel negatively every single day. This is even more prevalent with travelers heading to and from the mountain and Central Oregon on weekends. There have been no significant improvements to the road system despite the huge increase in our city population. It is irresponsible and dangerous to continue to approve large scale development and expanding the UGB without making drastic advances in our road systems.

Myself and my family have a vested interest in our community and hope that its quiet character and charm will remain intact. My husband and I chose to raise our young son here in my hometown of Sandy and selected the Nicholas Glen neighborhood specifically because of its beauty, its quiet, its safety, and its proximity to the woods and the mountain. Sandy residents like us want the community to grow and thrive; we just want it to be done in a way that protects the small town feel and our quality of life. This project as it stands does not have the best interests of the adjoining neighborhoods in mind. It threatens to bring a slew of negative side effects to Nicholas Glen and our Tickle Creek area/Dubarko Road neighbors, as well as the entire Sandy community as a whole.

I hope you will hear my concerns and take them into consideration as you make decisions on this matter in the future.

Thank you for your time,

Sarah Bettey
18195 Melissa Ave
Sandy OR 97055
Sarahbettey2978@hotmail.com
971-246-2974

Exhibit WWW

To Whom it may Concern,

We wanted to share some of our concerns with the proposed development west of Ponder Lane. We are including some pictures to help show how it is used.

We own the adjacent property at 37721 SE Ponder Lane, and have a 100x100 barn that we access weekly for our business, Geren's Farm Supply. In one of the pictures with the flatbed truck you can see the barn in the background. We have trucks and semi's and some are doubles, deliver straw, local hay, eastern oregon hay, grass/alfalfa mix and alfalfa, which we store. Weekly, our employees access the barn to retrieve what we need to keep the business in supply. We are concerned about maintaining truck access to our barn and continuing our business.

Additional questions are if you are planning on using bolsters like they have on Arletha for emergency access. And if so, how are you going to keep people from using Ponder Lane and from parking along side of the development and walking to their homes? This what we see currently on Arletha.

We bought our property in 1974 and our driveway which is called Ponder Lane is where it was then. Because of our business which we bought in 1981, we hired Jim Turin and Sons in 2006 to pave it. They recommended we pave it 4" deep and have the wide corners because of the semis. We paid for 2" from Hwy 211 to the first corner and our neighbors paid for the other 2". We paid from the corner up to our home for the 4" the rest of the way.

Thank you for taking our concerns into consideration.

Les and Kathy Geren















Exhibit XXX

Emily Meharg <emeharg@ci.sandy.or.us>

RE: Bailey Meadows Subdivision file # 19-023 SUB/VAR/TREE

Gigi Duncan <gigiduncanhome@gmail.com>
To: emeharg@cityofsandy.com

Sat, Dec 14, 2019 at 8:09 AM

Hi City of Sandy,

I want to express my concerns about the proposed subdivision that will effect our neighborhood and the areas around us. After hearing the developer speak and after asking some questions, I came away with a pretty overwhelming sense that these people are just looking to make their quick buck and move on, leaving us with the consequences of their short vision. I feel that the way the subdivision is proposed is unsafe and unnecessarily taxing on our resources at the moment.

These are my specific concerns with regard to the proposal of the Bailey Meadows subdivision:

- Traffic: One way in and one way out, using only Melissa Avenue, is going to cause a huge

increase in traffic for our neighborhood, the surrounding neighborhoods, and the entire city.

- According to the City of Sandy's Transportation plan, local streets have the typical

capacity of 800-1000 average daily car trips. The new development of 100 proposed homes would add approximately 944 additional car trips on Melissa Avenue. Since the current Nicholas Glen neighborhood has over 100 homes already, it is safe to say that the traffic on Melissa Avenue will be double the typical capacity of a local street. Double the traffic is not conducive to a safe, enjoyable neighborhood. City Code 17.100.100 states the pattern of streets should be connected in such a way will spread traffic over many streets so that key streets are not overburdened. With only one access point Melissa Avenue will be overburdened and this overburden will sprawl into Dubarko and the other arterial streets with major connections to US 26.

- An additional 944 car trips per day will increase drive time not only on Melissa Avenue, but also on Dubarko, Bluff, Ruben, and 362nd. The intersections of Dubarko/OR 211, Dubarko/362nd, 362nd/US 26, Ruben/US 26, and Bluff/US 26 are currently rated as a C or D for their level of service according to our transportation plan mobility standard. With added development that has no other alternative route, those intersections will become much more overwhelmed and their level of service will decrease, most likely reaching the point of failing mobility according to the city standard. More drive time means wasted time and wasted fuel while stuck in congestion.

- More cars brings the possibility of more accidents. Cars already drive with excessive speed up and down the hill of Melissa Avenue. Children will no longer be safe enough to walk, ride their bikes, and play in the streets of our community, as there is a possibility of more pedestrian-involved accidents with increased car traffic. Increased traffic leads to frustrated drivers, who take more risks and drive faster. According to the city's traffic plan, there was a study that stated two accidents happened on Melissa Avenue between 2005 to 2007, one occurring at the intersection of Melissa/Rachael and the second occurring at the intersection of Melissa/Solso. The same study also mentioned that the intersection of Dubarko and OR 211 had a crash rate of 1.08 MEV, which is a relatively high crash rating, and it said that the intersection is in the top 10% of hazardous ODOT SPIS locations. The new development proposal's traffic study did not include the intersection Dubarko and OR 211 in their study, which raises the concern on how the new development would affect that already questionable area.

- More traffic will cause an increased noise level in our quiet neighborhood. Increased noise will change the quality of life in our neighborhood because it affects the ability to sleep, causes anxiety, and decreases overall health.

- As traffic volume increases, air quality will diminish and more pollution could enter Tickle Creek, contaminating it.

- Extra noise and traffic will lower property value, especially to those homes on Melissa.
- Developers were requested to have a second access connecting the new neighborhood to

OR 211. However, they fully intend to continue their proposal of only one access. This shows a disregard for our city's planning division in terms of the transportation system. It shows a disregard for the quality of life for the residents of both Bailey Meadows and Nicholas Glen. It shows a disregard for the congestion for the entire city of Sandy

including its residents and tourism traffic. The reasoning behind not having a second access point, in my opinion, is mediocre at best and shows a lack of care for the immediate future in our city.

- Developers claim there are site distance problems and the existing road, Ponder, hits OR 211 at an oblique angle. This seems to be illogical, considering that at the exact same spot where Ponder meets OR 211, on the eastern side of OR 211, there is already a new development with access using Arletha Court. If site distance and the oblique angle are an issue for the Bailey Meadows development, why would another development, using that exact same spot of intersection, be allowed a point of access?
- Developers mentioned that they have an agreement with the landowner to the south of the newly proposed development to purchase their property, with the purpose of future access to OR 211. However, that property is outside the Urban Growth Boundary currently. Because of this, even if that property were to be entered into the Urban Growth Boundary (which takes time), it will be years down the road that their idea of accessing OR 211 will even be feasible. According to these developers, they would need to an exception from the county to put a road through rural property to access OR 211 and from their talks with county planning, the staff would most likely not support that needed exception.
 - Safety: A cluster of 250+ homes in a small area, with one way in and one way out, will decrease the safety and security of our neighborhood.
 - Police, Fire, and Ambulance response time will be prolonged with only one main, well kept access street. The second access off Ponder will be available, but it is not ideal and probably not as safe for a quick response.
 - In the event of a natural disaster, Melissa Avenue would be an evacuation nightmare because it is the only way out for over 250 families.
 - Education: Adding more homes in the city of Sandy would cause a decrease in educational effectiveness within our school district.
 - Kelso Elementary, Boring Middle, and Sandy High School are the three schools affected by this proposed new development, as the new neighborhood would be in their school boundaries as it is currently drawn. Kelso Elementary and Boring Middle are already over 100% capacity. In a meeting with school parent groups, the Superintendent of Oregon Trail School District stated that Kelso is at 134% capacity. Even if boundaries are changed, Sandy Grade and Naas are over 100% capacity, and Firwood is at 98%. Our children will suffer.
 - There are currently new homes already being built within the boundary of these schools and several others that are tentative. If we add yet another development, it would cause a catastrophe as far as classroom size, space for classrooms, effectiveness in the classroom, mental health of students, safety of students and staff, and teacher burnout due to increased capacity and lack of resources.
 - Parks: Developers, as I understand the 17.86, should have a parkland dedication of 1.29 acres (using the formula given $100 \times 3 \times 0.0043$.) In the meeting, they made it perfectly clear that they will not dedicate any land for parks; it is not negotiable for them. They will simply just pay a fee

instead. To me, this again shows the lack of care and regard for our city planning and for the future of the area.

- Wildlife: With the development of rural land, wildlife will be threatened. They will be pushed out of their homes. Vehicle collisions with wildlife might increase. Increased amounts of pollution could harm remaining wildlife.

Thank you for your time,

Gigi Duncan
18275 Rachael Drive
Sandy OR

--

*Gigi Duncan, Broker
Team Manager*

Excellence is in the Details...

*The Horizon Home Team at
Premiere Property Group, LLC*

503-201-3369 Cell
GigiDuncanHome@gmail.com

<https://www.premierepropertygroup.com/agent-profile/gigi-duncan-9675941>
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Property Buyer/Seller Advisories**



Exhibit YYY

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows Subdivision

1 message

Tom Newell <tom.newell@live.com>

Tue, Dec 17, 2019 at 8:26 AM

To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

File number 19-023 SUBVAR/TREE

Good Morning Emily....

Wow, Bailey Meadows has created a firestorm.

I cannot attend the meeting tonight, so just wanted to voice my opposition to the project as it seems to be currently presented (this is my second email).

How can a 100 home development be put in without providing it's own primary street access? The burden on Melissa as a primary entry will certainly be too much and then the traffic will pour out onto Dubarko. Also, emergency exiting in a catastrophic event would not provide adequate egress. The development should provide primary access from the Hwy 211 side to ease traffic into town.

Then the school crowding situation and bus access should be included in decision making. And, I understand the developer won't build a park....even though it is actually a city requirement for these type developments. How about the current capacity of the wastewater facility, is it really able to accommodate this before the site is upgraded/rebuilt?

Sandy is growing and we can't stop that, but let's do it in a practical way. Thank you for considering all input.

Tom Newell

[18007 Rachael Dr](#)

[Sandy, Oregon](#)

503-477-2911

Sent from [Mail](#) for Windows 10

Exhibit ZZZ

12-17-19

City of Sandy Planning Division,

Greetings, our family lives on Rachael Dr and we believe creating a second entrance to the proposed development at Bailey Meadows Subdivision is more problematic than creating only one. By doing so, it would essentially create a vehicle pipeline allowing a shortcut from 211, bypassing Dubarko Rd via Melissa. If the original proposal estimates an extra 900+ vehicles per day on Melissa, with the new subdivision it is mind blowing to think how many additional vehicles would use this artery that do not even live in the neighborhood's...Thousands? Therefore, we propose the Gunderson Rd extension be the only public vehicle access to Bailey Meadows Subdivision. This would keep all traffic from 211, Dubarko, 362nd and Bailey Meadows off Melissa.

As an alternative to a public vehicle access, Melissa could be gated and used for service vehicle access only. Public sidewalks could still connect the two neighborhoods allowing pedestrian use to and from Tickle Creek Trail.

If the city does decide to keep proposal as is, we strongly suggest; enhanced police patrols, speed-bumps, stop signs and traffic circles for public safety. We would also like to see a focus group look into the traffic impact to our neighborhood with the newly proposed Thorofare.

Thank you for your consideration.

The Barnes Family

Exhibit AAAA

Kathleen Walker
15920 SE Bluff Rd.
Sandy, Oregon 97055

December 16, 2019

Dear Planning Commission and City Council:

As some of you know, I understand and can support responsible growth in Sandy. I have testified before on previous developments to ensure that applicable City codes and requirements are applied to ensure successful, profitable development that minimizes impacts to existing residents. I would like to make the following points and requests in reference to the Bailey Meadows Subdivision. In summary:

- 1) Keep the public comment period open as part of the continuance.
- 2) The development proposal does not meet the criteria for “Needed Housing”.
- 3) The City should require park land dedication, instead of accepting an in-lieu of fee.
- 4) Parkland dedication policies are incorporated into the City’s Land Use Regulations.
- 5) Parkland dedication is the City’s discretion only, and is not “subjective”.
- 6) Additional road access is necessary for this development.

1. Public Comment Period: It appears you intend to extend the hearing. The public comment period (both oral and written comments) should be extended because Sandy Development Code Section 17.80.60 and Section 17.20.50 (F) states that the Planning Director will prepare and present a Staff Report that evaluates whether the proposal complies with the review criteria. In an effort to provide public input to this proposal, we must have a clear understanding of the compliance with applicable City code and not have to rely on our own interpretation, or the developer’s, which may be biased. No staff report covering these points are online for public review. Please maintain the public comment period both oral and written, until the Staff Report is completed and the public has an opportunity to review that and compile public comments enlightened by professional staff findings.

2. Development Does Not Meet the Criteria for “Needed Housing”:

2017 ORS 197.303¹ - “Needed housing” defined

(1) As used in ORS 197.307 (Effect of need for certain housing in urban growth areas), “needed housing” means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary at price ranges and rent levels that are affordable to households within the county with a variety of incomes, **including but not limited to households with low incomes, very low incomes and extremely low incomes**, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a. “Needed housing” includes the following housing types:

All of the proposed lots are in excess of 7500 square feet, with homes costing in excess of \$400,000. That means that there are no homes **INCLUDED** that would be affordable to low, very low or extremely low incomes. Thus Bailey Meadows development does not meet the definition of “Needed Housing”. It appears state statute intended to encourage low income

housing is being used by a developer who plans to build large relatively costly homes, no low income people can afford with the intention to skirt the City's Development Code requirements that they deem "subjective" or have in their opinion, "unreasonable costs". As we know, these code requirements are intended to maintain our quality of life for existing and future residents and ensure that new development provides services like parks, roads, and utilities that should be paid by the development and not be put on the existing residents to pay.

3. Require park land dedication:

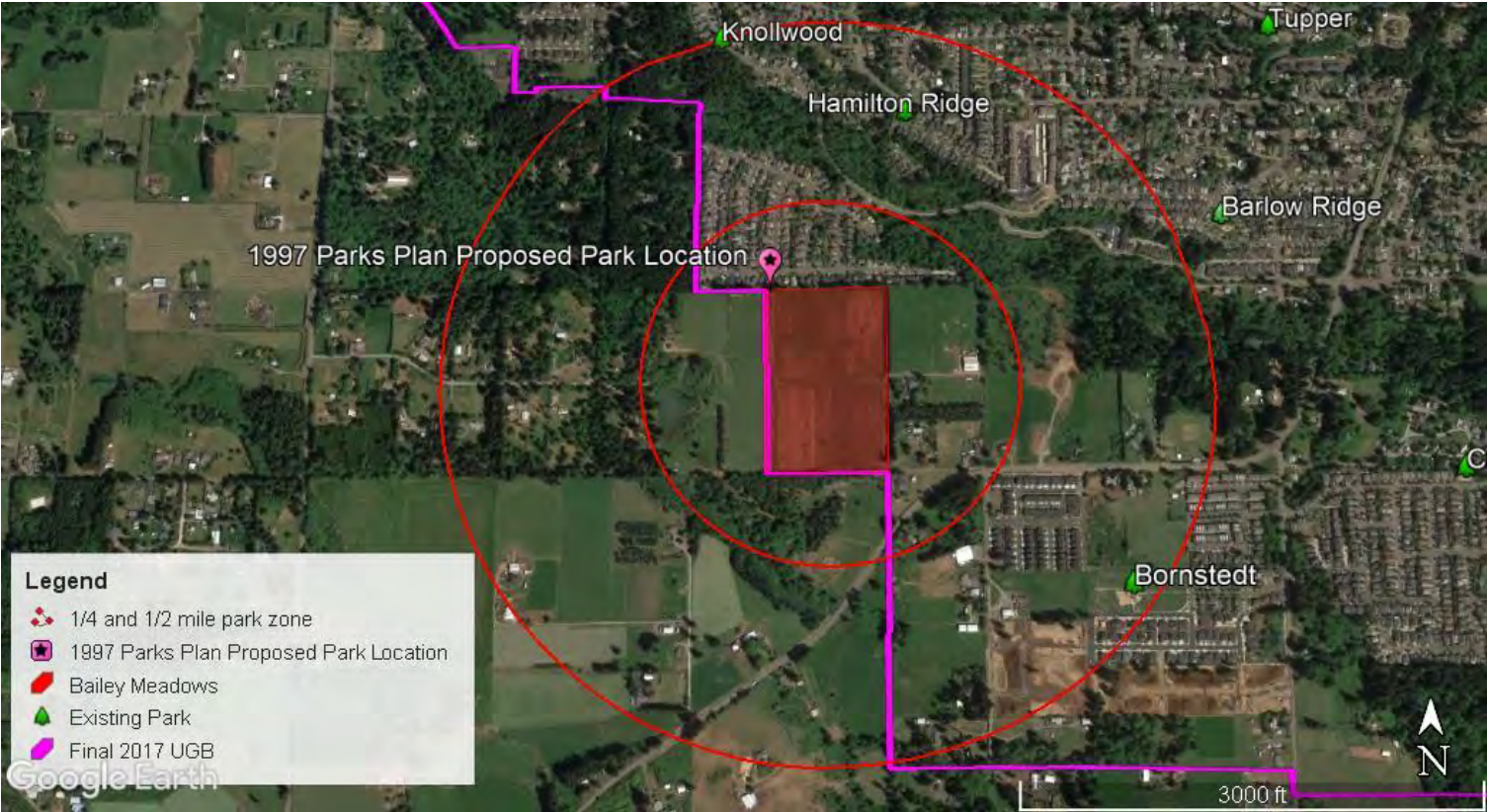
The City's Parks and Trails Board recommended that the Bailey Meadows development be required to dedicate park land because there was a park identified in this area in the 1997 Parks Master Plan. Section 17.86 of the City's code says "*New residential subdivisions, planned developments, multi-family or manufactured home park developments shall be required to provide parkland to serve existing and future residents of those developments.*" Most of our existing park system was developed by requiring park land dedication in developments where the 1997 Parks Master Plan identified a park. In proposed development areas where there was not a park identified in the Plan, the City chose to accept in-lieu of fees.

The 1997 City of Sandy Parks Master Plan (adopted in its entirety in City Development Code) called for "*80% of all dwellings be located within one quarter mile of a neighborhood park*" (Chapter 3) and without crossing major streets and highways, streams, etc. As identified in the 1997 City of Sandy Parks Master Plan, there is a need for a park in the area of Bailey Meadows. New residents in this area should not be expected to cross a busy highway to access Bornstedt Park a half mile away. Knollwood, the nearest park to Bailey Meadows, is over one half mile away and offers only a small playground. Hamilton Ridge is a 0.67 mile walk and crosses busy Dubarko Road.

The following page shows a map of the area with the 1997 Park Master Plan proposed park, a one quarter and one half mile zone around the development, and existing parks in the area. The one quarter mile objective is by walking and not as the crow flies. The existing subdivision to the north (Rachel Drive and Melissa Avenue) was approved in 1997, before the 1997 Parks Master Plan was adopted. Construction of the subdivision did not begin until 1998.

Bailey Meadows has suitable ground to provide a park, complete with flatter topography suitable for a multi-use ball field, and play structures. Now picture 100 new homes and hundreds of new Sandy residents in Bailey Meadows, with no neighborhood park within reasonable walking distance. Bailey Meadows has the UGB boundary to the west and the south. The potential complications of developing a neighborhood park in outside the UGB along with the roads and utilities needed at the park are more costly and complicated and would require Clackamas County approval or expansion of the UGB.

MAP OF PARK NEED



4. Park Dedication Policies are Incorporated into the City's Land Use Regulations:

The developer implies that the park land dedication policies are not applicable. Sandy Development Code Section 17.86 states:

"This chapter implements policies of Goal 8 of the Comprehensive Plan and the Parks Master Plan by outlining provisions for parks and open space in the City of Sandy."

Sandy's 1997 Parks Master Plan is incorporated into the City's Comprehensive Plan and has served as the guiding document for the last 22 years. Sandy's development code language and direction contained in Section 17.86 have also served to implement the need for public recreational space as new neighborhoods are built, so it comes as a dubious surprise that the direction in these documents are implied by the developer as "Not Applicable".

5. Parkland dedication is the City's discretion only, and is not "subjective"—

Sandy Development Code Section 17.86.40 says that:

"At the city's discretion only, the city may accept payment of a fee in lieu of land dedication."

The developer states that this requirement is "subjective" under the terms of the "Needed Housing" language. See Section 2 above on why the "Needed Housing" designation should not even apply to this large home and lot subdivision. But more importantly, the 1997 Parks Master Plan and development code language in section 17.86 objectively lays out proposed park needs and required policies to provide "quality of life" and serve "active and passive recreational needs" for future growth in Sandy.

Section 17.86.20 states that:

"The parkland must be able to accommodate play structures, play fields, picnic areas, or other active park use facilities. The average slope of the active use parkland shall not exceed 15%."

Section 17.86.40 states: *"The following factors shall be used in the choice of whether to accept land or cash in lieu:*

- a) *The topography, geology, access to, parcel size, and location of land in the development available for dedication;"*

Response: The Bailey Meadows subdivision contains relatively flat ground, suitable for play structures and play fields.

- b) *Potential adverse/beneficial effects on environmentally sensitive areas;*

Response: The Bailey Meadows subdivision contains no environmentally sensitive areas and is suitable for park land development.

- c) *Compatibility with the Parks Master Plan, Public Facilities element of the Comprehensive Plan"*

Response: The Parks Master Plan identifies a needed park in this area and is incorporated into the Comprehensive Plan in Section 17.86 and in other sections of City code.

- d) *Availability of previously acquired property;*

Response: There is no previously acquired property in this area to meet the need for park land. Similarly the City has not identified any other future parkland acquisition options. Understaffed and overworked City staff have not investigated or identified willing sellers of potential park property in the area of the Bailey Meadows subdivision. The price would need to be affordable and the time and expenses of finding a seller, land appraisal, surveys, purchase, and deed transfers would be additional costs. This has taken

the City years for Bornstedt and Tickle Creek. Park acquisition options outside the boundary adjacent UGB provide more challenges.

e) *The feasibility of dedication.*

Response: Park land dedication for Bailey Meadows is completely feasible and a far easier and cheaper option for the City to acquire park land property to meet the needs of the hundreds of new Bailey Meadows residents than trying to collect funds, find and buy nearby parkland. If a willing seller is not found for the Bailey Meadows neighborhood, these folks will have no neighborhood park. They will likely be legitimately complaining about this missing asset for decades to come. Accepting park land dedication eliminates this risk, additional effort and expenses while providing the new residents a reasonable, desirable and required City amenity.

Park land dedication is the fiscally prudent choice for the City over collecting fees and trying to acquire parkland near Bailey Meadows. Development code section 17.86.30 – *“The developer shall clear, fill, and/or grade all land to the satisfaction of the City, install sidewalks on the park land adjacent to any street, and seed the park land.”* These costs for the needed park should be paid by the developer building the neighborhood and not taken out of Sandy’s limited parkland acquisition and park development funds.

6. Additional road access is needed for this subdivision.

Existing traffic studies and staff recommendations indicate a need for secondary access to Bailey Meadows. As we learned in the Sandy Bluff phases, it is not good policy to allow developers to avoid or postpone developing the road access needed for these large subdivisions, at the expense and impact of existing residents. City code requires developers construct necessary roads and utilities to accommodate their development and this should be no exception. There should be no horse trading or concessions to other code requirements including parks, because of increased road access costs.

Conclusion:

As stated before, the 1997 Parks Master Plan identified a needed park in this area. The Sandy’s Parks and Trails Board recommended that the developer be required to dedicate land to provide a park for the 100 new homes. There are no existing parks that will serve the objective need for the hundreds of new residences added by this subdivision. There is no existing “willing seller” that will provide park land to serve this subdivision. There may never be one, or the cost may be out of reach for the City to pursue. For the last 22 years, developers in Sandy have dedicated park land based on the Parks Master Plan. In fact, a couple of developers built additional parks for their subdivisions because they knew it helped sell homes (as well as providing an excellent amenity to the new residents). Please disregard the spurious arguments in the developer’s response to City Code requirements and require they dedicate park land to meet the needs of the hundreds of new residents we will be welcoming to Sandy.

Please keep the public comment period open so that we can understand and provide comment on the staff’s formal assessment of how this proposed development meets Sandy Development Code requirements. Please require secondary access to the subdivision beyond Melissa Avenue based on traffic studies, staff and fire district recommendations, and existing City code.

Kindest Regards,

Kathleen Walker

Exhibit BBBB



December 16, 2019

Re: City of Sandy Parks Board recommendation and rationale on Bailey Meadows

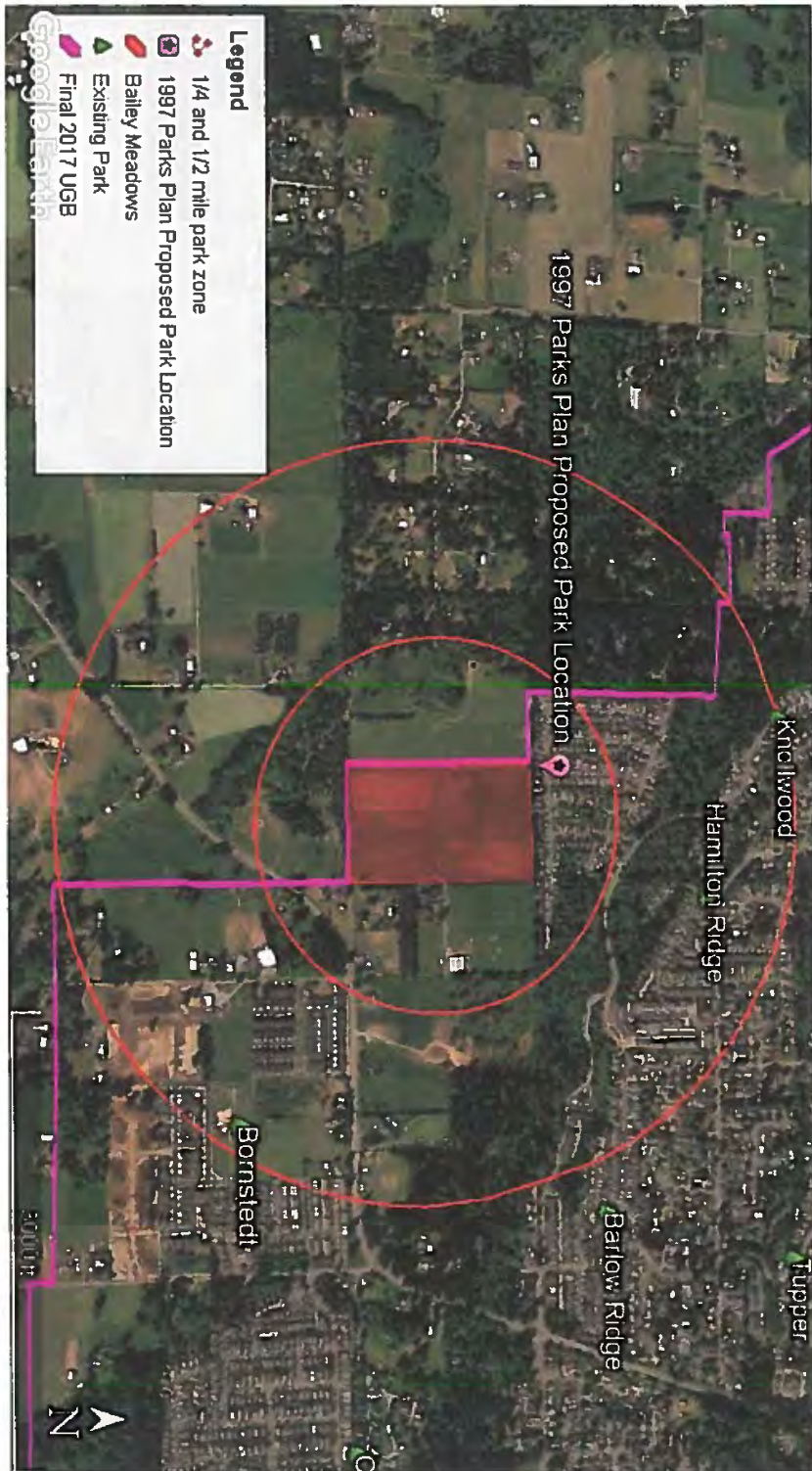
Dear Planning Commission, City staff and City Council:

As the members of the Sandy Parks and Trails Board, we wanted to take the opportunity to further explain our recommendation on park land dedication in Bailey Meadows. Our Parks Board meeting notes in the planning packet summarize the rationale in our recommendation, but we have had the opportunity to review the developer's response to our recommendation on pages 38-40 of your planning packet. We were unable to review the staff recommendation regarding park land dedication as the staff report is not completed yet. **We would recommend keeping the public comment period open until the staff report is completed.**

We recommend the City require park land dedication for this proposed development with the following rationale:

1. Section 17.86.10 of the City's code says "*New residential subdivisions, planned developments, multi-family or manufactured home park developments shall be required to provide parkland to serve existing and future residents of those developments.*"
2. There is a park referenced for the Bailey Meadows area in the 1997 Parks Master Plan incorporated under Section 17.86.00 and 17.86.10. The land is generally flat and therefore suitable for park facilities including a multi-use ball field.
3. The 1997 City of Sandy Parks Master Plan (adopted in its entirety in City Development Code) called for "*80% of all dwellings be located within one quarter mile of a neighborhood park*" (Chapter 3). National Recreation and Park Association (NRPA) identifies the goal of having a park within a ten minute walk and further defines accessibility to avoid crossing major streets and highways, streams or other topographic impediments. There is no other existing park land in the area to meet this development's need. See Figure 1 below. A walk to the closest park for most of the development property is over ½ mile (Knollwood) which does not meet our Master Plan intent of providing a park within ¼ to ½ mile of developments. Access to Bornstedt requires crossing a highway and is about ½ mile away.
4. As mentioned in Section 17.86.40: the choice to require park land dedication or accept an in-lieu of fee, "is the City's only". The City has developed most of its existing park system based on the layout of proposed parks in the 1997 Parks Master Plan. If the 1997 Plan identified a proposed park in the area of the development, the City required park land dedication. If the 1997 Plan did not identify a proposed park in the area, the City chose to accept in-lieu-of fees.

Figure 1 – Map of Park Need for Bailey Meadows



Section 17.86.40 states: “*The following factors shall be used in the choice of whether to accept land or cash in lieu.* Our responses are included.

- a) *The topography, geology, access to, parcel size, and location of land in the development available for dedication;* **Response:** The Bailey Meadows subdivision contains relatively flat ground, suitable for park play structures and play fields.
- b) *Potential adverse/beneficial effects on environmentally sensitive areas;* **Response:** The Bailey Meadows subdivision contains no environmentally sensitive areas and is suitable for park land development.
- c) *Compatibility with the Parks Master Plan, Public Facilities element of the Comprehensive Plan*” **Response:** The Parks Master Plan identifies a needed park in this area and is incorporated into the Comprehensive Plan in Section 17.86 and in other sections of City code. The City’s in-lieu-of fee for park land acquisition is intended to apply where there are already parks that serve a proposed development, or the Parks Master Plan identifies no proposed park in the area of development.
- d) *Availability of previously acquired property;* **Response:** There is no previously acquired property in this area to meet the need for park land. Similarly the City has not identified any other future parkland acquisition options. Understaffed and overworked City staff have not investigated or identified willing sellers of potential park property in the area of the Bailey Meadows subdivision. The price would need to be affordable and the time and expenses of finding a seller, land appraisal, surveys, purchase, and deed transfers would be additional costs. This has taken the City years for Bornstedt and Tickle Creek.
- e) *The feasibility of dedication.* **Response:** Park land dedication for Bailey Meadows is completely feasible and a far easier and cheaper option for the City to acquire park land property to meet the needs of the hundreds of new Bailey Meadows residents than trying to collect funds, find and buy nearby parkland. If a willing seller is not found for the Bailey Meadows neighborhood, these folks will have no neighborhood park. They will likely be legitimately complaining about this missing asset for decades to come. Accepting park land dedication eliminates this risk, additional effort and expenses while providing the new residents a reasonable, desirable and required City amenity.

Yet another consideration in favor of park land dedication over in-lieu-of fees for Bailey Meadows is development code section 17.86.30 – “*The developer shall clear, fill, and/or grade all land to the satisfaction of the City, install sidewalks on the park land adjacent to any street, and seed the park land.*” These costs for the needed park should be paid by the developer building the neighborhood and not taken out of Sandy’s limited parkland acquisition and park development funds.

Bailey Meadows is surrounded on the west and the south by the Urban Growth Boundary (UGB) – see Figure 1 - which may limit the potential for the City to acquire and develop a neighborhood park. For the same reasons that the secondary access road development

outside the City limits is potentially costly and time consuming, developing a neighborhood park to the west or south would require going through Clackamas County.

While the Parks Board is no expert in land use laws, it appears that the intent of the Needed Housing is for “low, very low, and extremely low income housing”. Therefore, it is questionable how 7500 ft² lots with \$400,000 homes proposed would fall under this definition of “Needed Housing” in ORS 195.303. Further, the 1997 Parks Master Plan adopted into Sandy’s Comprehensive Plan and incorporated into the applicable Development Code language in Section 17.86 is clear and objective. In fact, it has served the City for the last 22 years to ensure that developers successfully and profitably build subdivisions, provide for Sandy’s growth, while meeting Section 17.86.10’s requirement that developers “shall be required to provide parkland to serve existing and future residents of those developments”.

We encourage and recommend that the Planning Commission, City staff, and City Council exercise the City’s discretion, and require park land dedication as part of the Bailey Meadows development to provide the desired and required amenities for these new residents.

Sincerely,

Sandy Parks Board Members:

Don Robertson

Susan Drew

Michael Weinberg

Kathleen Walker

Makoto Lane

October 15, 2019

Michael C. Robinson
Admitted in Oregon
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C: 503-407-2578
mrobinson@schwabe.com

VIA E-MAIL

Mr. Kelly O'Neill, Jr., Director
Development Services Department
Sandy City Hall
39250 Pioneer Blvd.
Sandy, OR 97055

RE: City of Sandy File No. 19-023 SUB/VAR/TREE

Dear Mr. O'Neill:

This office represents the Applicant.

The Applicant requests that the City cancel the scheduled October 28, 2019 Sandy Planning Commission initial evidentiary hearing on this Application by providing mailed notice to all property owners entitled to such notice. The Applicant also requests that the City reschedule the Sandy Planning Commission initial evidentiary hearing for December 17, 2019 at 7:00 p.m. The Applicant will extend the 120-day period in ORS 227.178(1) by fifty (50) days, the period of the continuance.

Please let me know if you have any questions.

Very truly yours,



Michael C. Robinson

MCR/jmhi

Cc Ms. Emily Meharg (via email)
Mr. Cody Bjugan (via email)
Mr. Monty Hurley (via email)
Mr. Chris Goodell (via email)
Mr. David Doughman (via email)

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Exhibit DDDD

Technical Memorandum

To: Cody Bjugan, Allied Homes & Development
From: Jessica Hijar
Date: January 6, 2020
Subject: UGB Amendment & Gunderson Road Connection
 Traffic Impact Analysis, Addendum #1



**LANCASTER
ENGINEERING**

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 lancasterengineering.com

This memorandum is written as an addendum to the Bailey Meadows Subdivision Traffic Impact Analysis prepared by Lancaster Engineering dated June 20, 2019. Specifically, analysis is provided regarding the potential new roadway connection to Highway 211. The current planning effort includes a connection of Gunderson Road to Highway 211 as considered in the City of Sandy's Transportation System Plan (TSP).

In addition, this memorandum addresses the Transportation Planning Rule and associated approval criteria relative to the proposed Urban Growth Boundary (UGB) amendment, comprehensive plan and zone map amendments, and annexation applications. All of these are necessary to accommodate a connection of Gunderson Road to Highway 211.

Future Roadway Connection

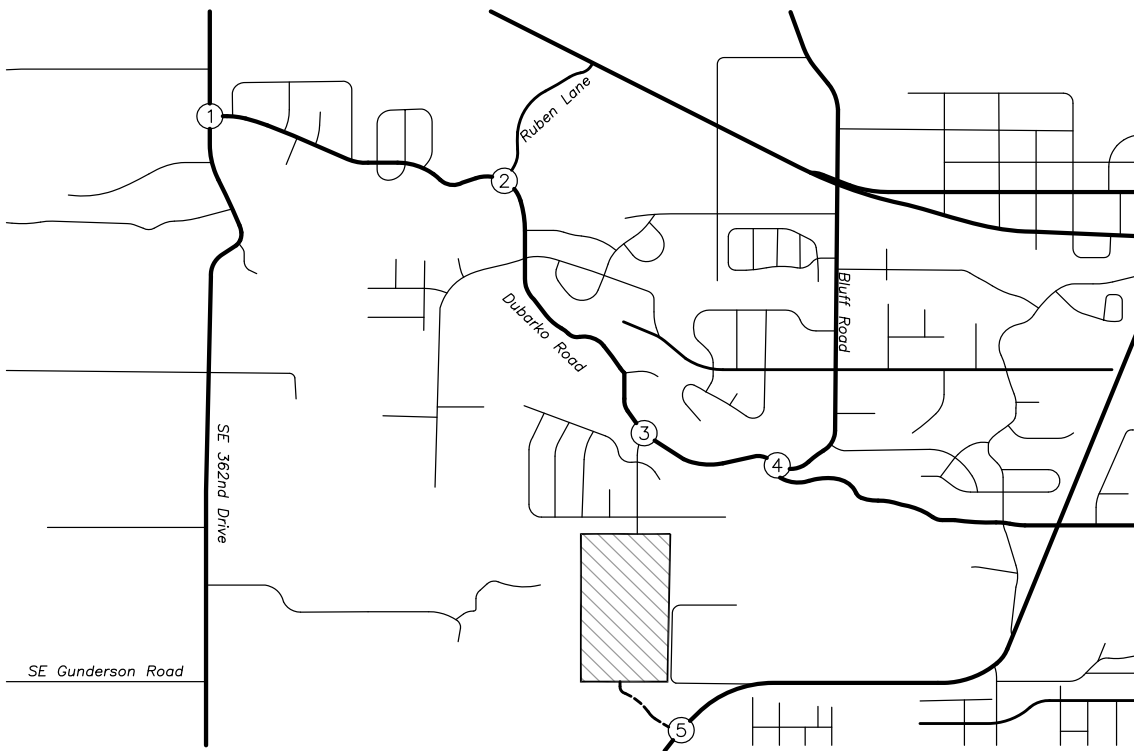
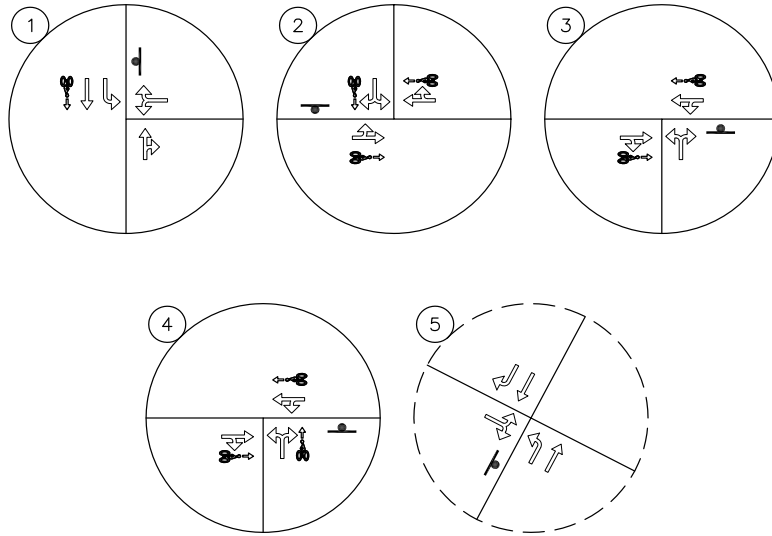
The planned connection of Gunderson Road to Highway 211 will provide an additional route into and out of the Bailey Meadows subdivision as well as the existing neighborhood to the north. This will reduce reliance on Melissa Avenue, which will provide access to the Bailey Meadows subdivision via Dubarko Road. The planned intersection of Gunderson Road at Highway 211 will be a three-legged intersection that is stop-controlled for the SE Gunderson Road approach. Future development on the south side of Highway 211 could extend the street to the east, to eventually connect with Cascadia Village Drive, as shown in the TSP. The existing characteristics of the subject roadways are shown in Table 1. The existing and future intersection configurations are shown in Figure 1 on page two.

Table 1: Vicinity Roadway Characteristics

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|--------------------------|---------------|-----------------------|------------------|---------|-----------|---------------|
| Highway 211 | ODOT | District Highway | 45-55 mph posted | No | No | Partial |
| Gunderson Road (planned) | City of Sandy | Future Minor Arterial | Not Posted | Partial | Partial | Yes |

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STUDY INTERSECTION (PROPOSED)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY
-  FUTURE MINOR ARTERIAL



VICINITY MAP



FIGURE 1

PAGE 2



Trip Distribution

The Gunderson connection to Highway 211 is expected to serve trips to and from the Bailey Meadows subdivision, as well as trips from the existing neighborhood north of Bailey Meadows, which currently uses only Melissa Avenue. Based on travel time studies, it is not expected that traffic from outside the immediate area (such as residents in Bornstedt Village or Cascadia Village) would use the new Gunderson Road connection as a bypass route. Those trips would have to use Gunderson Road, three different streets within Bailey Meadows, Melissa Avenue, and Dubarko Road. This would be a very circuitous route and would not be faster than existing travel routes serving these neighborhoods.

Bailey Meadows Trips

The overall directional distribution of site trips to and from Bailey Meadows was based on the original TIS, but trip routing was modified to reflect the new street connection.

To & From the East

It is expected that the 15 percent of site trips in the TIS previously assigned to Dubarko Road to the east will all use the new Gunderson Road connection. Turning left onto Highway 211 at the new intersection will have significantly lower delay than turning left or crossing Highway 211 at Dubarko Road.

Contribution: 15% via Gunderson

To & From the South

A total of 10 percent of the trips are expected to be to and from the south, and all these trips will use the Gunderson Road connection to Highway 211, since that will be a much more direct route.

Contribution: 10% via Gunderson

To & From the West

Trips to and from the west (30%) were assigned primarily to 362nd Avenue, as this is the quickest route to shopping destinations as well as Highway 26 west of Sandy. Travel time studies show that the route using Dubarko Road to 362nd Avenue is identical in time to the route using Highway 211 to 362nd Avenue. Therefore, the 30% was split evenly via Melissa Avenue to the north and Gunderson Road to the south.

Contribution: 15% via Gunderson

The total percentage of site trips using Gunderson Road is 40 percent, or 378 of the site's 944 trips per day.



Rerouted Existing Trips

Since 40 percent of the Bailey Meadows trips are expected to use the Gunderson Road connection to Highway 211, it is expected that a similar, although slightly lower percentage of the existing neighborhood traffic would also use Gunderson. Since the existing neighborhood is north of the project site, the use of Gunderson could decrease from 40 percent to approximately 30 percent. As shown in the TIS, the existing traffic volume on Melissa Avenue was measured to be 1160 vehicles per day.

In total, 30 percent of the existing 1160 average daily traffic (ADT) on Melissa Avenue would reroute via Gunderson Road, or 348 trips per day.

In summary, the table below shows the total daily traffic volumes to the north (via Melissa Avenue) and to the south (via Gunderson Road) with the future street connection in place.

Table 2: Trip Distribution Summary

| | Daily Traffic Volumes | |
|--|-----------------------|----------------|
| | Melissa Avenue | Gunderson Road |
| Existing neighborhood traffic | 1160 | 0 |
| Existing neighborhood traffic w/ Gunderson | 812 | 348 |
| Bailey Meadows site trips with Gunderson | 566 | 378 |
| <i>Total Daily Volume with Gunderson</i> | <i>1378</i> | <i>726</i> |

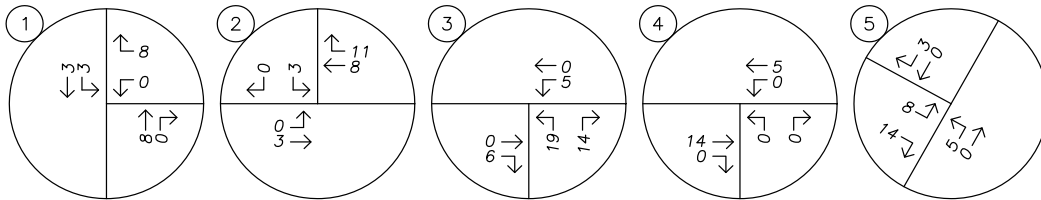
The updated trip distribution and assignment during the morning and evening peak hours are shown in Figure 2 on page five.

LEGEND

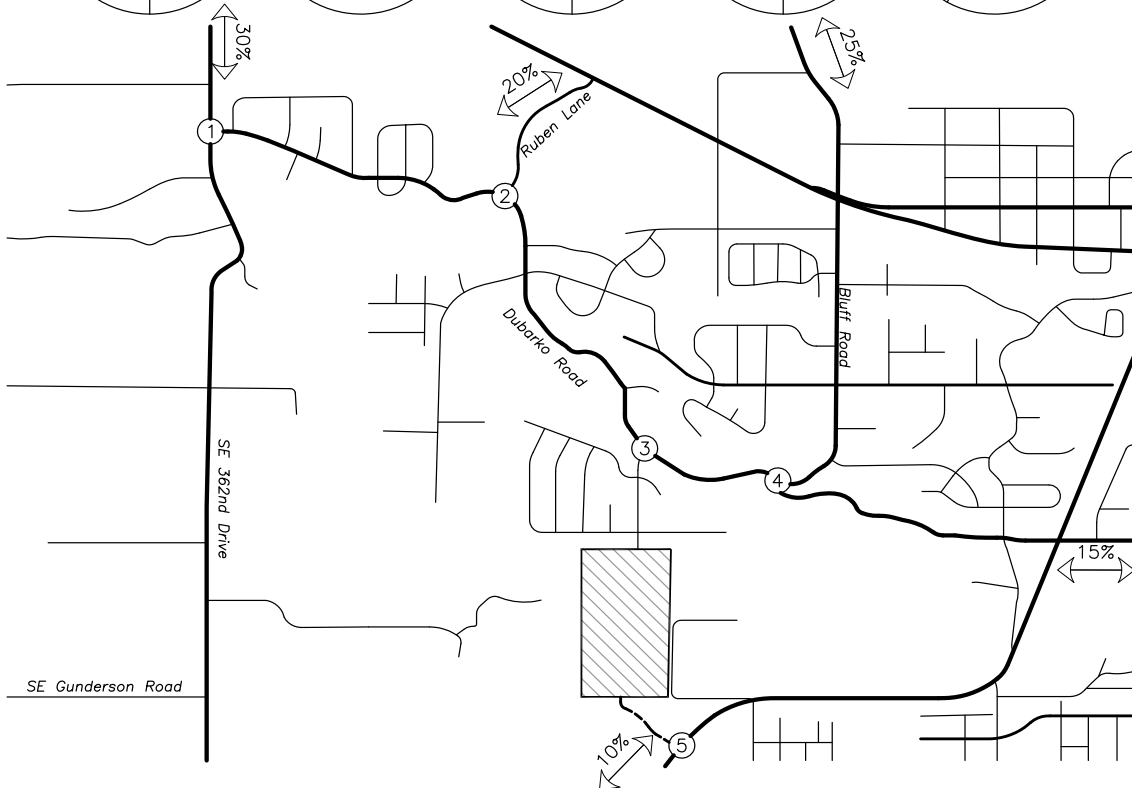
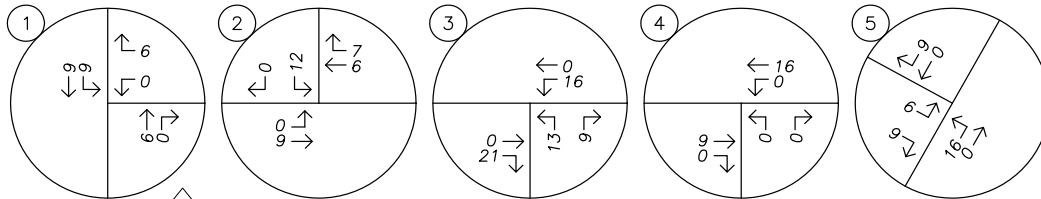
XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |

AM PEAK HOUR



PM PEAK HOUR



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Development Plan – Site Trips
 AM & PM Peak Hours



FIGURE
2
PAGE
5



Traffic Volumes

Existing Conditions

Twenty-four-hour speed data was collected on Highway 211 near the intersection with Ponder Lane on December 4th, 2018. The morning and evening peak hours of traffic occurred between 7:00 AM and 8:00 AM and between 4:00 PM and 5:00 PM, respectively.

Since Highway 211 is under the jurisdiction of ODOT, highway traffic volumes were seasonally adjusted to reflect the 30th highest hour per methodologies in ODOT's Analysis Procedures Manual (APM). Based on the commuter seasonal trend in ODOT's 2018 Seasonal Trend Table, a seasonal factor of 1.122 was calculated and applied to through volumes on Highway 211.

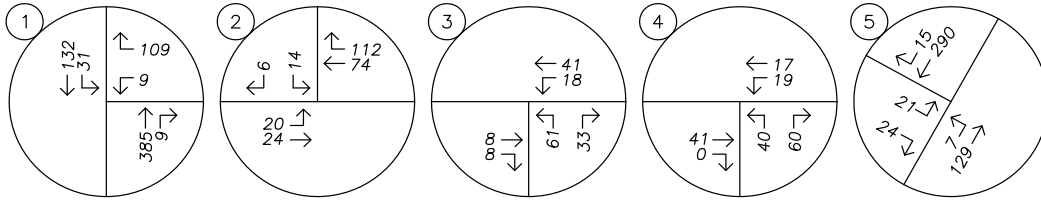
Buildout Conditions

A compounded growth rate of two percent per year was used to estimate growth on all streets under the City of Sandy jurisdiction as described within the TIS. Growth rates for traffic volumes on Highway 211 were derived using ODOT's 2037 Future Volume Tables in accordance with the APM. Using data corresponding to mileposts 3.75 and 5.07, a linear growth rate of 2.8 percent was calculated and applied to through volumes on the highway. Traffic volumes were projected over a period of four years in order to estimate the year 2022 buildout traffic volumes (traffic count data was collected in 2018).

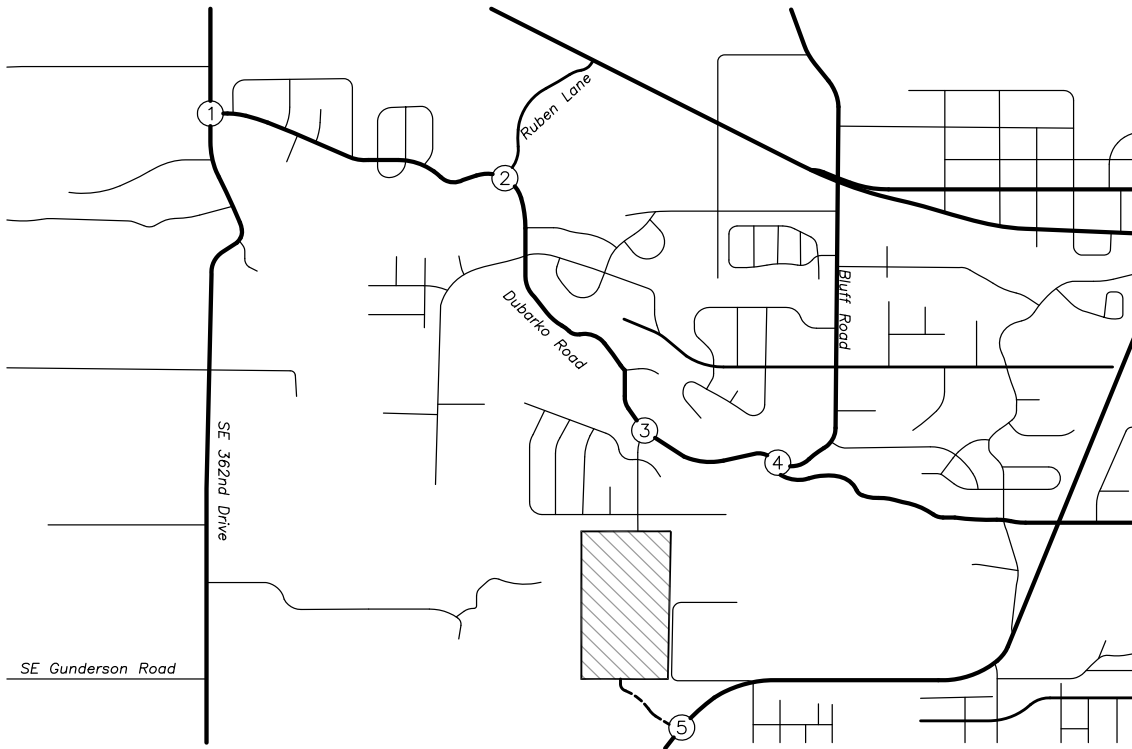
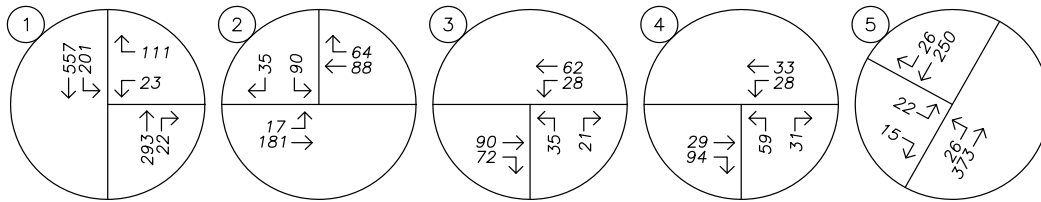
The year 2022 buildout scenario was updated to include a redistribution of existing trips that are likely to use the new Highway 211 roadway connection. Finally, site trips generated by the Bailey Meadows subdivision, discussed previously within the Trip Distribution section, were added to the projected year 2022 volumes in order to obtain the year 2022 buildout traffic volumes.

The year 2022 buildout traffic volumes are shown in Figure 3 on page seven.

AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
 Year 2022 Buildout Traffic Volumes
 AM & PM Peak Hours



FIGURE
3
PAGE
7



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Preliminary Traffic Signal Warrants

Preliminary traffic signal warrants were examined for all study intersections based on methodologies in the *Manual on Uniform Traffic Control Devices*¹ (MUTCD) and the Analysis Procedures Manual. Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT and that the eighth-highest hour is 5.6 percent of the daily traffic. Volumes were used for the evening peak hour under the year 2022 buildout scenario.

For the intersection under ODOT jurisdiction, the APM dictates that minor-street right turns are only used if the volume exceeds 85 percent of the lane capacity, and even then, only the increment of volume in excess of 85 percent can be used. In this case, none of the right turns can be used for the purpose of the signal warrant analysis.

Due to insufficient minor street volumes, traffic signal warrants are not met at the intersection of SE Gunderson Road at Highway 211 under year 2022 buildout scenario.

Left-Turn Lane Warrants

Left-turn lane warrants were examined at the planned intersection of Highway 211 at SE Gunderson Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream.

Warrants were examined based on the design curves developed by the Texas Transportation Institute, as adopted by the APM. This methodology evaluates the need for a left-turn lane based on the number of left-turning vehicles, the number of travel lanes, the number of advancing and opposing vehicles, and the roadway travel speed.

A left-turn lane is warranted at the intersection of SE Gunderson Road at Highway 211 under the year 2022 buildout scenario and it is recommended that a left-turn lane be constructed as part of the intersection improvements.

¹ Federal Highway Administration (FTA), American Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual of Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010



Operational Analysis

A capacity analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*² (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s TSP states that both signalized and unsignalized intersections are required to operate at LOS D or better.

The applicable minimum operational standards for ODOT facilities are established under the Oregon Highway Plan and are based on the classification of the roadway and its v/c ratio. District highways located outside the Urban Growth Boundary and within an unincorporated community has a peak hour v/c ratio target of 0.80.

Table 3: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 13 | B | 0.24 | 19 | C | 0.36 |
| Ruben Lane at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Year 2022 Buildout Conditions | 9 | A | 0.13 | 10 | B | 0.09 |
| Dubarko Road at Bluff Road | | | | | | |
| Year 2022 Buildout Conditions | 8 | A | 0.16 | 8 | A | 0.15 |
| Highway 211 at SE Gunderson Road | | | | | | |
| Year 2022 Buildout Conditions | 11 | B | 0.08 | 13 | B | 0.08 |

All intersections are projected to operate within the City of Sandy and ODOT’s operational standards under all analysis scenarios.

² Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Intersection Location

The City of Sandy TSP shows a planning-level depiction of the Gunderson Road extension that was outside of the UGB at the time the TSP was adopted but is within the current UGB. This is shown below in Figure 4.



Figure 4: Alignment from Sandy TSP

However, upon closer investigation and engineering analysis, it was determined that the alignment shown on the TSP was not feasible for construction of an intersection with Highway 211, primarily due to poor sight distance, the need for a perpendicular intersection, and a very steep superelevated roadway section.

Looking to the northeast from the TSP-identified location, sight distance is limited by both horizontal and vertical curves on Highway 211. In addition, sight distance from the future fourth leg of the intersection would be particularly poor. At

the TSP-identified location, the highway was designed for moving traffic, not for accommodation of an intersection. Due to the high design speed and the horizontal curve, superelevation (the banking of the roadway around the curve) is very steep. This facilitates through traffic on the highway, but makes an intersection at this location problematic, due to difficult turning and crossing movements across the steep curve.

Need for UGB Expansion

The nearest suitable intersection location was found to be farther to the southwest, at the location currently proposed for a UGB amendment. From this location, it is far enough from the horizontal and vertical curves to the northeast to have adequate sight distance and far enough southwest of the curve to not be in a

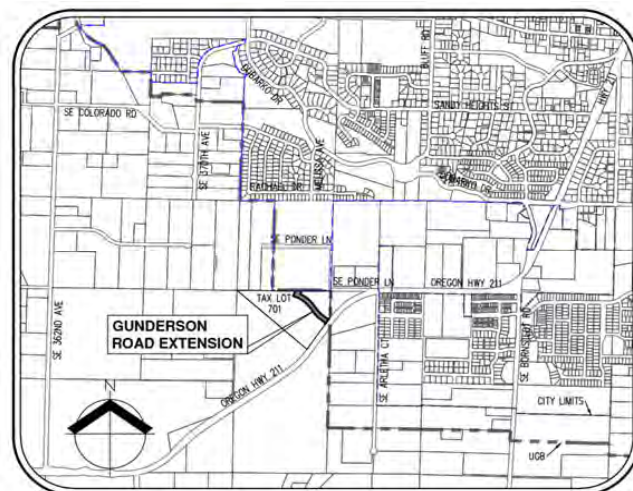


Figure 5: Planned Alignment



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superelevated roadway section. However, this alignment is outside of the current UGB of the City of Sandy, as shown in Figure 5. As such, a UGB amendment is proposed to accommodate the road extension.

With the proposed UGB amendment, there will be a triangle-shaped remnant piece of property that will also be brought into the UGB. This remnant is approximately 2.38 acres in size and is proposed to be dedicated as a public neighborhood park. This will be a small, passive-use neighborhood park that will be used primarily by the residents in the area. Trips to and from the park will be primarily pedestrian and bicycle trips and no separate parking lot is planned.

Oregon Administrative Rules

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation applications trigger the need to address the Transportation Planning Rule (TPR) and associated criteria from the Oregon Administrative Rules. These are addressed below.

OAR 660-012-0060 Transportation Planning Rule

The primary purpose of the TPR is to account for the potential transportation impacts associated with any amendments to adopted plans and land use regulations. The TPR is quoted in *italics* below, with a response immediately following each section.

1. *If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*

- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*

Response: The proposed UGB amendment, comprehensive plan and zone map amendment, and annexation will not change the functional classification of any transportation facilities. In fact, it will implement planned roadway connections in the TSP.

- (b) Change standards implementing a functional classification system; or*

Response: The standards that implement the functional classification system are contained in the TSP and will not change as part of this proposal.

- (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing*



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requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

- (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;*
- (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or*
- (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.*

Response: The proposed UGB amendment and associated plan amendments will facilitate the Gunderson Road connection and will not result in developable property that will increase trip generation. In fact, by facilitating an important street connection it is implementing the City of Sandy TSP, will improve connectivity for the neighborhood, and will improve performance of the surrounding transportation system. The proposal will not result in a significant effect as defined by the TPR and no mitigations are necessary.

OAD 660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB

This section of the OAR is specific to UGB expansions and speaks to public facilities (such as transportation facilities) that require specific site characteristics. The OAR is quoted in *italics* below, with a response immediately following each section.

- 3. When the primary purpose for expansion of the UGB is to accommodate a particular industrial use that requires specific site characteristics, or to accommodate a public facility that requires specific site characteristics, and the site characteristics may be found in only a small number of locations, the preliminary study area may be limited to those locations within the distance described in section (1) or (2), whichever is appropriate, that have or could be improved to provide the required site characteristics. For purposes of this section:*

- (a) The definition of "site characteristics" in OAR 660-009-0005(11) applies for purposes of identifying a particular industrial use.*

Response: In OAR 660-009-0005(11), "Site Characteristics" are defined by visibility, proximity to a particular transportation facility, and major transportation routes. In this case, the "site" for the UGB amendment is very narrowly defined and the location between the subdivision and Highway 211 is dictated by engineering standards that must be satisfied for a safe and efficient intersection location.

- (b) A "public facility" may include a facility necessary for public sewer, water, storm water, transportation, parks, schools, or fire protection. Site characteristics may include but are not limited to size, topography and proximity.*



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Response: Since the primary purpose of the proposed UGB amendment is to accommodate the extension of Gunderson Road to Highway 211, it is by definition a “public facility”. Site characteristics such as topography are what have dictated the need for the intersection in the location as proposed. Additionally, the applicant is providing area for a neighborhood park, a minor public facility.

Summary & Conclusions

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation will implement the City of Sandy TSP and result in improved operation at the study area roadways and intersections. The connection will improve conditions for the existing neighborhood to the north of the Bailey Meadows subdivision by providing another means of vehicular access to the area.



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Appendix

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 1/6/2020
 Scenario: Year 2022 Buildout Conditions - Evening Peak Hour

Major Street: Highway 211 Minor Street: SE Gunderson Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 675 PM Peak Hour Volumes: 22

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 6,750 | 8,850 | |
| Minor Street* | 220 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 6,750 | 13,300 | |
| Minor Street* | 220 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 6,750 | 10,640 | |
| Minor Street* | 220 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 85% of the turn lane capacity.



Project: Bailey Meadows Subdivision
 Intersection: Highway 211 at SE Gunderson Road
 Date: 1/6/2020
 Scenario: 2022 Buildout conditions

Speed? 45 mph

PM Peak Hour

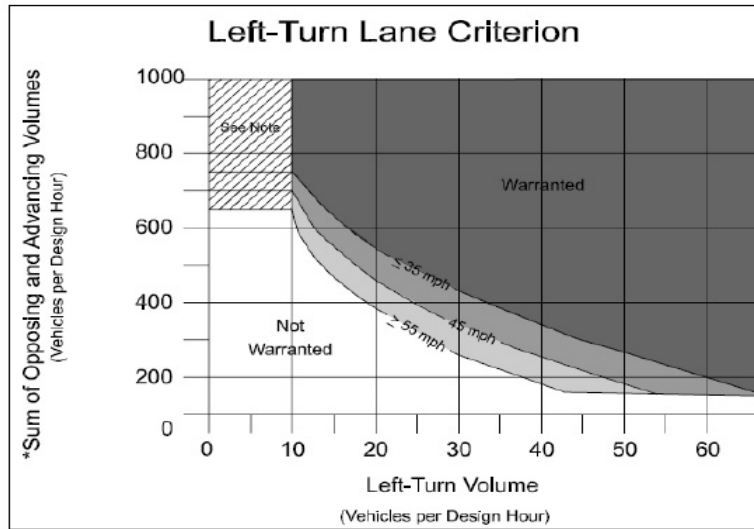
Left-Turn Volume 26

Approaching DHV 250
 # of Advancing Through Lanes 1

Opposing DHV 399
 # of Opposing Through Lanes 1

O+A DHV 649

Lane Needed? **Yes**



Source: Oregon DOT Analysis Procedures Manual 2008

$$*(\text{Advancing Vol} / \# \text{ of Advancing Through Lanes}) + (\text{Opposing Vol} / \# \text{ of Opposing Through Lanes})$$

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

Lanes, Volumes, Timings
1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.876 | | 0.997 | | | |
| Flt Protected | 0.996 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Flt Permitted | 0.996 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 2% | 2% | 6% | 6% |
| Adj. Flow (vph) | 11 | 128 | 453 | 11 | 36 | 155 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 139 | 0 | 464 | 0 | 36 | 155 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 39.7% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

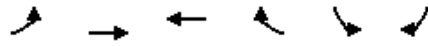
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 2.7 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 128 | 453 | 11 | 36 | 155 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 686 | 459 | 0 | 0 | 464 | |
| Stage 1 | 459 | - | - | - | - | |
| Stage 2 | 227 | - | - | - | - | |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | |
| Pot Cap-1 Maneuver | 415 | 604 | - | - | 1077 | |
| Stage 1 | 638 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 401 | 604 | - | - | 1077 | |
| Mov Cap-2 Maneuver | 401 | - | - | - | - | |
| Stage 1 | 617 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 13.1 | 0 | | 1.6 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 582 | 1077 | - | |
| HCM Lane V/C Ratio | - | - | 0.239 | 0.034 | - | |
| HCM Control Delay (s) | - | - | 13.1 | 8.5 | - | |
| HCM Lane LOS | - | - | B | A | - | |
| HCM 95th %tile Q(veh) | - | - | 0.9 | 0.1 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | 0.919 | | 0.959 | |
| Flt Protected | | 0.978 | | | 0.966 | |
| Satd. Flow (prot) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Flt Permitted | | 0.978 | | | 0.966 | |
| Satd. Flow (perm) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 6% | 6% | 2% | 2% | 13% | 13% |
| Adj. Flow (vph) | 22 | 27 | 83 | 126 | 16 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 49 | 209 | 0 | 23 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.4% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

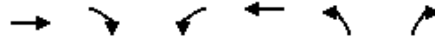
HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 1.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 27 | 83 | 126 | 16 | 7 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 209 | 0 | - | 0 | 217 | 146 |
| Stage 1 | - | - | - | - | 146 | - |
| Stage 2 | - | - | - | - | 71 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1338 | - | - | - | 747 | 873 |
| Stage 1 | - | - | - | - | 855 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1338 | - | - | - | 734 | 873 |
| Mov Cap-2 Maneuver | - | - | - | - | 734 | - |
| Stage 1 | - | - | - | - | 840 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 3.5 | 0 | 9.8 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1338 | - | - | - | 771 | |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.029 | |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.8 | |
| HCM Lane LOS | A | A | - | - | A | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr _t | 0.932 | | | | 0.952 | |
| Flt Protected | | | 0.985 | | 0.969 | |
| Satd. Flow (prot) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Flt Permitted | | | 0.985 | | 0.969 | |
| Satd. Flow (perm) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 |
| Heavy Vehicles (%) | 22% | 22% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 10 | 10 | 23 | 52 | 77 | 42 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 20 | 0 | 0 | 75 | 119 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.9% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

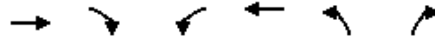
HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|-------|-------|
| Int Delay, s/veh | 6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 10 | 23 | 52 | 77 | 42 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 20 | 0 | 113 | 15 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 98 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1596 | - | 884 | 1065 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1596 | - | 871 | 1065 |
| Mov Cap-2 Maneuver | - | - | - | - | 871 | - |
| Stage 1 | - | - | - | - | 993 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.2 | 9.4 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 931 | - | - | 1596 | - | |
| HCM Lane V/C Ratio | 0.128 | - | - | 0.014 | - | |
| HCM Control Delay (s) | 9.4 | - | - | 7.3 | 0 | |
| HCM Lane LOS | A | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | | | 0.919 | |
| Flt Protected | | | | 0.974 | 0.980 | |
| Satd. Flow (prot) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Flt Permitted | | | | 0.974 | 0.980 | |
| Satd. Flow (perm) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles (%) | 12% | 12% | 9% | 9% | 4% | 4% |
| Adj. Flow (vph) | 59 | 0 | 27 | 24 | 57 | 86 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 59 | 0 | 0 | 51 | 143 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | | 9 | 15 | | 15 | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.2% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 0 | 27 | 24 | 57 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.8 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 40% | 0% | 53% |
| Vol Thru, % | 0% | 100% | 47% |
| Vol Right, % | 60% | 0% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 100 | 41 | 36 |
| LT Vol | 40 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 0 | 0 |
| Lane Flow Rate | 143 | 59 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.154 | 0.072 | 0.064 |
| Departure Headway (Hd) | 3.877 | 4.396 | 4.456 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 913 | 807 | 796 |
| Service Time | 1.95 | 2.466 | 2.528 |
| HCM Lane V/C Ratio | 0.157 | 0.073 | 0.064 |
| HCM Control Delay | 7.7 | 7.8 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.2 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | SEL | SER | NEL | NET | SWT | SWR |
|----------------------------|-------|-------|-------|------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.928 | | | | | 0.850 |
| Flt Protected | 0.977 | | 0.950 | | | |
| Satd. Flow (prot) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.977 | | 0.950 | | | |
| Satd. Flow (perm) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 827 | | | 1043 | 1164 | |
| Travel Time (s) | 18.8 | | | 23.7 | 26.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 23 | 26 | 8 | 140 | 315 | 16 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 49 | 0 | 8 | 140 | 315 | 16 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |

Intersection Summary

| | |
|-----------------------------------|------------------------|
| Area Type: | Other |
| Control Type: | Unsignalized |
| Intersection Capacity Utilization | 26.6% |
| Analysis Period (min) | 15 |
| | ICU Level of Service A |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

Intersection

Int Delay, s/veh 1.1

Movement SEL SER NEL NET SWT SWR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 26 | 8 | 140 | 315 | 16 |

Major/Minor Minor2 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|-------|---|---|---|
| Conflicting Flow All | 471 | 315 | 331 | 0 | - | 0 |
| Stage 1 | 315 | - | - | - | - | - |
| Stage 2 | 156 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 551 | 725 | 1228 | - | - | - |
| Stage 1 | 740 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 547 | 725 | 1228 | - | - | - |
| Mov Cap-2 Maneuver | 547 | - | - | - | - | - |
| Stage 1 | 735 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |

Approach SE NE SW

| | | | |
|----------------------|------|-----|---|
| HCM Control Delay, s | 11.2 | 0.4 | 0 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

| | | | | | |
|-----------------------|-------|---|-------|---|---|
| Capacity (veh/h) | 1228 | - | 629 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.078 | - | - |
| HCM Control Delay (s) | 8 | - | 11.2 | - | - |
| HCM Lane LOS | A | - | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

Lanes, Volumes, Timings
 1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.888 | | 0.991 | | | |
| Flt Protected | 0.992 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Flt Permitted | 0.992 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 1% | 1% |
| Adj. Flow (vph) | 25 | 121 | 318 | 24 | 218 | 605 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 146 | 0 | 342 | 0 | 218 | 605 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 46.0% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

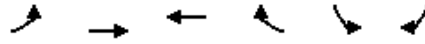
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 3.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 121 | 318 | 24 | 218 | 605 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 1371 | 330 | 0 | 0 | 342 | |
| Stage 1 | 330 | - | - | - | - | |
| Stage 2 | 1041 | - | - | - | - | |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | |
| Pot Cap-1 Maneuver | 161 | 712 | - | - | 1223 | |
| Stage 1 | 728 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 132 | 712 | - | - | 1223 | |
| Mov Cap-2 Maneuver | 132 | - | - | - | - | |
| Stage 1 | 598 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 18.7 | 0 | | 2.3 | | |
| HCM LOS | C | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 406 | 1223 | - | |
| HCM Lane V/C Ratio | - | - | 0.359 | 0.179 | - | |
| HCM Control Delay (s) | - | - | 18.7 | 8.6 | - | |
| HCM Lane LOS | - | - | C | A | - | |
| HCM 95th %tile Q(veh) | - | - | 1.6 | 0.6 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | 0.943 | | 0.962 | |
| Flt Protected | | 0.996 | | | 0.965 | |
| Satd. Flow (prot) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Flt Permitted | | 0.996 | | | 0.965 | |
| Satd. Flow (perm) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 19 | 203 | 99 | 72 | 101 | 39 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 222 | 171 | 0 | 140 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 36.1% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

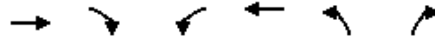
HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 203 | 99 | 72 | 101 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 171 | 0 | - | 0 | 376 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 241 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1412 | - | - | - | 627 | 917 |
| Stage 1 | - | - | - | - | 894 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1412 | - | - | - | 618 | 917 |
| Mov Cap-2 Maneuver | - | - | - | - | 618 | - |
| Stage 1 | - | - | - | - | 881 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.7 | 0 | 11.7 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1412 | - | - | - | 680 | |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.207 | |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.7 | |
| HCM Lane LOS | A | A | - | - | B | |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | ↑ | | | ↑ | ↑ | |
| Traffic Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr't | 0.940 | | | | 0.949 | |
| Flt Protected | | | 0.985 | | 0.970 | |
| Satd. Flow (prot) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Flt Permitted | | | 0.985 | | 0.970 | |
| Satd. Flow (perm) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 106 | 85 | 33 | 73 | 41 | 25 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 191 | 0 | 0 | 106 | 66 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

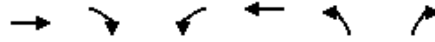
HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh | 2.6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 85 | 33 | 73 | 41 | 25 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 191 | 0 | 288 | 149 |
| Stage 1 | - | - | - | - | 149 | - |
| Stage 2 | - | - | - | - | 139 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1395 | - | 707 | 903 |
| Stage 1 | - | - | - | - | 884 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1395 | - | 689 | 903 |
| Mov Cap-2 Maneuver | - | - | - | - | 689 | - |
| Stage 1 | - | - | - | - | 862 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.4 | 10.2 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 756 | - | - | 1395 | - | |
| HCM Lane V/C Ratio | 0.087 | - | - | 0.024 | - | |
| HCM Control Delay (s) | 10.2 | - | - | 7.6 | 0 | |
| HCM Lane LOS | B | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.897 | | | 0.954 | | |
| Flt Protected | | | | 0.978 | 0.968 | |
| Satd. Flow (prot) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Flt Permitted | | | | 0.978 | 0.968 | |
| Satd. Flow (perm) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 34 | 111 | 33 | 39 | 69 | 36 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 145 | 0 | 0 | 72 | 105 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | 15 | | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 25.8% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 111 | 33 | 39 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.4 | 7.8 | 7.9 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 46% |
| Vol Thru, % | 0% | 24% | 54% |
| Vol Right, % | 34% | 76% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 123 | 61 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 145 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.124 | 0.148 | 0.086 |
| Departure Headway (Hd) | 4.213 | 3.682 | 4.29 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 841 | 959 | 825 |
| Service Time | 2.29 | 1.761 | 2.368 |
| HCM Lane V/C Ratio | 0.126 | 0.151 | 0.087 |
| HCM Control Delay | 7.9 | 7.4 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.3 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.946 | | | | | 0.850 |
| Flt Protected | 0.971 | | 0.950 | | | |
| Satd. Flow (prot) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.971 | | 0.950 | | | |
| Satd. Flow (perm) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 45 | 45 | |
| Link Distance (ft) | 1495 | | | 875 | 917 | |
| Travel Time (s) | 34.0 | | | 13.3 | 13.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 24 | 16 | 28 | 405 | 272 | 28 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 40 | 0 | 28 | 405 | 272 | 28 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 31.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 16 | 28 | 405 | 272 | 28 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | 733 | 272 | 300 | 0 | - | 0 |
| Stage 1 | 272 | - | - | - | - | - |
| Stage 2 | 461 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 388 | 767 | 1261 | - | - | - |
| Stage 1 | 774 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 379 | 767 | 1261 | - | - | - |
| Mov Cap-2 Maneuver | 379 | - | - | - | - | - |
| Stage 1 | 757 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 13.2 | 0.5 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 1261 | - | 477 | - | - | |
| HCM Lane V/C Ratio | 0.022 | - | 0.084 | - | - | |
| HCM Control Delay (s) | 7.9 | - | 13.2 | - | - | |
| HCM Lane LOS | A | - | B | - | - | |
| HCM 95th %tile Q(veh) | 0.1 | - | 0.3 | - | - | |

Exhibit EEEE

City of Sandy Urban Growth Boundary Amendment

Date: January 2020

Submitted to: City of Sandy
Planning Department
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

AKS Job Number: 7107



AKS
ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

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Exhibits

- Exhibit A:** City of Sandy Land Use Application Form
 - Exhibit B:** Clackamas County Land Use Application Form
 - Exhibit C:** Property Ownership Information
 - Exhibit D:** Clackamas County Assessor’s Map
 - Exhibit E:** City of Sandy Noticing Materials
 - Exhibit F:** Lancaster Mobley Engineering Traffic Documentation
 - Exhibit G:** Supplemental Materials
-

Land Use Application for an Urban Growth Boundary Amendment

Submitted to: City of Sandy
Planning Department
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

Property Owners: Lawrence Pullen
36940 Deming Road
Sandy, OR 97055

Richard Pullen
36969 Deming Road
Sandy, OR 97055

Sherrene TenEyck
37020 SE Deming Road
Sandy, OR 97055

Applicant's Consultant: AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Contact: Chris Goodell, AICP, LEED^{AP}
Email: chrisg@aks-eng.com
Phone: (503) 563-6151

Applicant's Legal Counsel: Schwabe, Williamson & Wyatt
Pacwest Center 1211 SW 5th Avenue, Suite 190
Portland, OR 97204

Contact: Michael Robinson
Email: mrobinson@schwabe.com
Phone: (503) 796-3756

Site Location: North of Highway 211 and south of Ponder Lane



**Clackamas County
Assessor's Map:**

2 4E 23, Tax Lot 701

Site Size:

±14.24 acres

Land Use District:

Exclusive Farm Use (EFU)



I. Executive Summary

The City of Sandy is currently processing a land use application for the Bailey Meadows subdivision (local file No. 19-023 SUB/VAR/TREE). Bailey Meadows is located in the southwestern portion of the City, near Oregon Route 211 (OR 211) and SE Ponder Lane. A condition of approval is anticipated to be included in the City's Notice of Decision that would cause submittal of an application for an amendment to the City's UGB. This application, if approved, would permit the construction of Gunderson Road (a Minor Arterial roadway per City of Sandy's Transportation System Plan) and provide an additional means of access to Bailey Meadows. The purpose of this application is to fulfill this forthcoming condition of approval. Additionally, the Applicant is willing to dedicate a portion of the subject site for parkland.

The alignment for the Gunderson Road extension, as discussed above, falls within property (Clackamas County Assessor's Map 2 4E 23 Tax Lot 701) that is located outside of Sandy's City limits and UGB. This property is currently designated Exclusive Farm Use (EFU) by Clackamas County, but is within the City of Sandy's Urban Reserve Area (URA). The portion of the property that is planned to be included within the amended UGB is limited to areas necessary to construct the Gunderson Road extension, including land for the roadway, associated storm drainage improvements, accompanying utilities, grading, etc. and additional area for parkland dedication.

Based upon the Urban Growth Management Agreement between the City of Sandy and Clackamas County, this UGB amendment application is subject to a coordinated City-County effort. Although it is understood that the City will hold hearings for the application prior to the County doing so, the application is being submitted to both jurisdictions for review at the same time.

II. Site Description/Setting

The property (Tax Lot 701) included in this application has a total area of ±14.30 acres, though only the acreage required for the road right-of-way and associated improvements and parkland dedication are planned to be incorporated within the Sandy UGB. Tax Lot 701 is located outside of, but adjacent to the UGB, immediately south of the active Bailey Meadows Subdivision application (City of Sandy Local Case File No. 19-023 SUB/VAR/TREE), northwest of OR 211, and west of the intersection of SE Ponder Lane and OR 211.

The property is fairly flat with wooded areas on the northwest half and pasture on the eastern half. The property does not contain structures and access is served from OR 211 on the south side of the site.

III. Applicable Review Criteria

The Oregon Statewide Planning Goals, Oregon Administrative Rules, and Oregon Revised Statutes are relevant to the UGB Amendment application. Therefore, the responses are applicable for review by both the City of Sandy and Clackamas County.

The Sandy Comprehensive Plan Goals and Policies and the Clackamas County Comprehensive Plan Goals and Policies are applicable to the City and County jurisdictions respectively. If any of the findings for these items are needed for responses to other jurisdictions (e.g., City, County, ODOT, DLCD, or LCDC), they will be referenced specifically. This limitation applies to this complete application narrative.



OREGON STATEWIDE PLANNING GOALS AND GUIDELINES (The Goals)

The following Oregon Statewide Planning Goals are applicable to this action:

- Goal 1 – Citizen Involvement
- Goal 2 – Land Use Planning
- Goal 6 – Air, Land, and Water Resources Quality
- Goal 8 – Recreational Needs
- Goal 11 – Public Facilities and Services
- Goal 12 – Transportation
- Goal 14 – Urbanization

Goals 3 (Agricultural Lands) and 4 (Forest Lands) are not applicable to UGB amendments pursuant to Oregon Administrative Rule (OAR) 660-024-0020(1)(b) and have been omitted for brevity.

Goal 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces) is not applicable, pursuant to OAR 660-023-0250(3)(a)-(c), because there are no identified Goal 5 resources on the property, and has been omitted for brevity.

Goal 7 (Areas Subject to Natural Hazards) is not applicable and has been omitted because the subject site does not contain mapped areas of steep slopes 25 percent or greater or other known hazard areas.

Goals 9 (Economic Development) and 10 (Housing) are not applicable because the proposed comprehensive plan amendments allow for a public transportation facility and are not associated with employment lands or residential development.

Goal 13 (Energy Conservation) is not applicable because the amendment does not affect the City or County goals or policies governing energy conservation.

Goals 15 (Willamette River Greenway), 16 (Estuarine Resources), 17 (Coastal Shorelands), 18 (Beaches and Dunes), and 19 (Ocean Resources) are not applicable because the subject site does not contain lands described in those goals. Thus, the approval criteria have been omitted for brevity.

Goal 1 (Citizen Involvement)

To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

Response: Goal 1 calls for the opportunity for citizens to be involved in all phases of the planning process. The City of Sandy has an established citizen involvement program. The application will be processed according to Chapter 17.12 of the LDC, which involves public notification, public hearings, and decision appeal procedures, as established in City of Sandy LDC Section 17.12.30 and 17.12.40.

Clackamas County maintains a Committee for Citizen Involvement with membership that includes representatives of Community Planning Organizations. The application will be processed in accordance with Section 1307 of the Clackamas County Zoning and



Development Ordinance (ZDO) which involves public notification, public hearings, and decision appeal procedures. Therefore, the application is consistent with Goal 1.

Goal 2 (Land Use Planning)

To establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions.

Response: This application will be processed by the City through a Quasi-Judicial Type IV procedure in accordance with LDC Chapter 17.12. The City and County have acknowledged comprehensive plans and land use development (zoning) codes that implement the irrespective comprehensive plans. The City will review and process this application consistent with the procedures detailed in the LDC. The County will review and process this application consistent with the process detailed in Section 1307 of the Clackamas County ZDO.

This application provides an adequate factual basis for the City and County to approve the application because it describes the current and planned future site characteristics and applies the relevant approval criteria to those characteristics. Therefore, following this process will ensure consistency with Statewide Planning Goal 2.

Goal 6 (Air, Water and Land Resources Quality)

To maintain and improve the quality of the air, water and land resources of the state.

Response: Goal 6 is implemented by Comprehensive Plan policies to protect air, land, and water resource quality. Generally, these policies rely on coordination with the Department of Environmental Quality (DEQ) for their implementation. Specific standards related to the project include requirements for addressing stormwater runoff, grading, and erosion control standards related to a minor public facility (i.e. Gunderson Road) and requirements related to site planning for parkland dedication will be addressed in the future. The property planned to be brought into the UGB is within the City's existing Urban Reserve Area and will retain its' existing zoning until annexed into the City in the future. Thus, the application is consistent with Goal 6.

Goal 8 (Recreational Needs)

To satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities including destination resorts.

Response: Goal 8 is implemented by Comprehensive Plan policies pertaining to parks, open space, and recreation facilities. The City's Comprehensive Plan with respect to Goal 8, its parks master plan, and its development regulations governing recreational needs (e.g., park dedication/fee in-lieu-of requirements, open space provisions, etc.) are supported by this application. The subject property is providing land to be brought within the UGB to dedicate as parkland and satisfy the recreational needs of citizens in the area. Although Bailey Meadows Subdivision provides for and meets SDC criteria for on-site needs, in this case the City and Applicant agree to an off-site improvement. The site-specific location for the off-site extension of Gunderson Road and parkland improvements are outside the UGB, as described in this written document, and require a UGB amendment to allow an



urban facility to be built on land currently within the County's jurisdiction. The planned parkland dedication provided by this application will benefit the City and its residents. Therefore, Goal 8 is satisfied.

Goal 11 (Public Facilities and Services)

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

Response: The subject property is currently located outside the UGB and the City limits. Since the purpose of the amendment is to permit construction of a road, public facilities, water, and/or sanitary sewer service are not required. The property is planned for the extension of a public road and will include necessary stormwater infrastructure. Additionally, the Applicant is willing to dedicate area for a park facility to satisfy needs of the residents in the general vicinity. This application will not impact urban services or utilities and will serve the transportation system in the area consistent with the Sandy TSP. Therefore, this application is consistent with Goal 11.

Goal 12 (Transportation)

To provide and encourage a safe, convenient and economic transportation system.

Response: A portion of the subject property is planned to be used as a public transportation facility, connecting to the transportation system north of the site. The UGB Amendment & Gunderson Road Connection Traffic Impact Analysis (TIA) prepared by Lancaster Engineering is included in Exhibit F that documents compliance with Goal 12 and applicable State, County, and City transportation-related requirements. Please refer to the TIA for further information. The intended street and connectivity improvements encourage a safe, convenient, and economic transportation system. Therefore, this application is consistent with Goal 12.

Goal 14 (Urbanization)

To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities.

Response: Tax Lot 701 is located within the URA and is currently designated with Clackamas County EFU zoning designation. An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow creation of the public transportation and parkland facilities. The subject application accommodates urban population within the UGB by providing an efficient transportation network per the Sandy TSP and does not involve new commercial, industrial, or agricultural uses. Additionally, the Applicant is providing area for parkland to dedicate to the City and enhance the lives of the residents in the vicinity. The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property to permit both the minor public facility uses. Interim use and development, prior to annexation, is not associated with this application. Therefore, the application is consistent with Goal 14.



FINDINGS FOR TRANSPORTATION PLANNING RULE COMPLIANCE

Response: OAR 660, Division 12, is the Oregon Transportation Planning Rule (the TPR) adopted by the Land Conservation and Development Commission (LCDC). The TPR implements Goal 12, Transportation, and is an independent approval standard in addition to Goal 12 for map amendments. OAR 660-012-0060(1) and (2) apply to amendments to acknowledged maps, as is the case with this application.

The TPR requires a two-step analysis. First, under OAR 660-012-0060(1), the Applicant must determine if the application has a “significant affect,” as that term is defined in OAR 660-012-0060(1). The City may rely on transportation improvements found in transportation system plans, as allowed by OAR 660-012-0060(3)(a), (b), and (c), to show that failing intersections will not be made worse or intersections not now failing will not fail. If there is a “significant affect,” then the Applicant must demonstrate appropriate mitigation under OAR 660-012-0060(2), et seq.

OREGON ADMINISTRATIVE RULES

Chapter 660 Division 12 TRANSPORTATION PLANNING

660-012-0060 Plan and Land Use Regulation Amendments

- (1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:
- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);
 - (b) Change standards implementing a functional classification system; or
 - (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.
 - (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;
 - (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or
 - (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Response: The analysis provided by Lancaster Engineering found that this amendment would not “significantly affect” an existing or planned transportation facility. In fact, the purpose of



the application is to implement the City's adopted TSP, by providing for the completion of Gunderson Road, a planned City Minor Arterial roadway. Please refer to the TIA (Exhibit A) for further information. Therefore, the criteria are met.

- (2) If a local government determines that there would be a significant effect, then the local government must ensure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility measured at the end of the planning period identified in the adopted TSP through one or a combination of the remedies listed in (a) through (e) below, unless the amendment meets the balancing test in subsection (2)(e) of this section or qualifies for partial mitigation in section (11) of this rule. A local government using subsection (2)(e), section (3), section (10) or section (11) to approve an amendment recognizes that additional motor vehicle traffic congestion may result and that other facility providers would not be expected to provide additional capacity for motor vehicles in response to this congestion.
- (a) Adopting measures that demonstrate allowed land uses are consistent with the planned function, capacity, and performance standards of the transportation facility.
 - (b) Amending the TSP or comprehensive plan to provide transportation facilities, improvements or services adequate to support the proposed land uses consistent with the requirements of this division; such amendments shall include a funding plan or mechanism consistent with section (4) or include an amendment to the transportation finance plan so that the facility, improvement, or service will be provided by the end of the planning period.
 - (c) Amending the TSP to modify the planned function, capacity or performance standards of the transportation facility.
 - (d) Providing other measures as a condition of development or through a development agreement or similar funding method, including, but not limited to, transportation system management measures or minor transportation improvements. Local governments shall, as part of the amendment, specify when measures or improvements provided pursuant to this subsection will be provided.
 - (e) Providing improvements that would benefit modes other than the significantly affected mode, improvements to facilities other than the significantly affected facility, or improvements at other locations, if:
 - (A) The provider of the significantly affected facility provides a written statement that the system-wide benefits are sufficient to balance the significant effect, even though the improvements would not result in consistency for all performance standards;
 - (B) The providers of facilities being improved at other locations provide written statements of approval; and
 - (C) The local jurisdictions where facilities are being improved provide written statements of approval.

Response: Since a "significant affect" is not found, this section does not apply. Please refer to the TIA (Exhibit A) for further information. Therefore, the criteria are met.

- (3) Notwithstanding sections (1) and (2) of this rule, a local government may approve an amendment that would significantly affect an existing transportation facility without assuring that the allowed land uses are consistent with the function, capacity and performance standards of the facility where:
- (a) In the absence of the amendment, planned transportation facilities, improvements and services as set forth in section (4) of this rule would not be



adequate to achieve consistency with the identified function, capacity or performance standard for that facility by the end of the planning period identified in the adopted TSP;

- (b) Development resulting from the amendment will, at a minimum, mitigate the impacts of the amendment in a manner that avoids further degradation to the performance of the facility by the time of the development through one or a combination of transportation improvements or measures;
- (c) The amendment does not involve property located in an interchange area as defined in paragraph (4)(d)(C); and
- (d) For affected state highways, ODOT provides a written statement that the proposed funding and timing for the identified mitigation improvements or measures are, at a minimum, sufficient to avoid further degradation to the performance of the affected state highway. However, if a local government provides the appropriate ODOT regional office with written notice of a proposed amendment in a manner that provides ODOT reasonable opportunity to submit a written statement into the record of the local government proceeding, and ODOT does not provide a written statement, then the local government may proceed with applying subsections (a) through (c) of this section.

Response: Since a “significant affect” is not found, this section does not apply. Please refer to the TIA (Exhibit A) for further information. Therefore, the criteria are met.

- (4) Determinations under sections (1)–(3) of this rule shall be coordinated with affected transportation facility and service providers and other affected local governments.
 - (a) In determining whether an amendment has a significant effect on an existing or planned transportation facility under subsection (1)(c) of this rule, local governments shall rely on existing transportation facilities and services and on the planned transportation facilities, improvements and services set forth in subsections (b) and (c) below.
 - (b) Outside of interstate interchange areas, the following are considered planned facilities, improvements and services:
 - (A) Transportation facilities, improvements or services that are funded for construction or implementation in the Statewide Transportation Improvement Program or a locally or regionally adopted transportation improvement program or capital improvement plan or program of a transportation service provider.
 - (B) Transportation facilities, improvements or services that are authorized in a local transportation system plan and for which a funding plan or mechanism is in place or approved. These include, but are not limited to, transportation facilities, improvements or services for which: transportation systems development charge revenues are being collected; a local improvement district or reimbursement district has been established or will be established prior to development; a development agreement has been adopted; or conditions of approval to fund the improvement have been adopted.
 - (C) Transportation facilities, improvements or services in a metropolitan planning organization (MPO) area that are part of the area's federally-approved, financially constrained regional transportation system plan.



-
- (D) Improvements to state highways that are included as planned improvements in a regional or local transportation system plan or comprehensive plan when ODOT provides a written statement that the improvements are reasonably likely to be provided by the end of the planning period.
 - (E) Improvements to regional and local roads, streets or other transportation facilities or services that are included as planned improvements in a regional or local transportation system plan or comprehensive plan when the local government(s) or transportation service provider(s) responsible for the facility, improvement or service provides a written statement that the facility, improvement or service is reasonably likely to be provided by the end of the planning period.

Response: The subject site is located outside of interstate interchange areas. Therefore, these criteria apply. That said, the amendment is sought to implement a portion of the City's adopted TSP (e.g. Gunderson Road). The amendment has no other purpose and does not include re-designation/amendments that serve another purpose than those already considered as part of the City's TSP.

- (c) Within interstate interchange areas, the improvements included in (b)(A)–(C) are considered planned facilities, improvements and services, except where:
 - (A) ODOT provides a written statement that the proposed funding and timing of mitigation measures are sufficient to avoid a significant adverse impact on the Interstate Highway system, then local governments may also rely on the improvements identified in paragraphs (b)(D) and (E) of this section; or
 - (B) There is an adopted interchange area management plan, then local governments may also rely on the improvements identified in that plan and which are also identified in paragraphs (b)(D) and (E) of this section.

Response: The subject site is located outside of interstate interchange areas. Therefore, the above criteria are not applicable.

- (c) For purposes of this section, a written statement provided pursuant to paragraphs (b)(D), (b)(E) or (c)(A) provided by ODOT, a local government or transportation facility provider, as appropriate, shall be conclusive in determining whether a transportation facility, improvement or service is a planned transportation facility, improvement or service. In the absence of a written statement, a local government can only rely upon planned transportation facilities, improvements and services identified in paragraphs (b)(A)–(C) to determine whether there is a significant effect that requires application of the remedies in section (2).

Response: This section of the TPR requires coordination with affected transportation service providers. The Oregon Department of Transportation (ODOT) provides the road that serves the subject property. The subject property (Tax Lot 701) is within unincorporated Clackamas County and served by OR 211. Additionally, OR 211 is functionally classified as a Major Arterial in both the City and County TSPs but is under the jurisdiction of the State of Oregon. The Applicant met with City, County, and ODOT staff prior to submitting this application to discuss the effects of the application on their respective roads. The City will ensure coordination of the application with Clackamas County, as required by ORS



197.015, by providing the County with timely notice of this application, allowing the County to comment on the application, and including the County's comments in the decision, as is reasonable. The City will also coordinate with ODOT and TriMet as applicable. Therefore, the criteria of OAR 660-012-0060 (4) are met.

- (5) The presence of a transportation facility or improvement shall not be a basis for an exception to allow residential, commercial, institutional or industrial development on rural lands under this division or OAR 660-004-0022 and 660-004-0028.

Response:

The application is to include land within the UGB to allow the siting of a public transportation facility and dedication of parkland. This project does not involve an exception to allow residential, commercial, institutional, or industrial development on rural lands. The criterion is not applicable.

- (6) In determining whether proposed land uses would affect or be consistent with planned transportation facilities as provided in sections (1) and (2), local governments shall give full credit for potential reduction in vehicle trips for uses located in mixed-use, pedestrian-friendly centers, and neighborhoods as provided in subsections (a)-(d) below;
- (a) Absent adopted local standards or detailed information about the vehicle trip reduction benefits of mixed-use, pedestrian-friendly development, local governments shall assume that uses located within a mixed-use, pedestrian-friendly center, or neighborhood, will generate 10% fewer daily and peak hour trips than are specified in available published estimates, such as those provided by the Institute of Transportation Engineers (ITE) Trip Generation Manual that do not specifically account for the effects of mixed-use, pedestrian-friendly development. The 10% reduction allowed for by this section shall be available only if uses which rely solely on auto trips, such as gas stations, car washes, storage facilities, and motels are prohibited;
- (b) Local governments shall use detailed or local information about the trip reduction benefits of mixed-use, pedestrian-friendly development where such information is available and presented to the local government. Local governments may, based on such information, allow reductions greater than the 10% reduction required in subsection (a) above;
- (c) Where a local government assumes or estimates lower vehicle trip generation as provided in subsection (a) or (b) above, it shall assure through conditions of approval, site plans, or approval standards that subsequent development approvals support the development of a mixed-use, pedestrian-friendly center or neighborhood and provide for on-site bike and pedestrian connectivity and access to transit as provided for in OAR 660-012-0045(3) and (4). The provision of on-site bike and pedestrian connectivity and access to transit may be accomplished through application of acknowledged ordinance provisions which comply with 660-012-0045(3) and (4) or through conditions of approval or findings adopted with the plan amendment that assure compliance with these rule requirements at the time of development approval; and
- (d) The purpose of this section is to provide an incentive for the designation and implementation of pedestrian-friendly, mixed-use centers and neighborhoods by lowering the regulatory barriers to plan amendments which accomplish this type of development. The actual trip reduction benefits of mixed-use, pedestrian-friendly development will vary from case to case and may be somewhat higher or lower than presumed pursuant to subsection (a) above. The Commission concludes that this assumption is warranted given general information about the expected effects of mixed-use, pedestrian-friendly



development and its intent to encourage changes to plans and development patterns. Nothing in this section is intended to affect the application of provisions in local plans or ordinances which provide for the calculation or assessment of systems development charges or in preparing conformity determinations required under the federal Clean Air Act.

Response: The analysis provided by Lancaster Engineering does not rely upon credit for potential reductions in vehicle trips as described in this section. Therefore, these criteria do not apply.

Chapter 660 Division 14 **APPLICATION OF THE STATEWIDE PLANNING GOALS TO NEWLY INCORPORATED CITIES, ANNEXATION, AND URBAN DEVELOPMENT ON RURAL LANDS**

660-014-0060 **Annexations of Lands Subject to an Acknowledged Comprehensive Plan**

A city annexation made in compliance with a comprehensive plan acknowledged pursuant to ORS 197.251(1) or 197.625 shall be considered by the commission to have been made in accordance with the goals unless the acknowledged comprehensive plan and implementing ordinances do not control the annexation.

Response: This application includes an analysis of compliance with the goals and policies of the City of Sandy Comprehensive Land Use Plan (adopted October 20, 1997). Therefore, a City annexation for the subject property should be considered by the commission to have been made in accordance with the goals. The criterion is met.

...

Chapter 660 Division 24 **URBAN GROWTH BOUNDARIES**

660-024-0000 **Purpose and Applicability**

- (1) The rules in this division clarify procedures and requirements of Goal 14 regarding a local government adoption or amendment of an urban growth boundary (UGB). The rules in this division do not apply to the simplified UGB process under OAR chapter 660, division 38.
- (2) The rules in this division interpret Goal 14 as amended by the Land Conservation and Development Commission (LCDC or commission) on or after April 28, 2005, and are not applicable to plan amendments or land use decisions governed by previous versions of Goal 14 still in effect.
- (3) The rules in this division adopted on October 5, 2006, are effective April 5, 2007. The rules in this division amended on March 20, 2008, are effective April 18, 2008. The rules in this division adopted March 13, 2009, and amendments to rules in this division adopted on that date, are effective April 16, 2009, except as follows:
 - (a) A local government may choose to not apply this division to a plan amendment concerning the evaluation or amendment of a UGB, regardless of the date of that amendment, if the local government initiated the evaluation or amendment of the UGB prior to April 5, 2007;
 - (b) For purposes of this rule, "initiated" means that the local government either:
 - (A) Issued the public notice specified in OAR 660-018-0020 for the proposed plan amendment concerning the evaluation or amendment of the UGB; or
 - (B) Received LCDC approval of a periodic review work program that includes a work task to evaluate the UGB land supply or amend the UGB;



(c) A local government choice whether to apply this division must include the entire division and may not differ with respect to individual rules in the division.

(4) The rules in this division adopted on December 4, 2015, are effective January 1, 2016, except that a local government may choose to not apply the amendments to rules in this division adopted December 4, 2015 to a plan amendment concerning the amendment of a UGB, regardless of the date of that amendment, if the local government initiated the amendment of the UGB prior to January 1, 2016.

Response: The purpose of this division applies to the subject amendment of the UGB, which complies with the dates listed above.

...

660-024-0040 Land Need

(3) A local government may review and amend the UGB in consideration of one category of land need (for example, housing need) without a simultaneous review and amendment in consideration of other categories of land need (for example, employment need).

Response: This UGB amendment satisfies one need, public facilities (e.g. Gunderson Road and parkland dedication). Accordingly, other needs are not considered.

...

(7) The determination of 20-year land needs for transportation and public facilities for an urban area must comply with applicable requirements of Goals 11 and 12, rules in OAR chapter 660, divisions 11 and 12, and public facilities requirements in ORS 197.712 and 197.768. The determination of school facility needs must also comply with 195.110 and 197.296 for local governments specified in those statutes.

Response: This UGB amendment satisfies one need, public facilities (e.g. Gunderson Road and parkland dedication). Accordingly, other needs are not considered.

660-024-0050 Land Inventory and Response to Deficiency

(1) When evaluating or amending a UGB, a local government must inventory land inside the UGB to determine whether there is adequate development capacity to accommodate 20-year needs determined in OAR 660-024-0040. For residential land, the buildable land inventory must include vacant and redevelopable land, and be conducted in accordance with OAR 660-007-0045 or 660-008-0010, whichever is applicable, and ORS 197.296 for local governments subject to that statute. For employment land, the inventory must include suitable vacant and developed land designated for industrial or other employment use, and must be conducted in accordance with OAR 660-009-0015.

Response: This application involves a City of Sandy UGB Amendment to provide a public transportation facility (i.e. Gunderson Road) as illustrated in the Sandy TSP and to dedicate land to provide a park. The conceptual alignment of Gunderson Road shown in the Sandy TSP is on property not currently within the UGB; thus, the UGB amendment is needed to provide an efficient transportation network and serve residential lands already previously brought into the UGB. The subject property, Tax Lot 701, is the most feasible location where the extension of the transportation network and connection to OR 211 can be made safely. Please see the supplemental materials and TIA for further detailed

information. Additionally, please refer to the narrative responses which address OAR 660-024-0050(6) and (7) and OAR 660-024-0065(3).

(2) As safe harbors, a local government, except a city with a population over 25,000 or a metropolitan service district described in ORS 197.015(13), may use the following assumptions to inventory the capacity of buildable lands to accommodate housing needs:

- (a) The infill potential of developed residential lots or parcels of one-half acre or more may be determined by subtracting one-quarter acre (10,890 square feet) for the existing dwelling and assuming that the remainder is buildable land;
- (b) Existing lots of less than one-half acre that are currently occupied by a residence may be assumed to be fully developed.

(3) As safe harbors when inventorying land to accommodate industrial and other employment needs, a local government may assume that a lot or parcel is vacant if it is:

- (a) Equal to or larger than one-half acre, if the lot or parcel does not contain a permanent building; or
- (b) Equal to or larger than five acres, if less than one-half acre of the lot or parcel is occupied by a permanent building.

(4) If the inventory demonstrates that the development capacity of land inside the UGB is inadequate to accommodate the estimated 20-year needs determined under OAR 660-024-0040, the local government must amend the plan to satisfy the need deficiency, either by increasing the development capacity of land already inside the city or by expanding the UGB, or both, and in accordance with ORS 197.296 where applicable. Prior to expanding the UGB, a local government must demonstrate that the estimated needs cannot reasonably be accommodated on land already inside the UGB. If the local government determines there is a need to expand the UGB, changes to the UGB must be determined by evaluating alternative boundary locations consistent with Goal 14 and applicable rules at OAR 660-024-0060 or 660-024-0065 and 660-024-0067.

Response: On February 6, 2017 the City of Sandy adopted the Urban Growth Boundary Expansion Analysis, Final Report. The analysis concluded the existing UGB did not contain sufficient residential lands to meet the City's housing needs to 2034 and subsequently annexed in property north of Tax Lot 701. To satisfy the needs of lands previously brought into the UGB, according to 660-024-050(4) above, the local government must amend the plan to satisfy the need by amending the UGB when applicable. Therefore, this application involves a Sandy UGB Amendment to respond to a public transportation facility need. Changes to the Sandy UGB are made consistent with Goal 14 and OAR 660-024-0065 and 660-024-0067, as addressed in this written document. OAR 660-024-0060 is not applicable to this application because the property is not within the Portland Metro UGB.

(5) In evaluating an amendment of a UGB submitted under ORS 197.626, the director or the commission may determine that a difference between the estimated 20-year needs determined under OAR 660-024-0040 and the amount of land and development capacity added to the UGB by the submitted amendment is unlikely to significantly affect land supply or resource land protection, and as a result, may determine that the proposed amendment complies with section (4) of this rule.

Response: ORS 197.626 is not applicable to the UGB amendment because the amendment is not by a metropolitan service district, does not add more than 50 acres within the UGB, does not designate new lands as an urban reserve, does not amend the boundary of urban reserve



by a metropolitan service district, or designate or amend rural reserves. Therefore, the above criterion is not applicable to the application.

- (6) When land is added to the UGB, the local government must assign appropriate urban plan designations to the added land, consistent with the need determination and the requirements of section (7) of this rule, if applicable. The local government must also apply appropriate zoning to the added land consistent with the plan designation or may maintain the land as urbanizable land until the land is rezoned for the planned urban uses, either by retaining the zoning that was assigned prior to inclusion in the boundary or by applying other interim zoning that maintains the land's potential for planned urban development. The requirements of ORS 197.296 regarding planning and zoning also apply when local governments specified in that statute add land to the UGB.

Response: The land involved within the amendment area is anticipated to be designated Low Density Residential (LDR), but to retain Clackamas County zoning until annexed into the City of Sandy.

- (7) Lands included within a UGB pursuant to OAR 660-024-0065(3) to provide for a particular industrial use, or a particular public facility, must be planned and zoned for the intended use and must remain planned and zoned for that use unless the city removes the land from the UGB.

Response: The lands brought into the UGB are within the City's existing URA and will retain their existing Clackamas County zoning until annexed into the City in the future. Upon annexation and the application of City zoning designations to those lands, the land is intended to be converted for use as a public transportation facility and parkland and remain as such.

- (8) As a safe harbor regarding requirements concerning "efficiency," a local government that chooses to use the density and mix safe harbors in OAR 660-024-0040(8) is deemed to have met the Goal 14 efficiency requirements under:
- (a) Sections (1) and (4) of this rule regarding evaluation of the development capacity of residential land inside the UGB to accommodate the estimated 20-year needs; and
 - (b) Goal 14 regarding a demonstration that residential needs cannot be reasonably accommodated on residential land already inside the UGB, but not with respect to:
 - (A) A demonstration that residential needs cannot be reasonably accommodated by rezoning non-residential land, and
 - (B) Compliance with Goal 14 Boundary Location factors.

Response: The density and mix safe harbors standards in OAR 660-024-0040(8) are not applicable to this application. The criteria do not apply.

...
660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB

- (1) When considering a UGB amendment to accommodate a need deficit identified in OAR 660-024-0050(4), a city outside of Metro must determine which land to add to the UGB by evaluating alternative locations within a "study area" established pursuant to this rule. To establish the study area, the city must first identify a "preliminary study area" which shall not include land within a different UGB or the corporate limits of a city within a different UGB. The preliminary study area shall include:



-
- (a) All lands in the city's acknowledged urban reserve, if any;
 - (b) All lands that are within the following distance from the acknowledged UGB:
 - (A) For cities with a UGB population less than 10,000: one-half mile;
 - (B) For cities with a UGB population equal to or greater than 10,000: one mile;
 - (c) All exception areas contiguous to an exception area that includes land within the distance specified in subsection (b) and that are within the following distance from the acknowledged UGB:
 - (A) For cities with a UGB population less than 10,000: one mile;
 - (B) For cities with a UGB population equal to or greater than 10,000: one and one-half miles;
 - (d) At the discretion of the city, the preliminary study area may include land that is beyond the distance specified in subsections (b) and (c).
- (2) A city that initiated the evaluation or amendment of its UGB prior to January 1, 2016, may choose to identify a preliminary study area applying the standard in this section rather than section (1). For such cities, the preliminary study area shall consist of:
- (a) All land adjacent to the acknowledged UGB, including all land in the vicinity of the UGB that has a reasonable potential to satisfy the identified need deficiency, and
 - (b) All land in the city's acknowledged urban reserve established under OAR chapter 660, division 21, if applicable.

Response: This application involves a UGB Amendment to accommodate a need deficit identified in OAR 660-024-0050(4), as described above. Additionally, the purpose is to provide a specific public transportation facility and the location must be compliant with the Sandy TSP. Therefore, the above criteria are not applicable. Please see the following narrative response addressing OAR 660-024-0065(3).

- (3) When the primary purpose for expansion of the UGB is to accommodate a particular industrial use that requires specific site characteristics, or to accommodate a public facility that requires specific site characteristics, and the site characteristics may be found in only a small number of locations, the preliminary study area may be limited to those locations within the distance described in section (1) or (2), whichever is appropriate, that have or could be improved to provide the required site characteristics. For purposes of this section:
- (a) The definition of "site characteristics" in OAR 660-009-0005(11) applies for purposes of identifying a particular industrial use.
 - (b) A "public facility" may include a facility necessary for public sewer, water, storm water, transportation, parks, schools, or fire protection. Site characteristics may include but are not limited to size, topography and proximity.

Response: The primary purpose of this UGB Amendment application is to accommodate Gunderson Road, a future minor arterial roadway depicted in the Sandy TSP. Additionally, on February 6, 2017 the City of Sandy adopted the Urban Growth Boundary Expansion Analysis, Final Report. The analysis contains "Map #9 – Transportation System Plan and Street Stubs" which includes the Gunderson Road extension to OR 211.



To provide this public transportation facility improvement, the road should be extended to match the conceptual alignment in the Sandy TSP. In doing so, the road extension requires use of the subject property due to the specific location dictated in the Sandy TSP. Due to geometrical issues, safety concerns, and potential for transportation hazards, the alignment illustrated in the Sandy TSP is not practicable for construction. This application provides for a solution to extend Gunderson Road and fulfill the anticipated condition of approval associated with Bailey Meadows Subdivision. The location shown in the Supplemental Materials of Exhibit G can be improved to provide the required site characteristics and execute the extension of the transportation network to satisfy the needs of citizens in the general area. Please see the TIA and Supplemental Materials of Exhibit G for further details.

...

660-024-0067 Evaluation of Land in the Study Area for Inclusion in the UGB; Priorities

- (1) A city considering a UGB amendment must decide which land to add to the UGB by evaluating all land in the study area determined under OAR 660-024-0065, as follows:
 - (a) Beginning with the highest priority category of land described in section (2), the city must apply section (5) to determine which land in that priority category is suitable to satisfy the need deficiency determined under OAR 660-024-0050 and select for inclusion in the UGB as much of the land as necessary to satisfy the need.
 - (b) If the amount of suitable land in the first priority category is not sufficient to satisfy all the identified need deficiency, the city must apply section (5) to determine which land in the next priority is suitable and select for inclusion in the UGB as much of the suitable land in that priority as necessary to satisfy the need. The city must proceed in this manner until all the land need is satisfied, except as provided in OAR 660-024-0065(9).
 - (c) If the amount of suitable land in a particular priority category in section (2) exceeds the amount necessary to satisfy the need deficiency, the city must choose which land in that priority to include in the UGB by applying the criteria in section (7) of this rule.
 - (d) In evaluating the sufficiency of land to satisfy a need under this section, the city may use the factors identified in sections (5) and (6) of this rule to reduce the forecast development capacity of the land to meet the need.
 - (e) Land that is determined to not be suitable under section (5) of this rule to satisfy the need deficiency determined under OAR 660-024-0050 is not required to be selected for inclusion in the UGB unless its inclusion is necessary to serve other higher priority lands.
- (2) Priority of Land for inclusion in a UGB:
 - (a) First Priority is urban reserve, exception land, and nonresource land. Lands in the study area that meet the description in paragraphs (A) through (C) of this subsection are of equal (first) priority:
 - (A) Land designated as an urban reserve under OAR chapter 660, division 21, in an acknowledged comprehensive plan;
 - (B) Land that is subject to an acknowledged exception under ORS 197.732; and
 - (C) Land that is nonresource land.



Response: The land to be brought within the UGB is within the City of Sandy's Adopted URA. Therefore, the land is first priority for inclusion in a UGB. The criteria are met.

- (b) Second Priority is marginal land: land within the study area that is designated as marginal land under ORS 197.247 (1991 Edition) in the acknowledged comprehensive plan.
- (c) Third Priority is forest or farm land that is not predominantly high-value farm land: land within the study area that is designated for forest or agriculture uses in the acknowledged comprehensive plan and that is not predominantly high-value farmland as defined in ORS 195.300, or that does not consist predominantly of prime or unique soils, as determined by the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). In selecting which lands to include to satisfy the need, the city must use the agricultural land capability classification system or the cubic foot site class system, as appropriate for the acknowledged comprehensive plan designation, to select lower capability or cubic foot site class lands first.
- (d) Fourth Priority is agricultural land that is predominantly high-value farmland: land within the study area that is designated as agricultural land in an acknowledged comprehensive plan and is predominantly high-value farmland as defined in ORS 195.300. A city may not select land that is predominantly made up of prime or unique farm soils, as defined by the USDA NRCS, unless there is an insufficient amount of other land to satisfy its land need. In selecting which lands to include to satisfy the need, the city must use the agricultural land capability classification system to select lower capability lands first.

Response: The land to be brought within the UGB is within the City of Sandy's URA and is therefore first priority for inclusion. Therefore, second, third, and fourth priority lands are not under consideration.

SANDY COMPREHENSIVE PLAN GOALS AND POLICIES

Goal 1 – Citizen Involvement

- POLICY 1:** The City of Sandy shall maintain a citizen involvement program to allow opportunity for citizen involvement in the ongoing planning process.
- POLICY 2:** Comprehensive Plan changes shall include the opportunity for participation of citizens affected by the change.
- POLICY 4:** The City shall disseminate information and public notice to the residents of the Sandy area concerning on-going planning activities and pending actions.

Response: The City of Sandy has an established citizen involvement program. The application will be processed according to Chapter 17.12 of the LDC, which involves public notification, public hearings, and decision appeal procedures, as established in City of Sandy LDC Section 17.12.30 and 17.12.40. Therefore, the application is consistent with Goal 1.

Goal 2 – Land Use Planning

- POLICY 2:** Changes to the Comprehensive Plan Map shall be consistent with the policies of the Comprehensive Plan, state law, and intergovernmental agreements.

Response: Changes to the Comprehensive Plan Map are consistent with SDC Chapter 17.12 and the applicable policies of the Comprehensive Plan, as detailed in this written narrative. Consistency with applicable State statute and rules and the Urban Growth Management



Agreement (UGMA) between City of Sandy and Clackamas County have been addressed in this document. The amendment is Therefore, Policy 2 above is met.

POLICY 10: Due to the demand which new development places upon the community's infrastructure, the city may impose off-site improvement requirements necessitated by a development. Each development shall provide for all onsite needs, and in areas which represent a critical link in the facility and service delivery systems, the city may require the over-sizing of these systems. The City may negotiate late-comer fees or other arrangements to compensate developers for over-sizing of facilities.

Response: The Applicant is submitting this application to satisfy an anticipated condition of approval associated with City of Sandy Local File No. 19-023 SUB/VAR/TREE. Although Bailey Meadows Subdivision provides for and meets SDC criteria for on-site needs, in this case the City and Applicant agree to an off-site improvement requirement (i.e., Gunderson Road extension and parkland dedication). The off-site extension of Gunderson Road and improvements are outside the UGB, as described in this written document, and require a UGB amendment to allow an urban facility to be built on land currently within the County's jurisdiction. The policy above is understood and met by this application submittal.

POLICY 14: Proposed plan elements such as parks, roadways, schools, etc., are intended to be conceptual. Actual locations and quantities should be determined through the development process.

Response: The alignment of the extension of Gunderson Road to OR 211, a proposed plan element in the City's TSP, is conceptual. The actual location should be determined through the development process, as outlined above. To provide this public transportation facility improvement, the road should be extended to match the conceptual alignment in the Sandy TSP. However, due to geometrical issues, safety concerns, and potential for transportation hazards, the alignment illustrated in the Sandy TSP is not practicable for construction. This application provides for a solution to extend Gunderson Road and determine the actual functionable location through site analysis and development review. The location shown in the Supplemental Materials of Exhibit G can be improved to provide the required site characteristics and execute the extension of the transportation network to satisfy the needs of citizens in the general area. Please see the TIA and Supplemental Materials of Exhibit G for further details.

Additionally, according to the Sandy Parks Master Plan adopted May 15, 1997, there is not a conceptual location for a park on or near the subject site. Therefore, the location for the improvement should be determined through the development process. Though parkland dedication is not required of the Bailey Meadows Subdivision application, the Applicant is providing it and it must be brought within the Sandy UGB and annexed to allow for it. Policy 14 above is met.

Goal 5 – Natural Resources

Response: Goal 5 is not applicable to the decision. The decision does not affect a Goal 5 resource under OAR 660-023-0250(3)(a)-(c) because:



-
- a) The decision does not “create or amend” a resource list or a portion of an acknowledged plan or land use regulation adopted in order to protect a significant Goal 5 resource or to address specific requirements of Goal 5.”
 - b) The decision does not “allow” new uses that could be conflicting uses with a particular significant Goal 5 resource site on an acknowledged resource list.”
 - c) While the decision “amends an acknowledged UGB” no “factual information [was] submitted demonstrating that a resource site, or the impact areas of such a site, is included in the amended UGB area.”

Goal 6 – Air, Water, and Land Resources Quality

POLICY 4: Reduce congestion and delay on major streets to lessen localized pollution impacts of automobile travel through methods such as signal timing, access management, intersection improvements, etc.

Response: The City’s Comprehensive Plan with respect to Goal 6 and its development regulations governing land, air, and water quality are not affected by the decision. The intent of extending Gunderson Road to OR 211 is to enhance neighborhood circulation, thereby reducing congestion and delay in the area. This mitigates localized pollution impacts of vehicle activity in the area.

Goal 7 – Areas Subject to Natural Hazards

Response: The City’s Comprehensive Plan, with respect to Goal 7 and its development regulations governing natural hazards, is not affected by the decision. The subject site does not contain mapped areas of steep slopes 25 percent or greater or other known hazard areas.

Goal 8 – Recreational Needs

POLICY 1: Ensure that new residential development contributes equitably to park land acquisition, development, and maintenance.

POLICY 2: Establish methods to maintain and enhance the quality and quantity of parks, open space, and recreational facilities and services. Ensure that these facilities and services serve the diverse recreational needs and interests of area residents and are accessible to all members of the community.

POLICY 10: The conceptual location of community and neighborhood parks and areas of open space have been indicated on the City of Sandy Land Use Map. Actual park locations may be determined based on more site-specific information.

Response: According to the Sandy Parks Master Plan adopted May 15, 1997, there is not a conceptual location for a park on or near the subject site. Therefore, the location for the improvement should be determined through the development process. Though parkland dedication is not required of the Bailey Meadows Subdivision application, the Applicant is providing it and it must be brought within the Sandy UGB and annexed to allow for it. Goal 8 above is met.

Goal 9 – Economic Development

Response: The City’s Comprehensive Plan with respect to Goal 9 and its employment lands are not affected by the decision.



Goal 10 – Housing

Response: The subject property associated with this application to be incorporated within the UGB will be strictly for the purpose of constructing a public transportation facility and providing land for a park, and is not planned to include land for residential use. Therefore, the City’s Comprehensive Plan with respect to Goal 10 and residential land is not affected by the decision.

Goal 11 – Public Facilities and Services

Response: The City’s Comprehensive Plan contains an acknowledged Goal 11 element that includes policies to ensure sufficient and adequate public services are available (or will be available as appropriate) to serve lands within the UGB. The property north of the subject site, Bailey Meadows Subdivision, was found to be sufficiently served by public services at the time it was annexed into the City in June 2017. This application involves amending the City’s UGB to permit the extension of a public transportation facility (i.e., Gunderson Road) to allow for a future connection to OR 211. If approved, the extension is intended as an additional access to the subdivision and to distribute traffic from local streets to the surrounding area. The extension is not required for subdivision approval. Although providing parkland on the northeast portion of Tax Lot 701 will enhance quality of life for the residents in the area, it is not required for subdivision approval. Goal 11 is satisfied.

POLICY 3: Consider the needs of emergency service providers in the review of all development. Particular attention should be paid to:

- a) Street and driveway layout and site design features that ensure emergency vehicle access and building identification.
- b) Fire hydrant locations and fire flow.
- c) Security through appropriate lighting and landscape design.

Response: Policy 3 above, regarding emergency service provider access, is discussed in detail under Goal 12, Policy 2.

Goal 12 – Transportation

POLICY 1: Support a pattern of connected streets, sidewalks, and bicycle routes to: a) provide safe and convenient options for cars, bikes, and pedestrians; b) create a logical, recognizable pattern of circulation; and, c) spread traffic over local streets so that collector and arterial streets are not overburdened.

Response: This application involves the extension of a public transportation facility (i.e., Gunderson Road) to allow Bailey Meadows Subdivision a future connection to OR 211, as illustrated in the City of Sandy TSP. If approved, the extension is intended as an additional access to the subdivision and to distribute traffic from local streets to the surrounding area. The extension is planned to support a pattern of connected streets as stated above but is not required for subdivision approval.

POLICY 2: Work with fire district, police, and other emergency service providers to ensure that adequate emergency access is possible on all streets.

Response: Appendix D, Section D107 of the Oregon Fire Code addresses standards regarding fire apparatus access roads for one or two-family developments. As discussed in the Bailey



Meadows Subdivision application (City of Sandy Local File No. 19-023 SUB/VAR/TREE), the subdivision currently provides two separate and approved fire apparatus access roads (Melissa Avenue and SE Ponder Lane) and shall meet the requirements of Section D104.3.

The extension of Gunderson Road would provide an additional access to the subdivision. Therefore, if approved, the Gunderson Road extension will provide the secondary access to the subdivision and SE Ponder Lane will not be utilized to serve as an emergency access as described above.

Additionally, the nature of Policy 2 above requires coordination of the application by the City with affected governmental entities. Coordination requires notice of an application, an opportunity for an affected governmental entity to comment on the application, and the City's incorporation of the comments to a reasonable extent. The City can find that coordination of this application will be accomplished in two ways: by the Applicant prior to application submittal, and by the City in the review process for the application. Goal 12, Policy 2 is satisfied.

POLICY 21: Work with ODOT to determine locations for necessary traffic control signals. Proposed locations for future traffic signals have been determined for the downtown area in the City of Sandy Transportation System Plan. Other locations need to be determined in order to improve the safety and convenience of pedestrians, bicycles, and automobiles. The location of traffic signals should be consistent with the street network indicated in the Comprehensive Plan Map and current traffic engineering standards.

POLICY 22: Submit notice of development proposals impacting Highways 26 and 211 to ODOT for review and comment.

Response: The above criteria applies to City processes for noticing and coordinating with ODOT, as applicable. The standards above apply as the project plans to extend Gunderson Road to OR 211. Direct action by the Applicant will be taken as applicable. Policy 21 and 22 can be satisfied.

Goal 13 – Energy Conservation

Response: The City's Comprehensive Plan with respect to Goal 13 and its standards governing energy conservation are not affected by the decision.

Goal 14 – Urbanization

POLICY 1: Maintain an urban growth boundary with sufficient residential, commercial, industrial, and public use lands necessary to support forecast population and employment for a 20-year horizon. The City will evaluate and update the 20-year land supply at each periodic review plan update.

Response: This application to amend the City UGB is necessary to provide a public transportation facility (i.e., Gunderson Road) to support residential land north of the project site which was included within the UGB and subsequently annexed in 2017. Additionally, this application provides parkland dedication which will benefit residential lands in the vicinity. As described above, the City is required to maintain a UGB with sufficient residential lands, as addressed in the February 2017 City of Sandy Urban Growth Boundary Expansion Analysis. This application will provide a public road as illustrated in



the Sandy TSP that aligns with the existing transportation network in the area and implement a connection to OR 211.

POLICY 2: Urban growth should be directed in a generally contiguous manner consistent with the city's ability to economically maintain and extend public services and facilities.

POLICY 3: The City of Sandy shall encourage the development of land according to the following priorities:

- a) Vacant, buildable lands or underutilized lands located within developed or developing areas.
- b) Lands contiguous to development areas where services can be easily and economically extended.
- c) Lands which are significantly separated from developing areas by vacant land, or areas which would place an undue burden on the city's infrastructure.

Response: The project site is currently vacant, with pasture and vegetated areas. As stated above, urban growth should be directed in a contiguous manner and the planned Gunderson Road extension will facilitate growth north of the project site while having no impact on urban services or utilities. Per Goal 14, Policy 3(b) above, the City shall encourage the development of land which is contiguous to development areas where services can be easily and economically extended. The extension of Gunderson Road will provide access and distribute traffic from local streets to the surrounding area and provide parkland dedication, a benefit to lands north of the project site and those within the City limits.

POLICY 4: An Urban Growth Boundary (UGB) and Urban Reserve Area (URA) shall be jointly adopted by the City of Sandy and Clackamas County. Procedures for coordinated management of the unincorporated lands within the UGB and URA shall be specified in an intergovernmental agreement adopted by the Sandy City Council and the Clackamas County Board of Commissioners.

Response: The property involved in this application, Tax Lot 701, is associated with an UGMA, as it is within the Sandy Adopted URA. The applicable elements are addressed within this written narrative.

POLICY 6: Designated URA lands will be considered for inclusion within the UGB on a phased basis, primary at periodic review. Legislative amendments to the UGB shall be large enough to facilitate cohesive neighborhood framework planning and efficient provision of public facilities. Property owners will also have the opportunity to request that land within the designated URA be included within the Sandy UGB, based on the criteria outlined in LCDC Goal 14 and the Urban Growth Management Agreement with Clackamas County.

Response: This application involves a property owner's (i.e., the Applicant's) request that Tax Lot 701, land within the designated Sandy URA, be included with the Sandy UGB. The applicable criteria, including Land Conservation and Development Commission (LCDC) Goal 14 noted above, have been addressed in this written document. Policy 6 is relevant and satisfied.

POLICY 7: The City of Sandy shall have the lead role in designating planned land uses and densities for incorporated and unincorporated lands within the UGB and the URA. The Comprehensive Plan shall constitute the comprehensive plan for all land within the Urban Growth Boundary and Urban Reserve Area.



Response: The subject application involves property which is located within the URA. This written document contains analysis of the City’s comprehensive plan goals and policies associated with the property. Therefore, Policy 7 is applicable.

POLICY 8: The City of Sandy shall have the lead role in coordinating public facility planning (streets, sanitary and storm sewers, water, parks and open space, schools) within the UGB and the URA.

Response: Tax Lot 701 is located within the Sandy Adopted URA. Therefore, Policy 8 is applicable, and the City of Sandy shall have the lead role in coordinating this application for the planned public transportation facilities and parkland.

POLICY 9: County zoning shall apply to unincorporated lands within the UGB and URA until annexation to the City of Sandy.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation and a comprehensive plan amendment is necessary to apply City zoning to allow for the public transportation facilities and parkland. Policy 9 is applicable and satisfied.

POLICY 11: Clackamas County shall have the lead role in processing land use and development applications for unincorporated lands within the UGB and URA.

Response: Tax Lot 701 is located within the Sandy Adopted URA. Therefore, Policy 11 is applicable, and the City of Sandy shall coordinate with Clackamas County in processing the subject land use and development application for unincorporated lands within the URA.

POLICY 12: The City of Sandy will support development within the areas outside the city limits but within the Sandy Urban Growth Boundary or Urban Reserve Area based on the following standards and restrictions:

- a) County zoning in effect at the time of adoption of the Urban Reserve Area will be frozen until the unincorporated land is included within the UGB and annexed for urban development.
- b) New commercial and industrial uses will generally be discouraged outside the City limits and within the UGB or within the Urban Reserve Area.
- c) Agricultural and forest uses will be allowed in accordance with Clackamas County zoning.
- d) The City and County shall coordinate plans for interim rural residential development within the designated Urban Reserve Area. The following strategies will be used to ensure that interim rural development does not inhibit long-term urbanization of lands within the Sandy UGB and Urban Reserve Area:
 - 1) shadow plats
 - 2) cluster development
 - 3) redevelopment plans
 - 4) non-remonstrance agreements or deed restrictions for annexation and provision of urban facilities

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation and a comprehensive plan amendment is necessary to apply City zoning allowing this urban development (i.e.,



creation of a public transportation facility and parkland). Therefore, the subject application does not involve new commercial, industrial, or agricultural uses. The Applicant understands that City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations are intended for the property. Interim use and development, prior to annexation, is not associated with this application. The application complies with the applicable components of Policy 12 above.

CLACKAMAS COUNTY COMPREHENSIVE PLAN GOALS AND POLICIES

GOALS

The overall goals of the plan are:

- Balance public and private interests and adopt a coordinated set of goals and policies to guide future development in Clackamas County.
- Identify the most appropriate land uses for individual sites by evaluating site characteristics in light of market demand, human needs, technology, and state, regional, and County goals.
- Provide for growth in areas where public facilities can economically be provided to support growth.
- Create development opportunities most compatible with the fiscal and financial capacity of the County and its residents.

Response: This application balances public and private interests by complying with goals and policies in the Clackamas County Comprehensive Plan. The primary purpose of this application is to facilitate a transportation need in the area by extending Gunderson Road to provide a connection to OR 211, as illustrated in the Sandy TSP. Additionally, the Applicant plans to provide area for parkland. The project site is relatively flat with no existing improvements which makes it an appropriate site to facilitate the City's transportation vision. To distribute traffic from local streets to arterials and collectors, the extension of this public facility can economically be provided to support growth north of the subject site. The overall goals of the plan are incorporated into this UGB Amendment.

Chapter 4: LAND USE

URBANIZATION

URBANIZATION GOALS

- Clearly distinguish Urban and Urban Reserve areas from non-urban areas.
- Encourage development in areas where adequate public services and facilities can be provided in an orderly and economic way.
- Insure an adequate supply of land to meet immediate and future urban needs.
- Provide for an orderly and efficient transition to urban land use.
- Distinguish lands immediately available for urban uses from Future Urban areas within Urban Growth Boundaries.

Response: The subject property is within the Sandy Urban Reserve Area. This application supports development in an area of the City where a public transportation facility has been deemed necessary to accommodate planned growth. Tax Lot 701 is relatively flat and unimproved, allowing the extension of Gunderson Road to be provided in an economic way and



facilitate the needs of urban residential housing north of the site. This application provides for an efficient transition to urban land use because the portion of land to be annexed is the necessary area for the improvement and land will not be annexed to allow or develop homes. The area for parkland dedication will enhance the lives of local residents. The subject site will be available for urban uses, specifically both minor public facilities, after annexation.

4.A. General Urbanization Policies

4.A.2 Coordinate with affected cities in designating urban areas outside of Metro. Land designated as a Rural Reserve, as shown on Map 4-9, shall not be designated as an Urban Reserve or added to an urban growth boundary. The following areas may be designated as Urban:

4.A.2.3. Land to which public facilities and services can be provided in an orderly and economic way.

Response: The subject property is not designated as a Rural Reserve on Map 4-9. Tax Lot 701 is planned to provide a public transportation facility to meet the needs of the surrounding area.

4.A.3 Land use planning for urban areas shall integrate all applicable policies found throughout the Plan including the following:

4.A.3.1. Locate land uses of higher density or intensity to increase the effectiveness of transportation and other public facility investments.

Response: The purpose of this application is to allow the extension of a public transportation facility (e.g. Gunderson Road) thereby providing the improvement illustrated in the Sandy TSP and to provide land for a park. Therefore, the application will increase effectiveness of the City's transportation network.

4.A.4 Establish Urban Growth Management Areas and Urban Growth Management Agreements to clarify planning responsibilities between the County and cities for areas of mutual interest.

Response: The Urban Growth Management Agreement (UGMA) between Clackamas County and the City of Sandy coordinates the development and amendment of comprehensive plans and implementing measures affecting the City's urban growth. The document is addressed in this written document and is included as Exhibit H.

4.E. Urban Reserve Area Policies

4.E.1. The following policies apply to Urban Reserve areas established pursuant to OAR 660, Division 21:

4.E.1.1 Clackamas County shall recommend to Metro land in Clackamas County which should be designated Urban Reserve, when Urban Reserve amendments to the Region 2040 Urban Growth Management Functional Plan are considered by Metro. The cities of Sandy, Molalla, Estacada and Canby, in coordination with Clackamas County, may designate and adopt other urban reserve areas in a manner consistent with OAR 660-021-0000.

Response: The Urban Growth Management Agreement (UGMA) between Clackamas County and the City of Sandy coordinates the development and amendment of comprehensive plans and implementing measures affecting the City's urban growth. The document is addressed in this written narrative and is included as Exhibit H.



4.E.1.5 Lands within a designated Urban Reserve area shall continue to be planned and zoned for rural uses in a manner that ensures a range of opportunities for the orderly, economic and efficient provision of urban services when these lands are included in the Urban Growth Boundary. Planning and zoning shall be done in a manner consistent with OAR 660-021-0000 and the Metro Code, in areas where Metro has jurisdiction.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow for the urban development (i.e., creation of a minor public transportation facility and parkland). The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. Interim use and development, prior to annexation, is not associated with this application

4.E.2. The following policies apply to Urban Reserve areas established pursuant to OAR 660, Division 27, as shown on Map 4-9:

4.E.2.3 The County shall not amend the Comprehensive Plan or Zoning and Development Ordinance or the Comprehensive Plan Map or zoning designations:

- a. To allow within Urban Reserve areas, new uses that were not allowed on the date the Urban Reserve areas were designated, except those uses authorized by amendments to the Oregon Revised Statutes or Oregon Administrative Rules enacted after designation of Urban Reserve areas.
- b. To allow within Urban Reserve areas, the creation of new lots or parcels smaller than allowed on the date Urban Reserve areas were designated, except as authorized by amendments to the Oregon Revised Statutes or Oregon Administrative Rules enacted after designation of Urban Reserve areas.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow for the urban development (i.e., creation of a minor public transportation facility and parkland). The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. Interim use and development, prior to annexation, is not associated with this application. This application will not allow new uses that were not allowed on the date the URA was designated or allow the creation of new lots.

URBAN GROWTH MANAGEMENT AGREEMENT BETWEEN CITY OF SANDY AND CLACKAMAS COUNTY

IV. Boundaries

- A. The Urban Growth Boundary (UGB) and Urban Growth Area (UGA) shall be as shown on map Attachment "A" to this agreement.



-
- B. The Urban Reserve Area (URA) shall be established as shown on map Attachment “A” to this Agreement. The URA shall establish the planned limits of the City’s urban growth for the mutually coordinated population and employment growth for a 30 to 50-year timeframe.
 - C. Amendments to the City’s and County’s Comprehensive Plans which modify the Urban Growth Boundary or Urban Reserve Area shall be deemed incorporated into this agreement. Any amendment proposed to the City’s UGB or URA shall be a coordinated city-county effort with adoption by both city and county. The county shall not consider adoption of any City UGB or URA amendment unless adopted by the city first. The city shall be responsible for initiating all legislative documents.

Response: This application involves an amendment to the City’s UGB and should be a coordinated city-county effort with adoption by both the City of Sandy and Clackamas County. As stated above, the City is responsible for initiating the legislative amendments.

V. Coordination and Planning

- A. The City comprehensive plan shall establish urban comprehensive plan land use designations and densities for all incorporated and unincorporated lands within the Urban Growth Boundary and Urban Reserve Areas.
- B. The City shall have the lead role on all urban legislative and quasi-judicial plan amendments within the City’s UGB and URA, with notice to the County. Proposed amendments to the comprehensive plan may be made at any time, whether initiated by the city or in response to a development application. The city may hear and act on comprehensive plan and zone change applications prior to annexation, although such actions will not be effective until the effective date of annexation.
- C. After annexation to the City, the County zoning districts will continue to apply in accordance with the provisions of ORS 215.130 until the City applies its own land use plan and/or zoning designations.

Response: An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow for the urban development (i.e., creation of a minor public transportation facility and parkland). The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. Interim use and development, prior to annexation, is not associated with this application.

- D. The City shall be responsible for public facilities planning with the County.
- E. The City shall be responsible for preparing and adopting a local transportation system plan for all lands within the City’s UGB and URA. As required by OAR 660, Division 12, the City shall coordinate its transportation planning with the County, affected state agencies, special districts and affected private transportation service providers.

Response: The Sandy TSP provides

- F. Where applications are made for a use of property under the same ownership that is divided by the City limit boundary, the City shall be responsible for processing both the City and County applications. Except as otherwise provided in this Agreement, the application for the County portion of the property shall be evaluated pursuant to City Code procedures, but applying the applicable substantive provisions of the County’s Comprehensive Plan and Zoning and Development Ordinance.

VI. Zoning and Development Proposals in Unincorporated UGA and URA

...



B. Land use applications for the following permits within the unincorporated UGB or URA shall be forwarded to the City prior to a County Decision. These applications shall include:

1. Comprehensive plan and zone changes
2. Subdivisions and partitions
3. Conditional use permits
4. Design review applications for new commercial or industrial buildings, and communication towers. Any city comments shall be made within 14 days.

Response: This UGB Amendment application involves a comprehensive plan and zone change for a property within the unincorporated UGB and URA and is therefore submitted to the City prior to a County decision.

IV. Conclusion

The required findings have been made and this written narrative and accompanying documentation demonstrate that the application is consistent with the applicable provisions of the Oregon Statewide Planning Goals, Oregon Administrative Rules, Oregon Revised Statutes, City of Sandy Comprehensive Plan, and Clackamas County Comprehensive Plan. The City and County can rely upon this information in their approval of this application.





Exhibit A: City of Sandy Land Use Application Form



LAND USE APPLICATION FORM

(Please print or type the information below)

Planning Department
39250 Pioneer Blvd.
Sandy OR 97055
503-489-2160

Name of Project City of Sandy Urban Growth Boundary Expansion

Location or Address Southeast of Ponder Lane, northwest of Oregon Highway 211

Map & Tax Lot Number T 25 , R 4E , Section 23 ; Tax Lot(s) 701

Request: This application involves the expansion of the City of Sandy's Urban Growth Boundary to accommodate a public transportation facility (e.g. Gunderson Road).

Please contact the Applicant's consultant and legal counsel (below) with any inquiries:

AKS Engineering & Forestry, LLC - Chris Goodell: (503) 563-6151; chrisg@aks-eng.com
Schwabe, Williamson & Wyatt - Michael Robinson: (503) 796-3756; mrobinson@schwabe.com

I am the (check one) owner lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

| | |
|--|--|
| Applicant (if different than owner) Allied Homes & Development | Owner Richard L Pullen, Lawrence Pullen, Sherrene Teneyck |
| Address 12404 SE Sunnyside Road, Suite 706 | Address 37020 SE Deming Road |
| City/State/Zip Clackamas, OR 97015 | City/State/Zip Sandy, OR 97055 |
| Phone Please contact Applicant's consultant | Phone Please contact Applicant's consultant |
| Email Please contact Applicant's consultant | Email Please contact Applicant's consultant |
| Signature <small>DocuSigned by:</small> <i>Cody Bugan</i> | Signature <small>DocuSigned by:</small> <i>Richard L Pullen</i> <small>DocuSigned by:</small> <i>Lawrence Pullen</i> <small>DocuSigned by:</small> <i>Sherrene Teneyck</i> |

If signed by Agent, owner's written authorization must be attached.

| File No. | Date | Rec. No. | Fee \$ |
|--|------|----------|--------|
| Type of Review (circle one): Type I Type II Type III Type IV | | | |

W:\City Hall\Planning\Planning Forms\Forms Updated 2018\General Land Use Application - updated 2019.doc

Fees Included: \$3,184 UGB Expansion Request
\$1,500 Traffic Review Fee



Exhibit B:
Clackamas County Land Use Application Form



CLACKAMAS COUNTY PLANNING AND ZONING DIVISION
 DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
 DEVELOPMENT SERVICES BUILDING
 150 BEAVERCREEK ROAD | OREGON CITY, OR 97045
 503-742-4500 | ZONINGINFO@CLACKAMAS.US

Land Use Application

| For Staff Use Only | |
|------------------------|-----------------|
| Date received: | Staff initials: |
| Application type: | File number: |
| Zone: | Fee: |
| Violation #: | CPO/Hamlet: |
| Applicant Information: | |

What is proposed? This application involves the expansion of the City of Sandy Urban Growth Boundary to accommodate a public transportation facility (e.g. Gunderson Road).

Name of applicant: Allied Homes & Development
 Mailing address: 12404 SE Sunnyside Road, Suite 706
 City Clackamas State OR Zip 97015
 Applicant is (select one): Property owner Contract purchaser Agent of the property owner or contract purchaser
 Name of contact person (if other than applicant): Chris Goodell; AKS Engineering & Forestry, LLC
 Mailing address of contact person: 12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Applicant #'s: Wk: _____ Contact Applicant's Consultant Cell: _____ Contact Applicant's Consultant Email: _____ Contact Applicant's Consultant
 Contact person #'s: Wk: (503) 563-6151 Cell: N/A Email: chrisg@aks-eng.com

Other persons (if any) to be mailed notices regarding this application:
 Richard L Pullen, Lawrence Pullen, Sherrene Teneyck, 37020 SE Deming Road, Sandy OR 97055 Property Owner
Name Address Zip Relationship
Michael Robinson Pacwest Center 1211 SW 5th Avenue, Suite 190 Legal Counsel
Name Address Zip Relationship
Portland, OR 97024

SITE ADDRESS: No situs, Tax Lot 701
 TAX LOT #: T 25 R 4E Section 23 Tax Lot(s) 701
 Adjacent properties under same ownership: Total land area: ±14.30 acres
 T N/A R N/A Section N/A Tax lot(s) _____
 T _____ R _____ Section _____ Tax lot(s) _____
 T _____ R _____ Section _____ Tax lot(s) _____

I hereby certify that the statements contained herein, along with the evidence submitted, are in all respects true and correct to the best of my knowledge. 12/20/2019

Richard L Pullen, Lawrence Pullen, 12/27/2019 12/21/2019
DocuSigned by: DocuSigned by: DocuSigned by:
Sherrene Lanette TenEyck
Property owner or contract purchaser's name Date
Owner or contract purchaser's signature
Cody Ejugan 12/30/2019
Applicant's name Date
Applicant's signature

Fee Included: \$4,000 UGB Expansion Request (Comprehensive Plan Amendment)

Exhibit C: Property Ownership Information

JB

WARRANTY DEED - STATUTORY FORM
(Individual or Corporation)

JOE B. PHILLIPS

Grantor, conveys and warrants to:

LAWRENCE L. PULLEN and RICHARD L. PULLEN and MARK D. TEN EYCK

Grantee, the following described real property free of encumbrances except as specifically set forth herein:

PLEASE SEE ATTACHED DESCRIPTION SHEET

This instrument will not allow use of the property described in this instrument in violation of applicable land use laws and regulations. Before signing or accepting this instrument, the person acquiring fee title to the property should check with the appropriate city or county planning department to verify approved uses.

ENCUMBRANCES:
NONE

The true consideration for this conveyance is \$40,000.00.

Dated this 21st day of April, 1993; if a corporate grantor, it has caused its name to be signed by order of its board of directors.

8-108/08

CHICAGO TITLE INSURANCE COMPANY

Joe B. Phillips
JOE B. PHILLIPS

STATE OF OREGON,)
County of Clackamas)ss.
April 21, 1993.)

Personally appeared the above named JOE B. PHILLIPS and acknowledged the foregoing instrument to be his/her/their voluntary act and deed.

Before me:

Luella J. Taylor
Notary Public for Oregon
My commission expires: 3-2-94



After recording return and send tax statements to:
LAWRENCE L. PULLEN
36940 SE Deming
Sandy, OR 97055

Escrow No. 2300-00570-LF - Order No. 108108

93 28438

A portion of the Southwest one-quarter of the Northeast one-quarter of Section 23, Township 2 South, Range 4 East of the Willamette Meridian, in the County of Clackamas and State of Oregon, being more particularly described as follows:

Beginning at a stone marking the Northwest corner of said legal subdivision; thence N.88°26'40"E., along the North line thereof, a distance of 1321.91 feet to the Northeast corner of said legal subdivision; thence S.0°18'10"E., along the East line thereof, a distance of 388.20 feet to a point in the Northwesterly right-of-way line of Oregon State Highway No. 211; thence S.33°18'01"W., along said right-of-way line, a distance of 558.61 feet to an iron rod; thence N.51°08'54"W., leaving said right-of-way line, a distance of 1305.73 feet to the point of beginning.

2

STATE OF OREGON }
County of Clackamas } ss.
I, John Kaufman, County Clerk, for the County of Clackamas, do hereby certify that the instrument of writing was received for recording in the records of said county at

93 APR 29 PM 2:00



Witness my hand and seal this 29th day of April 1993.
John Kaufman
JOHN KAUFMAN
County Clerk
Recording Certificate
CCPR-1 (Rev. 8/91)

93 28438



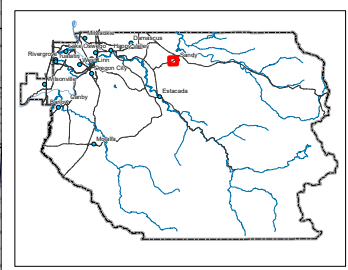
Exhibit D: Clackamas County Assessor's Map

SECTION 23 T.2S. R.4E. W.M.
CLACKAMUS COUNTY
1" = 400'

Cancelled Taxlots

- 2801
- 1000
- 2319
- 2300A1
- 1301
- 2701
- 503E1
- 503
- 1902
- 1802
- 517

- Parcel Boundary
- - - Private Road ROW
- - - Historical Boundary
- Railroad Centerline
- TaxCodeLines
- Map Index
- WaterLines
- Land Use Zoning
- ▨ Plats
- Water
- ⊙ Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- DLC Line
- Meander Line
- PLSS Section Line
- ⊕ Historic Corridor 40'
- ⊕ Historic Corridor 20'



THIS MAP IS FOR ASSESSMENT
PURPOSES ONLY



517/2018

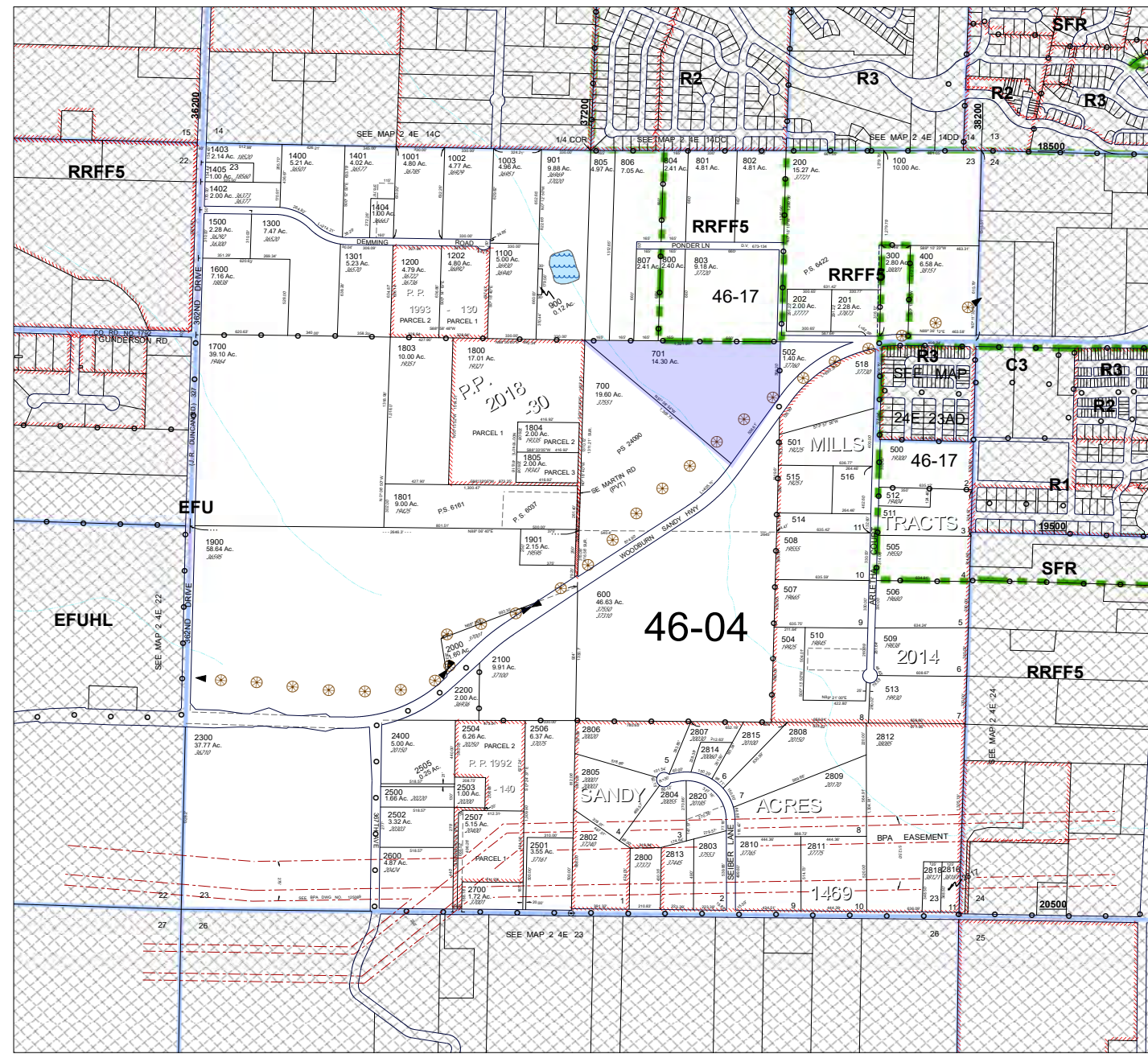
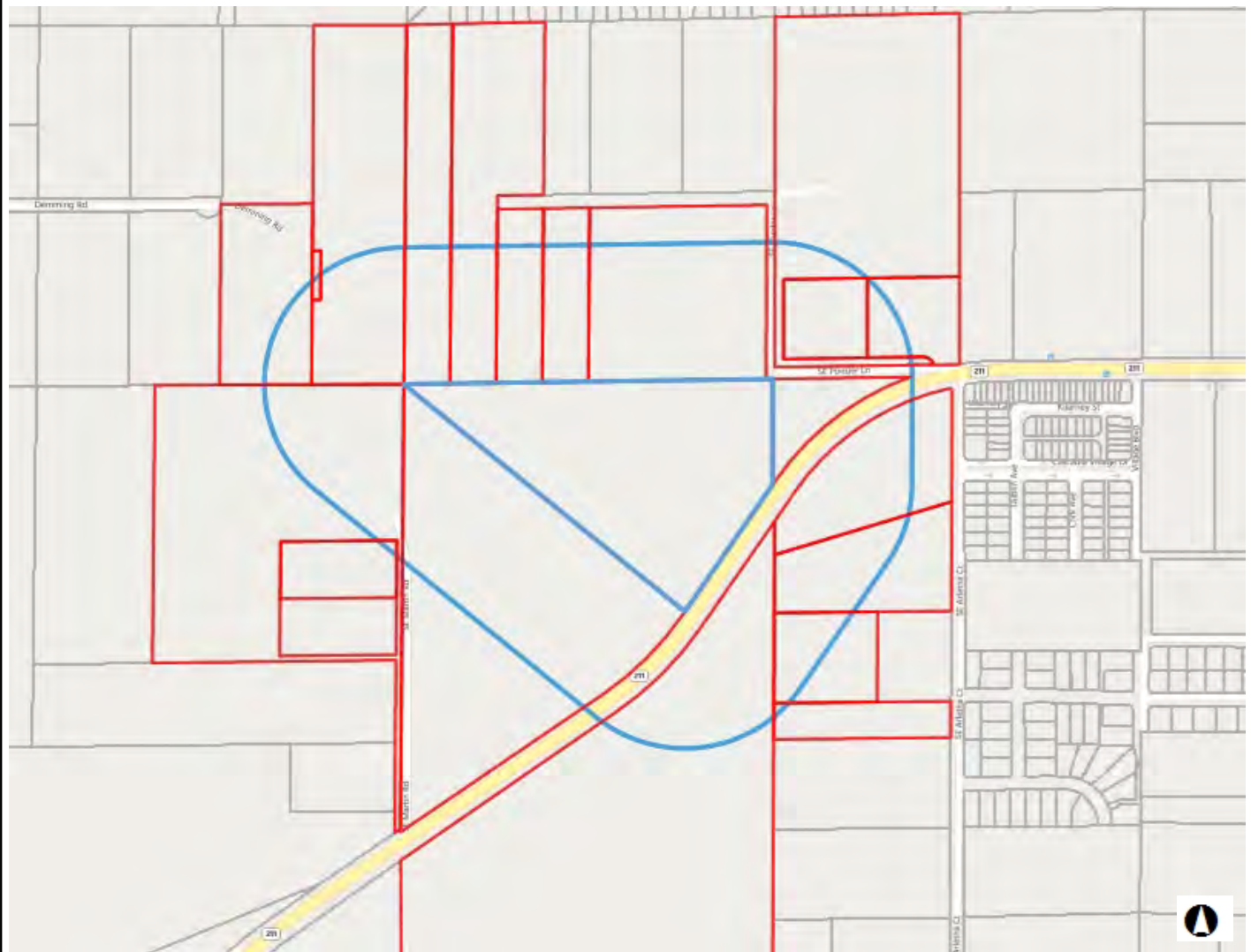




Exhibit E: City of Sandy Noticing Materials

24E23 00701 - 500' Radius

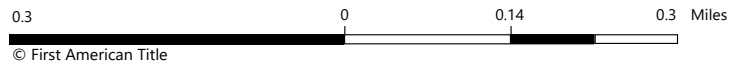


- Subject
- Radius
- Radius Properties

1/2/2020



Notes



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24E23 00200
Leslie Geren
37721 SE Ponder Ln
Sandy, OR 97055

24E23 00201
Paul Klahn
Po Box 671
Sandy, OR 97055

24E23 00202
Lucille Tiscus
37777 SE Ponder Ln
Sandy, OR 97055

24E23 00501
Nancy Bennett
19225 SE Arletha Ct
Sandy, OR 97055

24E23 00502
Broek Boaz & Brian Galovin
244 Plant Ln SE
Salem, OR 97317

24E23 00514
Robert & Barbara Johnson
19555 SE Arletha Ct
Sandy, OR 97055

24E23 00515
William Fisher
19251 SE Arletha Ct
Sandy, OR 97055

24E23 00518
Garrett & Meri Lang
37730 SE Highway 211
Sandy, OR 97055

24E23 00600
Robert & Shana Foster
21442 S Parkview Ln
Estacada, OR 97023

24E23 00700
Calvin & Teresa Mckinnis
37551 SE Highway 211
Sandy, OR 97055

24E23 00701
Lawrence Pullen
36940 Deming Rd
Sandy, OR 97055

24E23 00800
Grant Sturm
647 E Historic Columbia River Hwy
Troutdale, OR 97060

24E23 00803
Grant Sturm
647 E Historic Columbia River Hwy
Troutdale, OR 97060

24E23 00805
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 00806
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 00807
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 00900
Eyck Ten & Richard Pullen
37020 Deming Rd
Sandy, OR 97055

24E23 00901
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 01100
Richard Pullen
36940 Deming Rd
Sandy, OR 97055

24E23 01800
University Developments Llc
17150 University Ave STE 200
Sandy, OR 97055

24E23 01804
Sixth Generation Properties Llc
Po Box 1750
Oregon City, OR 97045



**Exhibit F: Lancaster Mobley Engineering
Traffic Documentation**

Technical Memorandum

To: Cody Bjugan, Allied Homes & Development
From: Jessica Hijar
Date: January 6, 2020
Subject: UGB Amendment & Gunderson Road Connection
 Traffic Impact Analysis, Addendum #1



**LANCASTER
ENGINEERING**

321 SW 4th Ave., Suite 400
 Portland, OR 97204
 phone: 503.248.0313
 fax: 503.248.9251
 lancasterengineering.com

This memorandum is written as an addendum to the Bailey Meadows Subdivision Traffic Impact Analysis prepared by Lancaster Engineering dated June 20, 2019. Specifically, analysis is provided regarding the potential new roadway connection to Highway 211. The current planning effort includes a connection of Gunderson Road to Highway 211 as considered in the City of Sandy's Transportation System Plan (TSP).

In addition, this memorandum addresses the Transportation Planning Rule and associated approval criteria relative to the proposed Urban Growth Boundary (UGB) amendment, comprehensive plan and zone map amendments, and annexation applications. All of these are necessary to accommodate a connection of Gunderson Road to Highway 211.

Future Roadway Connection

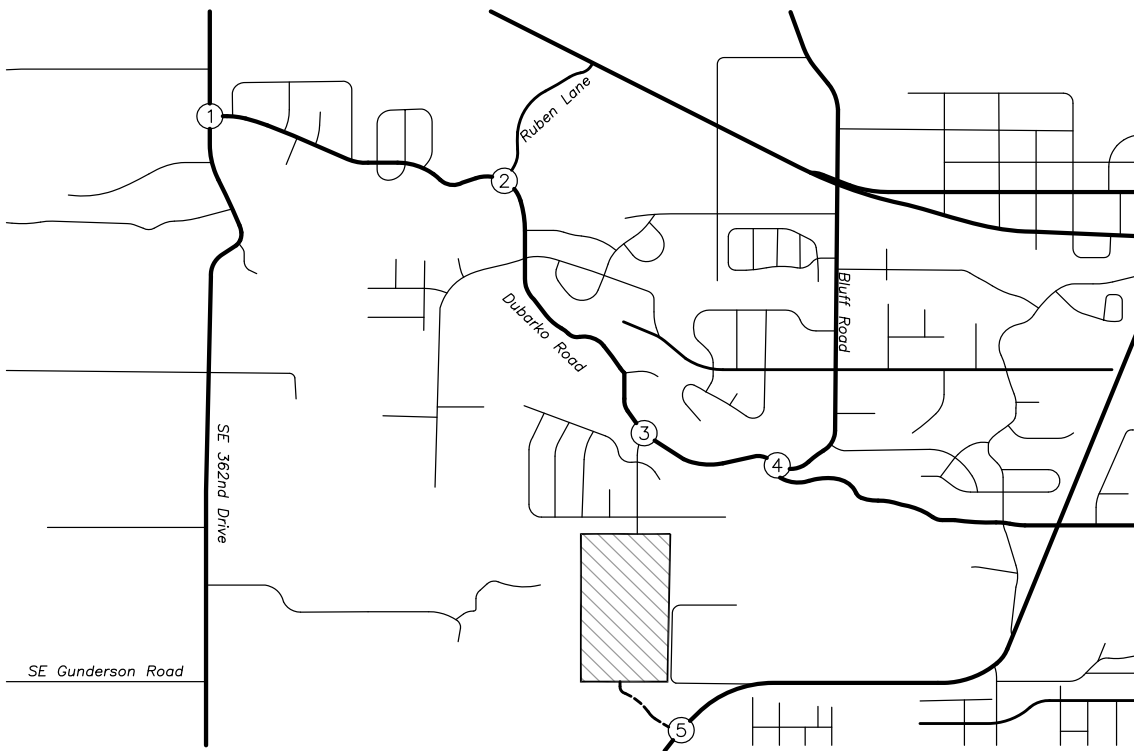
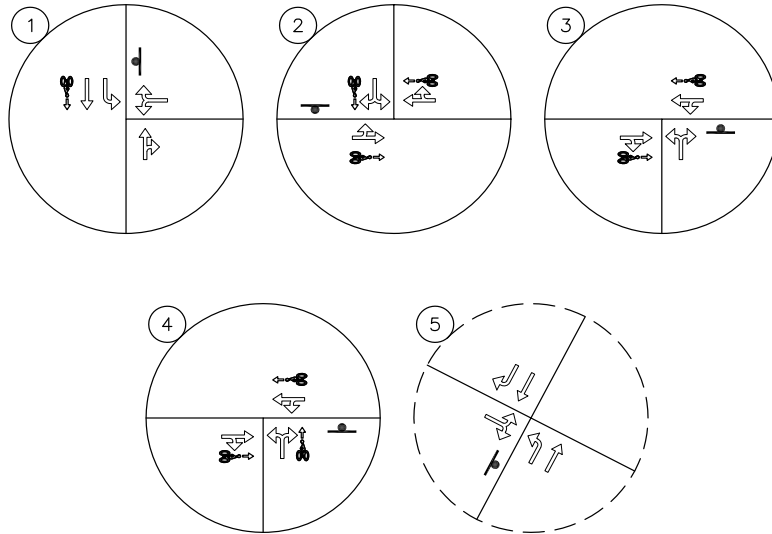
The planned connection of Gunderson Road to Highway 211 will provide an additional route into and out of the Bailey Meadows subdivision as well as the existing neighborhood to the north. This will reduce reliance on Melissa Avenue, which will provide access to the Bailey Meadows subdivision via Dubarko Road. The planned intersection of Gunderson Road at Highway 211 will be a three-legged intersection that is stop-controlled for the SE Gunderson Road approach. Future development on the south side of Highway 211 could extend the street to the east, to eventually connect with Cascadia Village Drive, as shown in the TSP. The existing characteristics of the subject roadways are shown in Table 1. The existing and future intersection configurations are shown in Figure 1 on page two.

Table 1: Vicinity Roadway Characteristics

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|--------------------------|---------------|-----------------------|------------------|---------|-----------|---------------|
| Highway 211 | ODOT | District Highway | 45-55 mph posted | No | No | Partial |
| Gunderson Road (planned) | City of Sandy | Future Minor Arterial | Not Posted | Partial | Partial | Yes |

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STUDY INTERSECTION (PROPOSED)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY
-  FUTURE MINOR ARTERIAL



VICINITY MAP



FIGURE 1

PAGE 2



Trip Distribution

The Gunderson connection to Highway 211 is expected to serve trips to and from the Bailey Meadows subdivision, as well as trips from the existing neighborhood north of Bailey Meadows, which currently uses only Melissa Avenue. Based on travel time studies, it is not expected that traffic from outside the immediate area (such as residents in Bornstedt Village or Cascadia Village) would use the new Gunderson Road connection as a bypass route. Those trips would have to use Gunderson Road, three different streets within Bailey Meadows, Melissa Avenue, and Dubarko Road. This would be a very circuitous route and would not be faster than existing travel routes serving these neighborhoods.

Bailey Meadows Trips

The overall directional distribution of site trips to and from Bailey Meadows was based on the original TIS, but trip routing was modified to reflect the new street connection.

To & From the East

It is expected that the 15 percent of site trips in the TIS previously assigned to Dubarko Road to the east will all use the new Gunderson Road connection. Turning left onto Highway 211 at the new intersection will have significantly lower delay than turning left or crossing Highway 211 at Dubarko Road.

Contribution: 15% via Gunderson

To & From the South

A total of 10 percent of the trips are expected to be to and from the south, and all these trips will use the Gunderson Road connection to Highway 211, since that will be a much more direct route.

Contribution: 10% via Gunderson

To & From the West

Trips to and from the west (30%) were assigned primarily to 362nd Avenue, as this is the quickest route to shopping destinations as well as Highway 26 west of Sandy. Travel time studies show that the route using Dubarko Road to 362nd Avenue is identical in time to the route using Highway 211 to 362nd Avenue. Therefore, the 30% was split evenly via Melissa Avenue to the north and Gunderson Road to the south.

Contribution: 15% via Gunderson

The total percentage of site trips using Gunderson Road is 40 percent, or 378 of the site's 944 trips per day.



Rerouted Existing Trips

Since 40 percent of the Bailey Meadows trips are expected to use the Gunderson Road connection to Highway 211, it is expected that a similar, although slightly lower percentage of the existing neighborhood traffic would also use Gunderson. Since the existing neighborhood is north of the project site, the use of Gunderson could decrease from 40 percent to approximately 30 percent. As shown in the TIS, the existing traffic volume on Melissa Avenue was measured to be 1160 vehicles per day.

In total, 30 percent of the existing 1160 average daily traffic (ADT) on Melissa Avenue would reroute via Gunderson Road, or 348 trips per day.

In summary, the table below shows the total daily traffic volumes to the north (via Melissa Avenue) and to the south (via Gunderson Road) with the future street connection in place.

Table 2: Trip Distribution Summary

| | Daily Traffic Volumes | |
|--|-----------------------|----------------|
| | Melissa Avenue | Gunderson Road |
| Existing neighborhood traffic | 1160 | 0 |
| Existing neighborhood traffic w/ Gunderson | 812 | 348 |
| Bailey Meadows site trips with Gunderson | 566 | 378 |
| <i>Total Daily Volume with Gunderson</i> | <i>1378</i> | <i>726</i> |

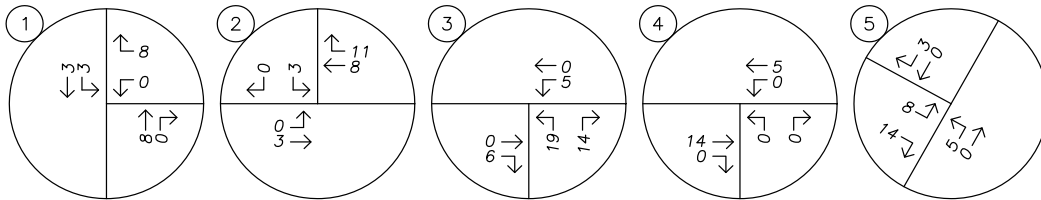
The updated trip distribution and assignment during the morning and evening peak hours are shown in Figure 2 on page five.

LEGEND

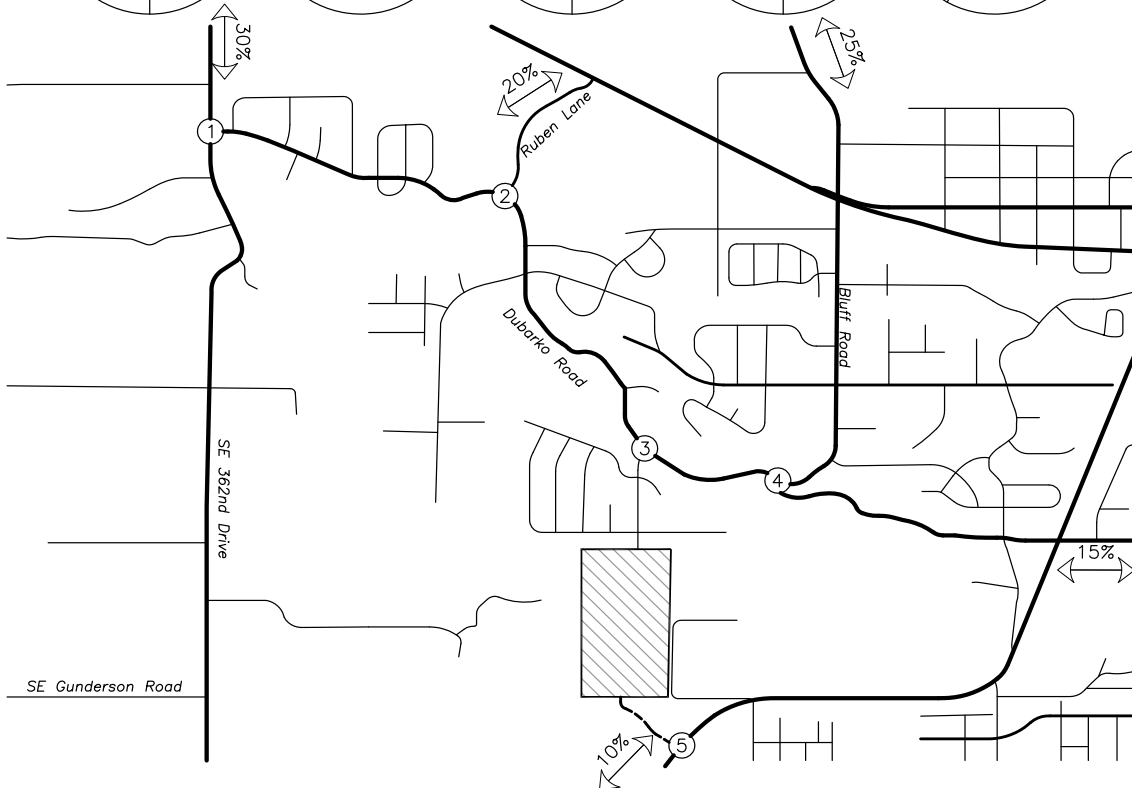
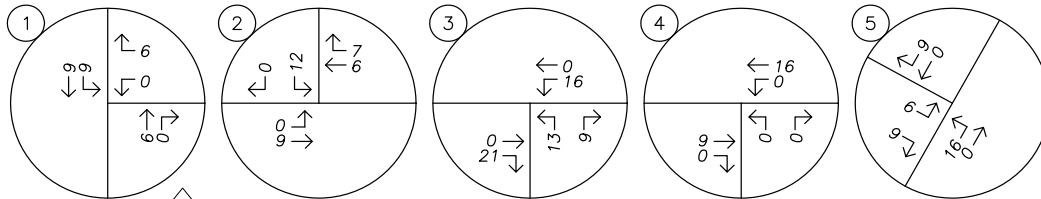
XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |

AM PEAK HOUR



PM PEAK HOUR



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Development Plan – Site Trips
 AM & PM Peak Hours



FIGURE
2
PAGE
5



Traffic Volumes

Existing Conditions

Twenty-four-hour speed data was collected on Highway 211 near the intersection with Ponder Lane on December 4th, 2018. The morning and evening peak hours of traffic occurred between 7:00 AM and 8:00 AM and between 4:00 PM and 5:00 PM, respectively.

Since Highway 211 is under the jurisdiction of ODOT, highway traffic volumes were seasonally adjusted to reflect the 30th highest hour per methodologies in ODOT's Analysis Procedures Manual (APM). Based on the commuter seasonal trend in ODOT's 2018 Seasonal Trend Table, a seasonal factor of 1.122 was calculated and applied to through volumes on Highway 211.

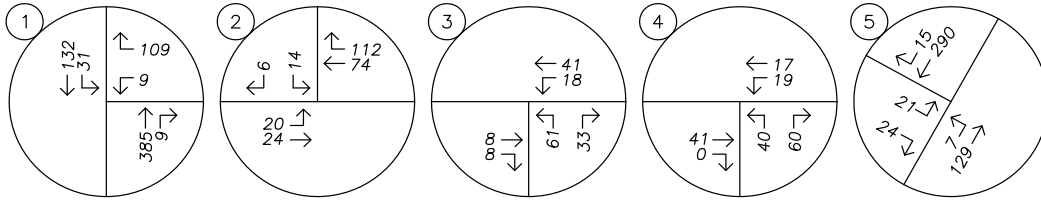
Buildout Conditions

A compounded growth rate of two percent per year was used to estimate growth on all streets under the City of Sandy jurisdiction as described within the TIS. Growth rates for traffic volumes on Highway 211 were derived using ODOT's 2037 Future Volume Tables in accordance with the APM. Using data corresponding to mileposts 3.75 and 5.07, a linear growth rate of 2.8 percent was calculated and applied to through volumes on the highway. Traffic volumes were projected over a period of four years in order to estimate the year 2022 buildout traffic volumes (traffic count data was collected in 2018).

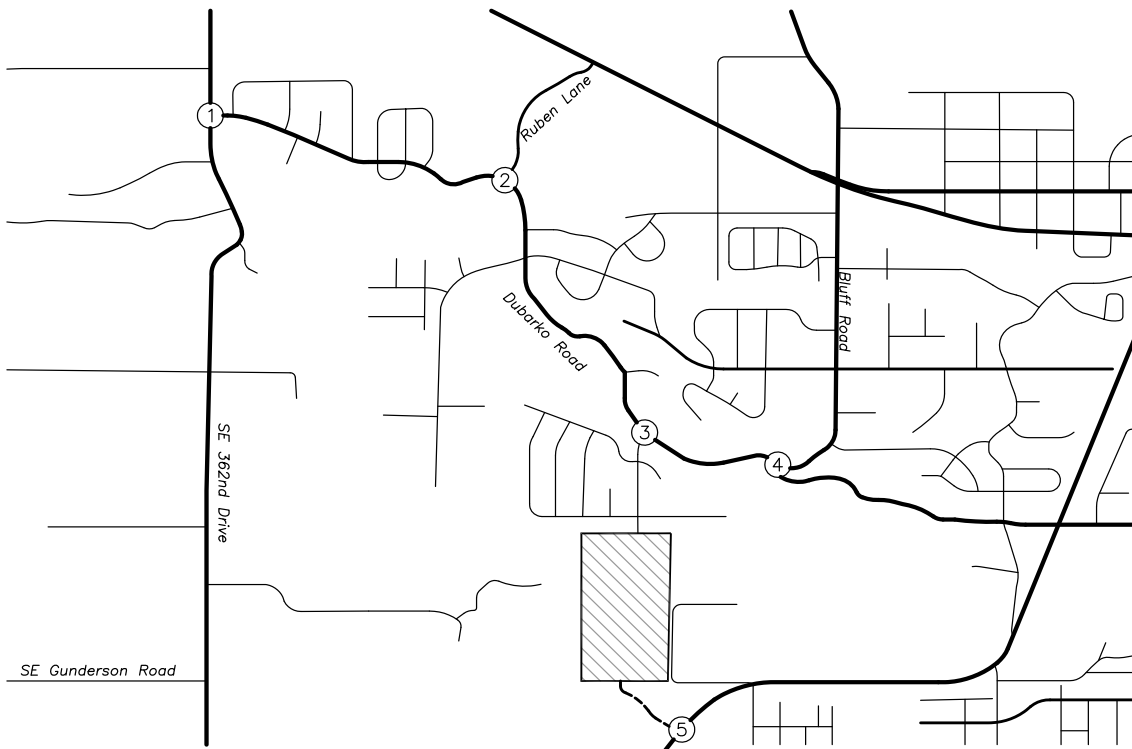
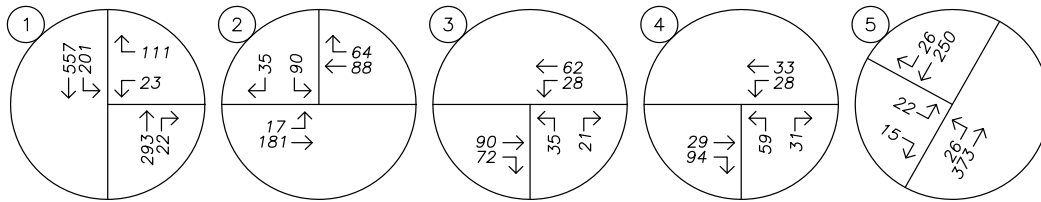
The year 2022 buildout scenario was updated to include a redistribution of existing trips that are likely to use the new Highway 211 roadway connection. Finally, site trips generated by the Bailey Meadows subdivision, discussed previously within the Trip Distribution section, were added to the projected year 2022 volumes in order to obtain the year 2022 buildout traffic volumes.

The year 2022 buildout traffic volumes are shown in Figure 3 on page seven.

AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
 Year 2022 Buildout Traffic Volumes
 AM & PM Peak Hours



FIGURE
3
PAGE
7



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Preliminary Traffic Signal Warrants

Preliminary traffic signal warrants were examined for all study intersections based on methodologies in the *Manual on Uniform Traffic Control Devices*¹ (MUTCD) and the Analysis Procedures Manual. Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT and that the eighth-highest hour is 5.6 percent of the daily traffic. Volumes were used for the evening peak hour under the year 2022 buildout scenario.

For the intersection under ODOT jurisdiction, the APM dictates that minor-street right turns are only used if the volume exceeds 85 percent of the lane capacity, and even then, only the increment of volume in excess of 85 percent can be used. In this case, none of the right turns can be used for the purpose of the signal warrant analysis.

Due to insufficient minor street volumes, traffic signal warrants are not met at the intersection of SE Gunderson Road at Highway 211 under year 2022 buildout scenario.

Left-Turn Lane Warrants

Left-turn lane warrants were examined at the planned intersection of Highway 211 at SE Gunderson Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream.

Warrants were examined based on the design curves developed by the Texas Transportation Institute, as adopted by the APM. This methodology evaluates the need for a left-turn lane based on the number of left-turning vehicles, the number of travel lanes, the number of advancing and opposing vehicles, and the roadway travel speed.

A left-turn lane is warranted at the intersection of SE Gunderson Road at Highway 211 under the year 2022 buildout scenario and it is recommended that a left-turn lane be constructed as part of the intersection improvements.

¹ Federal Highway Administration (FTA), American Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual of Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010



Operational Analysis

A capacity analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*² (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s TSP states that both signalized and unsignalized intersections are required to operate at LOS D or better.

The applicable minimum operational standards for ODOT facilities are established under the Oregon Highway Plan and are based on the classification of the roadway and its v/c ratio. District highways located outside the Urban Growth Boundary and within an unincorporated community has a peak hour v/c ratio target of 0.80.

Table 3: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 13 | B | 0.24 | 19 | C | 0.36 |
| Ruben Lane at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Year 2022 Buildout Conditions | 9 | A | 0.13 | 10 | B | 0.09 |
| Dubarko Road at Bluff Road | | | | | | |
| Year 2022 Buildout Conditions | 8 | A | 0.16 | 8 | A | 0.15 |
| Highway 211 at SE Gunderson Road | | | | | | |
| Year 2022 Buildout Conditions | 11 | B | 0.08 | 13 | B | 0.08 |

All intersections are projected to operate within the City of Sandy and ODOT’s operational standards under all analysis scenarios.

² Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Intersection Location

The City of Sandy TSP shows a planning-level depiction of the Gunderson Road extension that was outside of the UGB at the time the TSP was adopted but is within the current UGB. This is shown below in Figure 4.

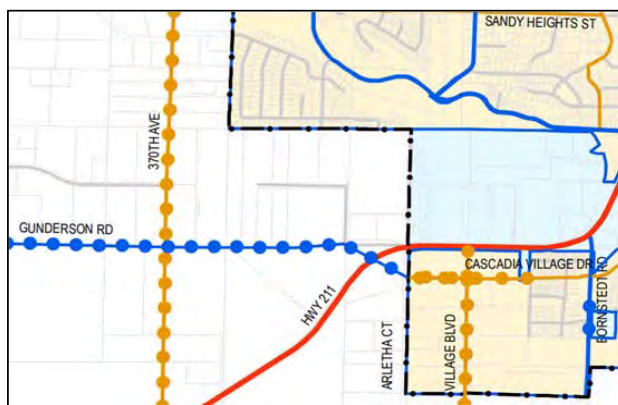


Figure 4: Alignment from Sandy TSP

However, upon closer investigation and engineering analysis, it was determined that the alignment shown on the TSP was not feasible for construction of an intersection with Highway 211, primarily due to poor sight distance, the need for a perpendicular intersection, and a very steep superelevated roadway section.

Looking to the northeast from the TSP-identified location, sight distance is limited by both horizontal and vertical curves on Highway 211. In addition, sight distance from the future fourth leg of the intersection would be particularly poor. At

the TSP-identified location, the highway was designed for moving traffic, not for accommodation of an intersection. Due to the high design speed and the horizontal curve, superelevation (the banking of the roadway around the curve) is very steep. This facilitates through traffic on the highway, but makes an intersection at this location problematic, due to difficult turning and crossing movements across the steep curve.

Need for UGB Expansion

The nearest suitable intersection location was found to be farther to the southwest, at the location currently proposed for a UGB amendment. From this location, it is far enough from the horizontal and vertical curves to the northeast to have adequate sight distance and far enough southwest of the curve to not be in a

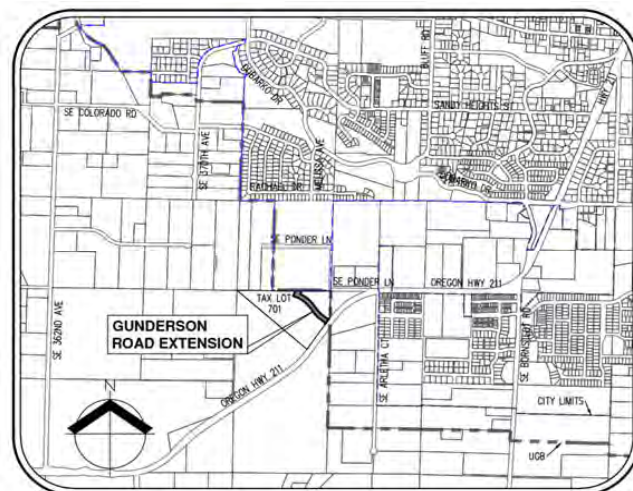


Figure 5: Planned Alignment



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superelevated roadway section. However, this alignment is outside of the current UGB of the City of Sandy, as shown in Figure 5. As such, a UGB amendment is proposed to accommodate the road extension.

With the proposed UGB amendment, there will be a triangle-shaped remnant piece of property that will also be brought into the UGB. This remnant is approximately 2.38 acres in size and is proposed to be dedicated as a public neighborhood park. This will be a small, passive-use neighborhood park that will be used primarily by the residents in the area. Trips to and from the park will be primarily pedestrian and bicycle trips and no separate parking lot is planned.

Oregon Administrative Rules

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation applications trigger the need to address the Transportation Planning Rule (TPR) and associated criteria from the Oregon Administrative Rules. These are addressed below.

OAR 660-012-0060 Transportation Planning Rule

The primary purpose of the TPR is to account for the potential transportation impacts associated with any amendments to adopted plans and land use regulations. The TPR is quoted in *italics* below, with a response immediately following each section.

1. *If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*

- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*

Response: The proposed UGB amendment, comprehensive plan and zone map amendment, and annexation will not change the functional classification of any transportation facilities. In fact, it will implement planned roadway connections in the TSP.

- (b) Change standards implementing a functional classification system; or*

Response: The standards that implement the functional classification system are contained in the TSP and will not change as part of this proposal.

- (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing*



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requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

- (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;*
- (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or*
- (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.*

Response: The proposed UGB amendment and associated plan amendments will facilitate the Gunderson Road connection and will not result in developable property that will increase trip generation. In fact, by facilitating an important street connection it is implementing the City of Sandy TSP, will improve connectivity for the neighborhood, and will improve performance of the surrounding transportation system. The proposal will not result in a significant effect as defined by the TPR and no mitigations are necessary.

OAD 660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB

This section of the OAR is specific to UGB expansions and speaks to public facilities (such as transportation facilities) that require specific site characteristics. The OAR is quoted in *italics* below, with a response immediately following each section.

- 3. When the primary purpose for expansion of the UGB is to accommodate a particular industrial use that requires specific site characteristics, or to accommodate a public facility that requires specific site characteristics, and the site characteristics may be found in only a small number of locations, the preliminary study area may be limited to those locations within the distance described in section (1) or (2), whichever is appropriate, that have or could be improved to provide the required site characteristics. For purposes of this section:*
 - (a) The definition of "site characteristics" in OAR 660-009-0005(11) applies for purposes of identifying a particular industrial use.*

Response: In OAR 660-009-0005(11), "Site Characteristics" are defined by visibility, proximity to a particular transportation facility, and major transportation routes. In this case, the "site" for the UGB amendment is very narrowly defined and the location between the subdivision and Highway 211 is dictated by engineering standards that must be satisfied for a safe and efficient intersection location.

- (b) A "public facility" may include a facility necessary for public sewer, water, storm water, transportation, parks, schools, or fire protection. Site characteristics may include but are not limited to size, topography and proximity.*



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Response: Since the primary purpose of the proposed UGB amendment is to accommodate the extension of Gunderson Road to Highway 211, it is by definition a “public facility”. Site characteristics such as topography are what have dictated the need for the intersection in the location as proposed. Additionally, the applicant is providing area for a neighborhood park, a minor public facility.

Summary & Conclusions

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation will implement the City of Sandy TSP and result in improved operation at the study area roadways and intersections. The connection will improve conditions for the existing neighborhood to the north of the Bailey Meadows subdivision by providing another means of vehicular access to the area.



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Appendix

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 1/6/2020
 Scenario: Year 2022 Buildout Conditions - Evening Peak Hour

Major Street: Highway 211 Minor Street: SE Gunderson Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 675 PM Peak Hour Volumes: 22

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 6,750 | 8,850 | |
| Minor Street* | 220 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 6,750 | 13,300 | |
| Minor Street* | 220 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 6,750 | 10,640 | |
| Minor Street* | 220 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 85% of the turn lane capacity.



Project: Bailey Meadows Subdivision
 Intersection: Highway 211 at SE Gunderson Road
 Date: 1/6/2020
 Scenario: 2022 Buildout conditions

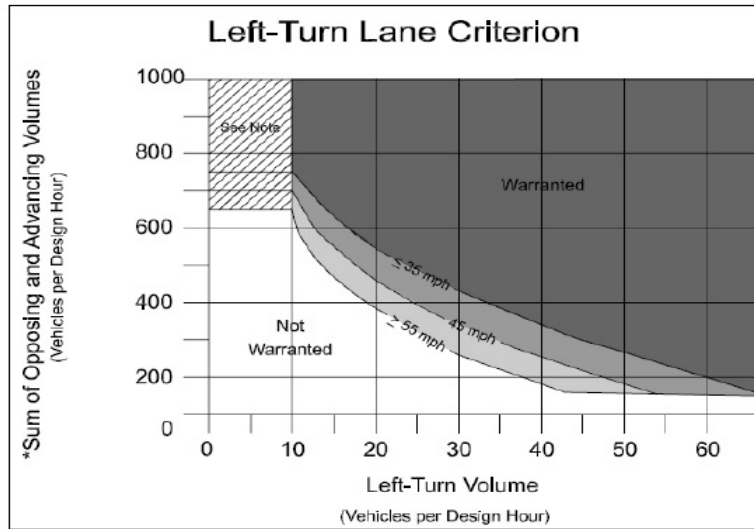
Speed? 45 mph

PM Peak Hour

| | |
|------------------------------|-----|
| Left-Turn Volume | 26 |
| Approaching DHV | 250 |
| # of Advancing Through Lanes | 1 |
| Opposing DHV | 399 |
| # of Opposing Through Lanes | 1 |

O+A DHV 649

Lane Needed? **Yes**



Source: Oregon DOT Analysis Procedures Manual 2008

***(Advancing Vol/ # of Advancing Through Lanes)+
 (Opposing Vol/ # of Opposing Through Lanes)**

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

Lanes, Volumes, Timings
 1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.876 | | 0.997 | | | |
| Flt Protected | 0.996 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Flt Permitted | 0.996 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 2% | 2% | 6% | 6% |
| Adj. Flow (vph) | 11 | 128 | 453 | 11 | 36 | 155 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 139 | 0 | 464 | 0 | 36 | 155 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 39.7% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

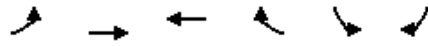
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 2.7 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 128 | 453 | 11 | 36 | 155 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 686 | 459 | 0 | 0 | 464 | |
| Stage 1 | 459 | - | - | - | - | |
| Stage 2 | 227 | - | - | - | - | |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | |
| Pot Cap-1 Maneuver | 415 | 604 | - | - | 1077 | |
| Stage 1 | 638 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 401 | 604 | - | - | 1077 | |
| Mov Cap-2 Maneuver | 401 | - | - | - | - | |
| Stage 1 | 617 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 13.1 | 0 | | 1.6 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 582 | 1077 | - | |
| HCM Lane V/C Ratio | - | - | 0.239 | 0.034 | - | |
| HCM Control Delay (s) | - | - | 13.1 | 8.5 | - | |
| HCM Lane LOS | - | - | B | A | - | |
| HCM 95th %tile Q(veh) | - | - | 0.9 | 0.1 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | 0.919 | | 0.959 | |
| Flt Protected | | 0.978 | | | 0.966 | |
| Satd. Flow (prot) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Flt Permitted | | 0.978 | | | 0.966 | |
| Satd. Flow (perm) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 6% | 6% | 2% | 2% | 13% | 13% |
| Adj. Flow (vph) | 22 | 27 | 83 | 126 | 16 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 49 | 209 | 0 | 23 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.4% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

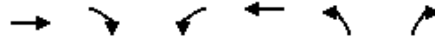
HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 1.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 27 | 83 | 126 | 16 | 7 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 209 | 0 | - | 0 | 217 | 146 |
| Stage 1 | - | - | - | - | 146 | - |
| Stage 2 | - | - | - | - | 71 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1338 | - | - | - | 747 | 873 |
| Stage 1 | - | - | - | - | 855 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1338 | - | - | - | 734 | 873 |
| Mov Cap-2 Maneuver | - | - | - | - | 734 | - |
| Stage 1 | - | - | - | - | 840 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 3.5 | 0 | 9.8 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1338 | - | - | - | 771 | |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.029 | |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.8 | |
| HCM Lane LOS | A | A | - | - | A | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr _t | 0.932 | | | | 0.952 | |
| Flt Protected | | | 0.985 | | 0.969 | |
| Satd. Flow (prot) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Flt Permitted | | | 0.985 | | 0.969 | |
| Satd. Flow (perm) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 |
| Heavy Vehicles (%) | 22% | 22% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 10 | 10 | 23 | 52 | 77 | 42 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 20 | 0 | 0 | 75 | 119 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.9% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

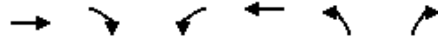
HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|-------|-------|
| Int Delay, s/veh | 6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 10 | 23 | 52 | 77 | 42 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 20 | 0 | 113 | 15 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 98 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1596 | - | 884 | 1065 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1596 | - | 871 | 1065 |
| Mov Cap-2 Maneuver | - | - | - | - | 871 | - |
| Stage 1 | - | - | - | - | 993 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.2 | 9.4 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 931 | - | - | 1596 | - | |
| HCM Lane V/C Ratio | 0.128 | - | - | 0.014 | - | |
| HCM Control Delay (s) | 9.4 | - | - | 7.3 | 0 | |
| HCM Lane LOS | A | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | | | 0.919 | |
| Flt Protected | | | | 0.974 | 0.980 | |
| Satd. Flow (prot) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Flt Permitted | | | | 0.974 | 0.980 | |
| Satd. Flow (perm) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles (%) | 12% | 12% | 9% | 9% | 4% | 4% |
| Adj. Flow (vph) | 59 | 0 | 27 | 24 | 57 | 86 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 59 | 0 | 0 | 51 | 143 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | | 9 | 15 | | 15 | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.2% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 0 | 27 | 24 | 57 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.8 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 40% | 0% | 53% |
| Vol Thru, % | 0% | 100% | 47% |
| Vol Right, % | 60% | 0% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 100 | 41 | 36 |
| LT Vol | 40 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 0 | 0 |
| Lane Flow Rate | 143 | 59 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.154 | 0.072 | 0.064 |
| Departure Headway (Hd) | 3.877 | 4.396 | 4.456 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 913 | 807 | 796 |
| Service Time | 1.95 | 2.466 | 2.528 |
| HCM Lane V/C Ratio | 0.157 | 0.073 | 0.064 |
| HCM Control Delay | 7.7 | 7.8 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.2 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | SEL | SER | NEL | NET | SWT | SWR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.928 | | | | | 0.850 |
| Flt Protected | 0.977 | | 0.950 | | | |
| Satd. Flow (prot) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.977 | | 0.950 | | | |
| Satd. Flow (perm) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 827 | | | 1043 | 1164 | |
| Travel Time (s) | 18.8 | | | 23.7 | 26.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 23 | 26 | 8 | 140 | 315 | 16 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 49 | 0 | 8 | 140 | 315 | 16 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 26.6% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

Intersection

Int Delay, s/veh 1.1

Movement SEL SER NEL NET SWT SWR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 26 | 8 | 140 | 315 | 16 |

Major/Minor Minor2 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|-------|---|---|---|
| Conflicting Flow All | 471 | 315 | 331 | 0 | - | 0 |
| Stage 1 | 315 | - | - | - | - | - |
| Stage 2 | 156 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 551 | 725 | 1228 | - | - | - |
| Stage 1 | 740 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 547 | 725 | 1228 | - | - | - |
| Mov Cap-2 Maneuver | 547 | - | - | - | - | - |
| Stage 1 | 735 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |

Approach SE NE SW

| | | | |
|----------------------|------|-----|---|
| HCM Control Delay, s | 11.2 | 0.4 | 0 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

| | | | | | |
|-----------------------|-------|---|-------|---|---|
| Capacity (veh/h) | 1228 | - | 629 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.078 | - | - |
| HCM Control Delay (s) | 8 | - | 11.2 | - | - |
| HCM Lane LOS | A | - | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

Lanes, Volumes, Timings
 1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.888 | | 0.991 | | | |
| Flt Protected | 0.992 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Flt Permitted | 0.992 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 1% | 1% |
| Adj. Flow (vph) | 25 | 121 | 318 | 24 | 218 | 605 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 146 | 0 | 342 | 0 | 218 | 605 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 46.0% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

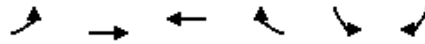
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 3.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 121 | 318 | 24 | 218 | 605 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 1371 | 330 | 0 | 0 | 342 | |
| Stage 1 | 330 | - | - | - | - | |
| Stage 2 | 1041 | - | - | - | - | |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | |
| Pot Cap-1 Maneuver | 161 | 712 | - | - | 1223 | |
| Stage 1 | 728 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 132 | 712 | - | - | 1223 | |
| Mov Cap-2 Maneuver | 132 | - | - | - | - | |
| Stage 1 | 598 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 18.7 | 0 | | 2.3 | | |
| HCM LOS | C | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 406 | 1223 | - | |
| HCM Lane V/C Ratio | - | - | 0.359 | 0.179 | - | |
| HCM Control Delay (s) | - | - | 18.7 | 8.6 | - | |
| HCM Lane LOS | - | - | C | A | - | |
| HCM 95th %tile Q(veh) | - | - | 1.6 | 0.6 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr't | | | 0.943 | | 0.962 | |
| Flt Protected | | 0.996 | | | 0.965 | |
| Satd. Flow (prot) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Flt Permitted | | 0.996 | | | 0.965 | |
| Satd. Flow (perm) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 19 | 203 | 99 | 72 | 101 | 39 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 222 | 171 | 0 | 140 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 36.1% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 203 | 99 | 72 | 101 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 171 | 0 | - | 0 | 376 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 241 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1412 | - | - | - | 627 | 917 |
| Stage 1 | - | - | - | - | 894 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1412 | - | - | - | 618 | 917 |
| Mov Cap-2 Maneuver | - | - | - | - | 618 | - |
| Stage 1 | - | - | - | - | 881 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.7 | 0 | 11.7 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1412 | - | - | - | 680 | |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.207 | |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.7 | |
| HCM Lane LOS | A | A | - | - | B | |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.940 | | | | 0.949 | |
| Flt Protected | | | 0.985 | | 0.970 | |
| Satd. Flow (prot) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Flt Permitted | | | 0.985 | | 0.970 | |
| Satd. Flow (perm) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 106 | 85 | 33 | 73 | 41 | 25 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 191 | 0 | 0 | 106 | 66 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

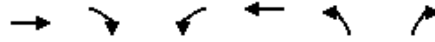
HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh | 2.6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 85 | 33 | 73 | 41 | 25 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 191 | 0 | 288 | 149 |
| Stage 1 | - | - | - | - | 149 | - |
| Stage 2 | - | - | - | - | 139 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1395 | - | 707 | 903 |
| Stage 1 | - | - | - | - | 884 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1395 | - | 689 | 903 |
| Mov Cap-2 Maneuver | - | - | - | - | 689 | - |
| Stage 1 | - | - | - | - | 862 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.4 | 10.2 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 756 | - | - | 1395 | - | |
| HCM Lane V/C Ratio | 0.087 | - | - | 0.024 | - | |
| HCM Control Delay (s) | 10.2 | - | - | 7.6 | 0 | |
| HCM Lane LOS | B | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr _t | 0.897 | | | | 0.954 | |
| Flt Protected | | | 0.978 | | 0.968 | |
| Satd. Flow (prot) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Flt Permitted | | | 0.978 | | 0.968 | |
| Satd. Flow (perm) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 750 | | 780 | | 615 | |
| Travel Time (s) | 20.5 | | 21.3 | | 16.8 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 34 | 111 | 33 | 39 | 69 | 36 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 145 | 0 | 0 | 72 | 105 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Stop | | Stop | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 25.8% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 111 | 33 | 39 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.4 | 7.8 | 7.9 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 46% |
| Vol Thru, % | 0% | 24% | 54% |
| Vol Right, % | 34% | 76% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 123 | 61 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 145 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.124 | 0.148 | 0.086 |
| Departure Headway (Hd) | 4.213 | 3.682 | 4.29 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 841 | 959 | 825 |
| Service Time | 2.29 | 1.761 | 2.368 |
| HCM Lane V/C Ratio | 0.126 | 0.151 | 0.087 |
| HCM Control Delay | 7.9 | 7.4 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.3 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.946 | | | | | 0.850 |
| Flt Protected | 0.971 | | 0.950 | | | |
| Satd. Flow (prot) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.971 | | 0.950 | | | |
| Satd. Flow (perm) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 45 | 45 | |
| Link Distance (ft) | 1495 | | | 875 | 917 | |
| Travel Time (s) | 34.0 | | | 13.3 | 13.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 24 | 16 | 28 | 405 | 272 | 28 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 40 | 0 | 28 | 405 | 272 | 28 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 31.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 16 | 28 | 405 | 272 | 28 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | 733 | 272 | 300 | 0 | - | 0 |
| Stage 1 | 272 | - | - | - | - | - |
| Stage 2 | 461 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 388 | 767 | 1261 | - | - | - |
| Stage 1 | 774 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 379 | 767 | 1261 | - | - | - |
| Mov Cap-2 Maneuver | 379 | - | - | - | - | - |
| Stage 1 | 757 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 13.2 | 0.5 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 1261 | - | 477 | - | - | |
| HCM Lane V/C Ratio | 0.022 | - | 0.084 | - | - | |
| HCM Control Delay (s) | 7.9 | - | 13.2 | - | - | |
| HCM Lane LOS | A | - | B | - | - | |
| HCM 95th %tile Q(veh) | 0.1 | - | 0.3 | - | - | |

Bailey Meadows Subdivision

Traffic Impact Analysis
Sandy, Oregon

Date:

June 20, 2019

Prepared for:

Cody Bjugan, Allied Homes & Development

Prepared by:

Jessica Hijar
Todd Mobley, PE



RENEWS: 12/31/2020



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Executive Summary

1. A 100-lot single family detached swelling unit subdivision is proposed for the following tax lots in Sandy, Oregon: 24E23 800, 801, 802, 803, and 804.
2. Access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.
3. The proposed subdivision is calculated to generate 74 trips during the morning peak hour, 99 trips during the evening peak hour, and 944 trips each weekday.
4. Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.
5. Due to insufficient major and minor street volumes, preliminary traffic signal warrants were not met at the study intersections under all analysis scenarios.
6. Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not met under any analysis scenario.
7. All study intersections, including the intersection of Melissa Avenue at Dubarko Road, are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.



Project Description

Introduction

The proposed development will include the construction of a 100-lot subdivision to be located on tax lots 24E23 800, 801, 802, 803, and 804 in Sandy, Oregon. The site is currently within the City of Sandy Urban Growth Boundary, the city limits, and is zoned Single Family Residential (SFR), which allows the subdivision as proposed. The project will be built in three phases, with the expected completion year of 2022.

This report includes traffic counts and a full operational analysis at the intersections listed below. This scope was developed based on City of Sandy's Traffic Impact Analysis (TIA) requirements and was approved by Replinger and Associates, the City's consulting transportation engineer. Coordination of the scope of work with the Oregon Department of Transportation (ODOT) was not necessary since no intersections on the state highway are affected.

1. SE 362nd Drive at Dubarko Road,
2. Ruben Lane at Dubarko Road,
3. Dubarko Road at Melissa Avenue, and
4. Dubarko Road at Bluff Road.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of supporting the existing uses as well as the proposed subdivision and to determine if mitigation is necessary. Detailed information on traffic counts, trip generation calculations, safety analyses, and level-of-service calculations is included in the appendix to this report.

Location Description

The subject site is located south of Rachel Drive and west of Ponder Lane in Sandy, Oregon. Although roadway stubs will be provided within the site for future roadway connections, access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.

Access to the subdivision cannot be provided via SE Ponder Lane in the southeast corner of the site since the existing right-of-way along SE Ponder Lane does not allow for two directions of travel and the current configuration of SE Ponder Lane at Highway 211 cannot support additional vehicle trips. There is not sufficient right-of-way available to realign Ponder Lane at its intersection with Highway 211. It is expected that additional access will be available to the east of the site as other properties develop.

Vicinity Streets

Five roadways have been identified in the traffic study scope. Table 1 provides a description of each of the roadways.



Table 1: Vicinity Roadway Descriptions

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|----------------------------|---------------|----------------------|------------------|---------|-----------|---------------|
| SE 362 nd Drive | City of Sandy | Rural Minor Arterial | 35 mph posted | Partial | Partial | Partial |
| Ruben Lane | City of Sandy | Collector | 25 mph posted | Yes | Partial | Yes |
| Dubarko Road | City of Sandy | Minor Arterial | 25 mph posted | Yes | Yes | Partial |
| Melissa Avenue | City of Sandy | Local Road | 25 mph statutory | Yes | Yes | No |
| Bluff Road | City of Sandy | Minor Arterial | 25 mph posted | Partial | Partial | Partial |

Study Intersections

Four nearby intersections were identified in discussions with City staff that are expected to be impacted by the proposed project. Table 2 below provides a summary of each of the study intersections.

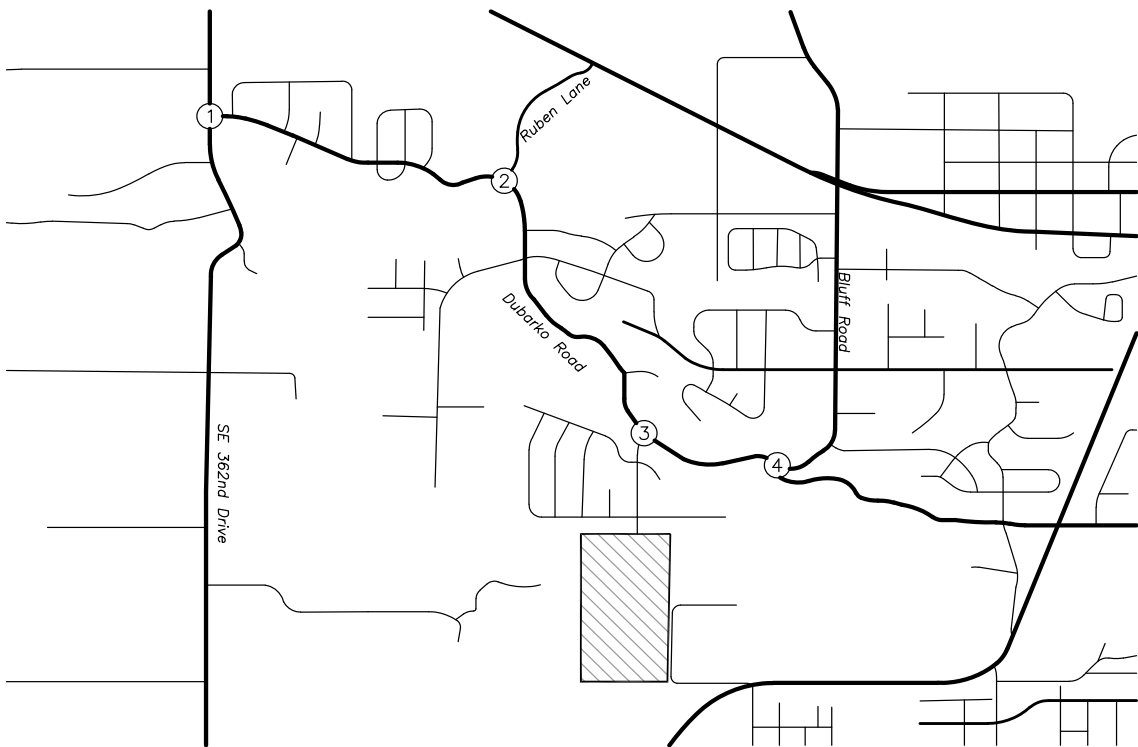
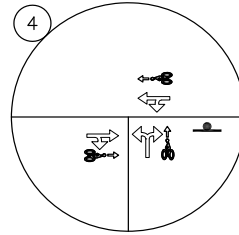
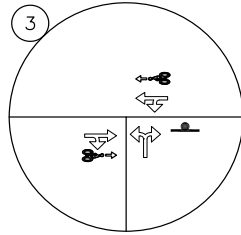
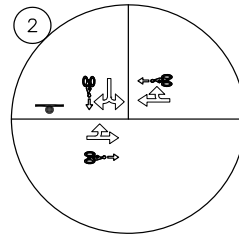
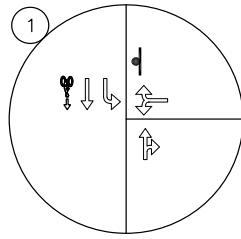
Table 2: Vicinity Intersection Descriptions

| Number | Intersection | Geometry | Traffic Control | Stopped Approaches |
|--------|--|--------------|-------------------------|--------------------|
| 1 | SE 362 nd Drive at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Westbound |
| 2 | Ruben Lane at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Southbound |
| 3 | Dubakro Road at Melissa Avenue | Three-Legged | Two-Way Stop Controlled | Northbound |
| 4 | Dubarko Road at Bluff Rod | Three-Legged | All-Way Stop Controlled | All |

The figure on the following page shows the site vicinity and the study intersection configurations.

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY



VICINITY MAP



FIGURE 1

PAGE 4



Site Trips

Trip Generation

To estimate the number of trips that will be generated by the proposed use, trip rates from the *Trip Generation Manual*¹ were used. Data from land use codes 210, *Single-Family Detached Housing*, was used to estimate the proposed development's trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed subdivision is projected to generate 74 morning peak hour trips, 99 evening peak hour trips, and 944 average weekday trips. The trip generation estimates are summarized in Table 3 below and detailed trip generation calculations are included as an attachment to this report.

Table 3: Trip Generation Summary

| Land Use Code | Size | Morning Peak Hour | | | Evening Peak Hour | | | Weekday Total |
|--------------------------------------|-----------|-------------------|-----|-------|-------------------|-----|-------|---------------|
| | | In | Out | Total | In | Out | Total | |
| 210 – Single-Family Detached Housing | 100 units | 19 | 55 | 74 | 62 | 37 | 99 | 944 |

Custom Trip Rates

Based on traffic counts collected at the existing intersection of Melissa Avenue at Dubarko Road and 24-hour counts collected along Melissa Avenue, a localized trip rate was derived for the existing subdivision that accesses Dubarko Road via Melissa Avenue. The custom trip rate was calculated to be 0.49 trips per unit during the morning peak hour, 0.63 trips per unit during the evening peak hour, and 6.90 trips per unit during each weekday. A comparison of the ITE trip rates and the trip rates based on localized data is provided in the following table.

Table 4: Trip Rate Comparison

| Data | Morning Trip Rate | Evening Trip Rate | Weekday Trip Rate |
|------------|-------------------|-------------------|-------------------|
| ITE | 0.74 trips/unit | 0.99 trips/unit | 9.44 trips/unit |
| Local Data | 0.49 trips/unit | 0.63 trips/unit | 6.90 trips/unit |

Since the localized data shows lower trip rates during all analysis periods, it can be expected that the proposed subdivision will yield site trips at a similar rate. Although this lower trip generation rate was not used for analysis, it should be noted that the trip generation based on ITE rates represents a conservative, worst-case analysis.

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Trip Distribution

The directional distribution of site trips to and from the proposed development was calculated based on travel patterns of trips to and from the existing neighborhood that is served by Melissa Avenue. In addition, the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution was estimated and used for analysis:

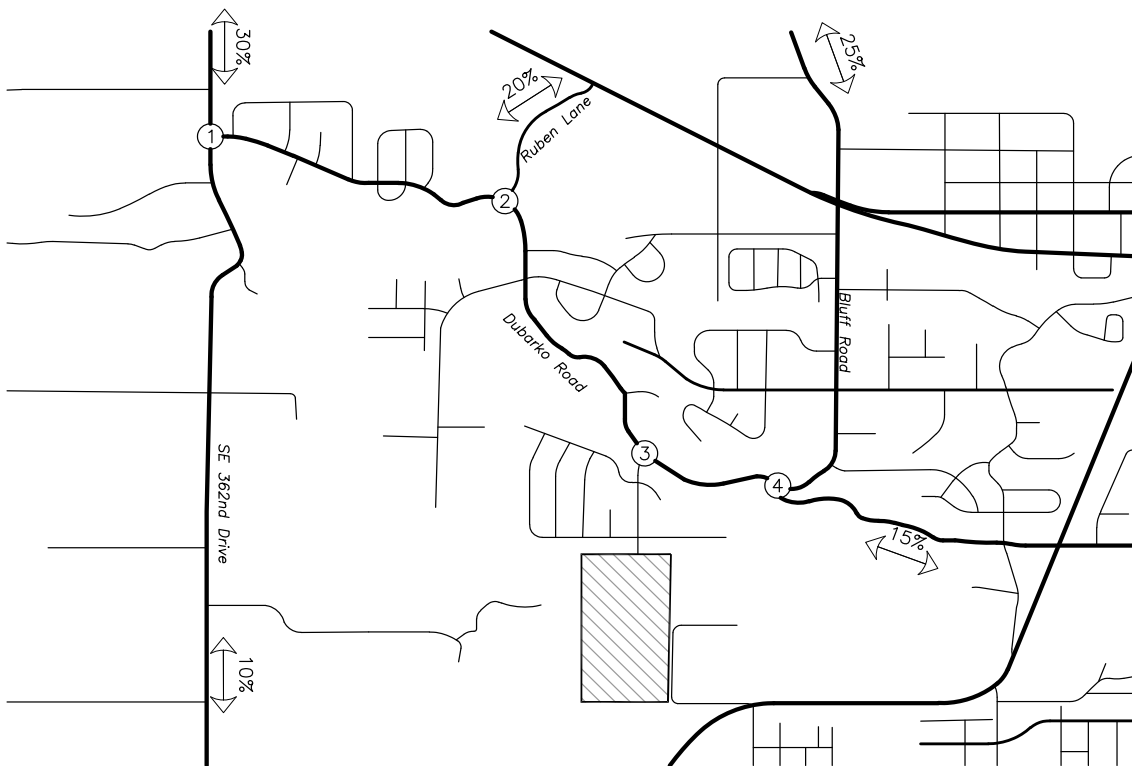
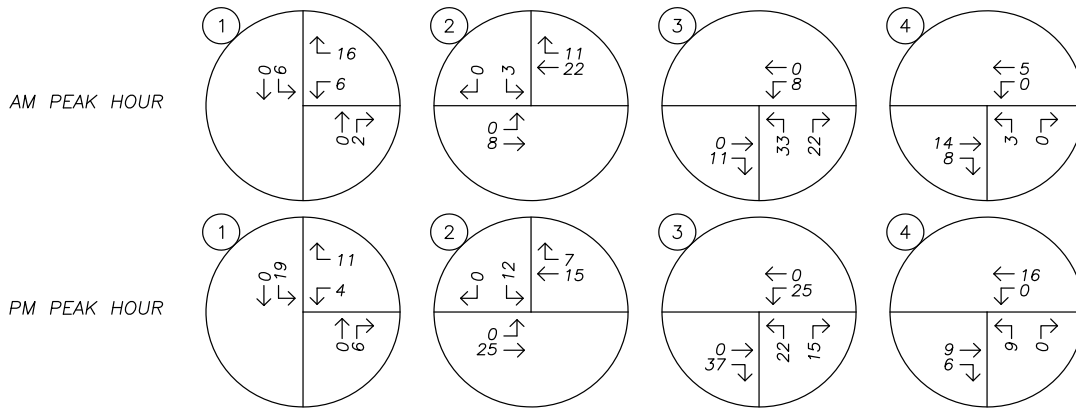
- Approximately 30 percent of site trips will travel to/from the north along SE 362nd Drive;
- Approximately 25 percent of site trips will travel to/from the north along Bluff Road;
- Approximately 20 percent of site trips will travel to/from the north on Ruben Lane;
- Approximately 15 percent of site trips will travel to/from the east along Dubarko Road; and
- Approximately 10 percent of site trips will travel to/from the south along SE 362nd Drive.

Figure 2 on page 7 shows the distribution and assignment of site trips for the proposed development.

LEGEND

XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |



SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours



FIGURE
2
PAGE
7



Traffic Volumes

Existing Conditions

Traffic counts were conducted at the intersection of Melissa Avenue at Dubarko Road on Thursday, April 25th, 2019 from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM. Traffic counts were conducted at all other study intersections on Wednesday, May 22nd, 2019 from 4:00 PM to 6:00 PM, and on Thursday, May 23rd, 2019 from 7:00 AM to 9:00 AM. Each intersection's respective morning and evening peak hours were used for analysis.

Background Conditions

In order to calculate the future traffic volumes on local streets, an exponential growth rate of two percent per year for an assumed period of three years was applied to the measured existing traffic volumes to approximate year 2022 background conditions.

In-Process Trips

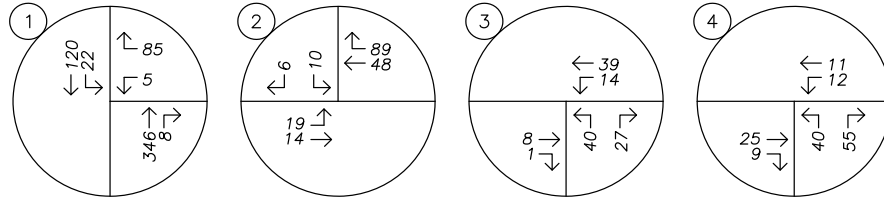
In-process trips associated with previously approved developments were added to the background volumes in order to represent future traffic volumes at the study intersections prior to the approval of the subject development. Trips associated with the approved 138-unit Sandy Heights Apartments were added to the study intersections.

Buildout Conditions

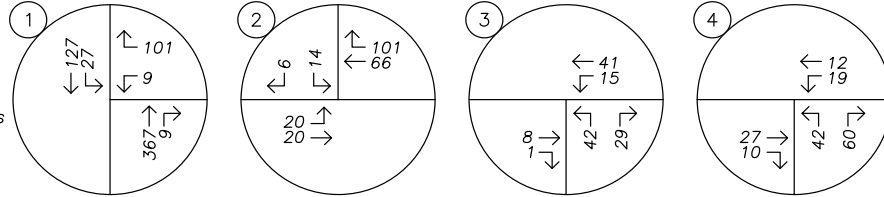
Trips to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2022 background traffic volumes to obtain the expected year 2022 buildout volumes.

Figure 3 on page 9 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the morning peak hour. Figure 4 on page 10 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the evening peak hour.

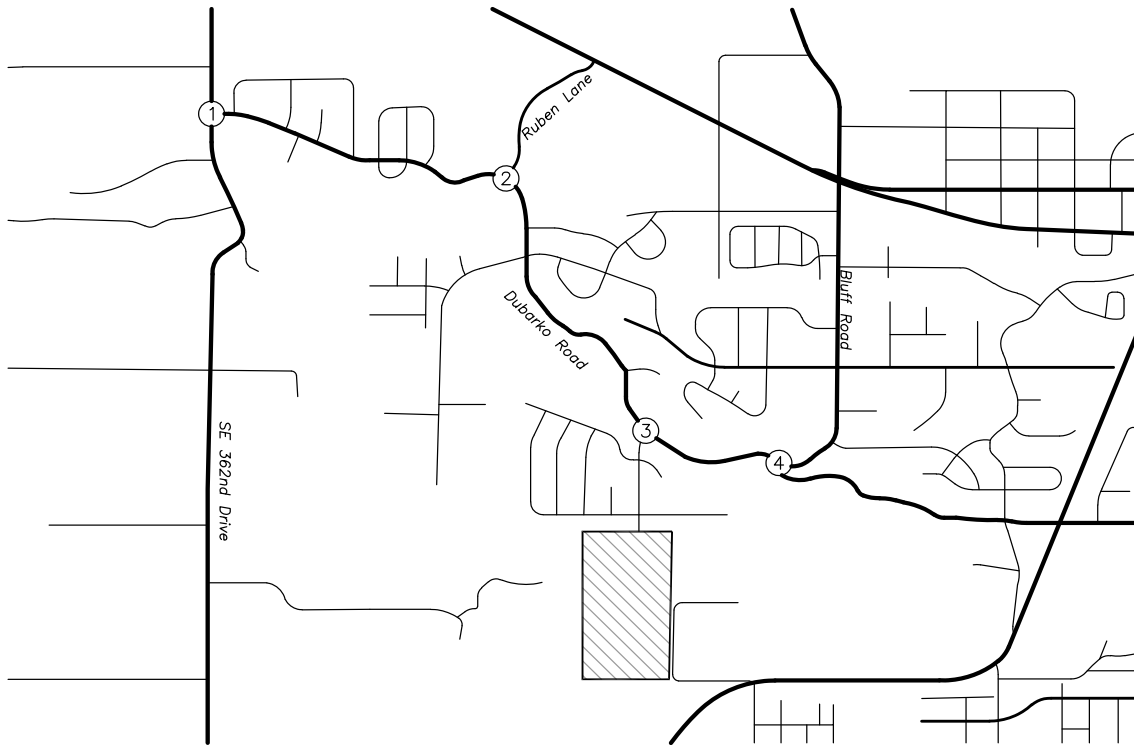
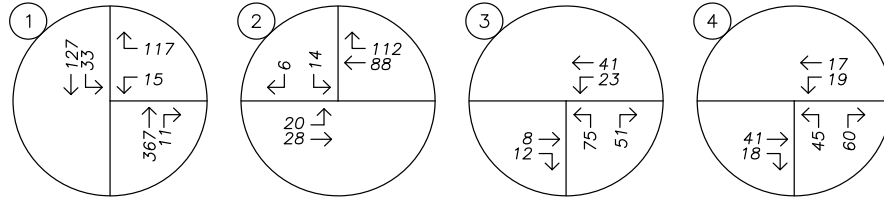
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



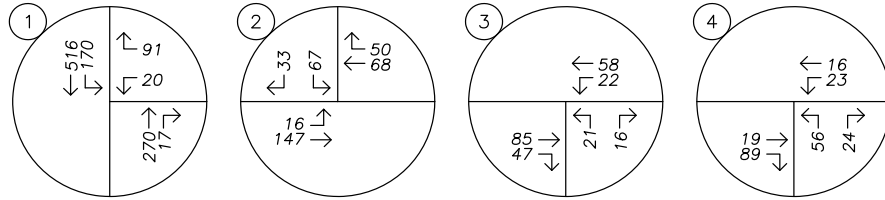
TRAFFIC VOLUMES
All Analysis Scenarios
AM Peak Hour



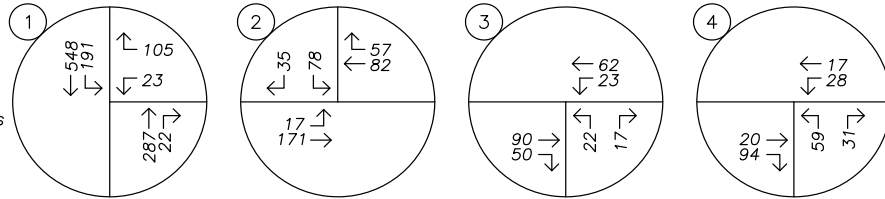
FIGURE 3

PAGE 9

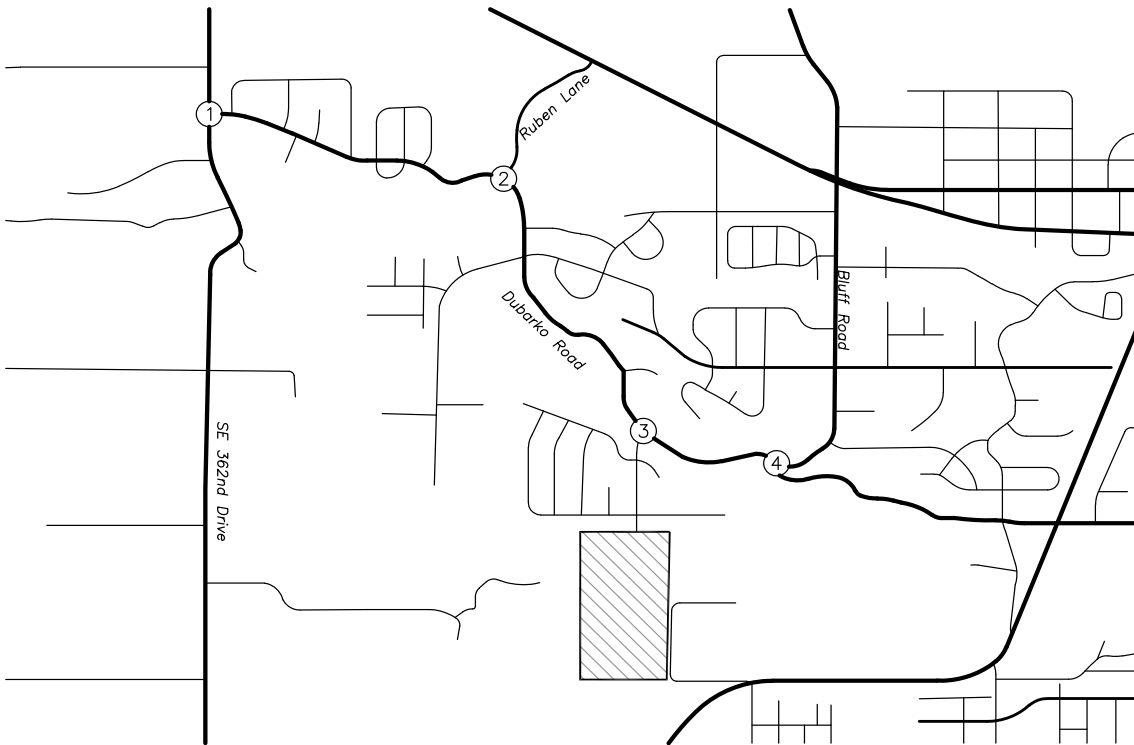
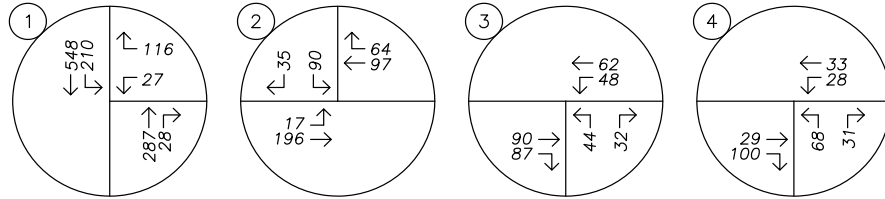
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



TRAFFIC VOLUMES
All Analysis Scenarios
PM Peak Hour



FIGURE
4

PAGE
10



Safety Analysis

Crash History Review

Using data obtained from the ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2012 to December 2016) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

Table 5: Crash Analysis Summary

| Intersection | Crash Type | | Crash Severity | Total | AADT | Crash Rate |
|--|------------|-----------|----------------|-------|--------|------------|
| | Turn | Sideswipe | PDO | | | |
| Dubarko Road at SE 362 nd Drive | 0 | 1 | 1 | 1 | 10,840 | 0.05 |
| Dubarko Road at Melissa Avenue | 2 | 0 | 2 | 2 | 2,490 | 0.44 |

The calculated crash rates at the intersections of Dubarko Road at SE 362nd Drive and at Melissa Avenue are not indicative of safety deficiencies or design flaws. No mitigation is recommended.

No reported crashes were found at the intersections of Dubarko Road at Ruben Lane and Dubarko Road at Bluff Road during the analysis period. Accordingly, no safety concerns were identified at these study intersections.

Warrant Analysis

Traffic Signal Warrants

Traffic signal warrants were examined for all study intersections based on the methodologies in the *Manual on Uniform Traffic Control Devices*² (MUTCD). Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT. Volumes were used for the year 2022 buildout conditions. Traffic signal warrants were not met at any of the study intersections due to low major and minor street

² Federal Highway Administration (FTA), America Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010.



traffic volumes. Detailed information on the traffic signal warrant analysis is included in the attached appendix.

Left-Turn Lane Warrants

Left-turn lane warrants were examined for the westbound left-turn lane at the intersection of Melissa Avenue at Dubarko Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream. Warrants were based on the methodology outlined in the National Cooperative Highway Research Program (NCHRP) Report Number 457³. These turn-lane warrants were evaluated based on the number of left-turning vehicles, the number of advancing and opposing vehicles, and the roadway travel speed.

Left-turn lanes were not warranted during any of the analysis scenarios. No new left-turn lanes are recommended.

³ Bonneson, James A. and Michael D. Fontaine, *NCHRP Report 457: An Engineering Study Guide for Evaluating Intersection Improvements*, Transportation Research Board, 2001.



Operational Analysis

Delay & Capacity Analysis

A capacity and delay analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*⁴ (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s Transportation System Plan states that both signalized and unsignalized intersections are required to operate at LOS D or better.

Based on the results of the operational analysis, shown in Table 6, the study intersections are currently operating acceptably and are projected to continue operating acceptably through the 2022 buildout year of the site. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 6: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Existing Conditions | 12 | B | 0.17 | 16 | C | 0.27 |
| Year 2022 Background Conditions | 13 | B | 0.22 | 18 | C | 0.34 |
| Year 2022 Buildout Conditions | 13 | B | 0.27 | 21 | C | 0.40 |
| Ruben Lane at Dubarko Road | | | | | | |
| Existing Conditions | 9 | A | 0.02 | 11 | B | 0.15 |
| Year 2022 Background Conditions | 10 | A | 0.03 | 11 | B | 0.18 |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Existing Conditions | 9 | A | 0.09 | 10 | A | 0.05 |
| Year 2022 Background Conditions | 9 | A | 0.09 | 10 | A | 0.06 |
| Year 2022 Buildout Conditions | 10 | A | 0.17 | 11 | B | 0.12 |
| Dubarko Road at Bluff Road | | | | | | |
| Existing Conditions | 8 | A | 0.15 | 8 | A | 0.13 |
| Year 2022 Background Conditions | 8 | A | 0.16 | 8 | A | 0.14 |
| Year 2022 Buildout Conditions | 8 | A | 0.17 | 8 | A | 0.16 |

⁴ Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Conclusions

Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.

Due to insufficient major and minor street volumes, traffic signal warrants were not met at the study intersections under all analysis scenarios.

Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not estimated to be met under any analysis scenario.

All study intersections, including the intersection of Melissa Avenue and Dubarko Road are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.

1e

Appendix



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location: General Urban/Suburban
Variable: Dwelling Units
Variable Value: 100

AM PEAK HOUR

Trip Rate: 0.74

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 25% | 75% | |
| Trip Ends | 19 | 55 | 74 |

PM PEAK HOUR

Trip Rate: 0.99

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 63% | 37% | |
| Trip Ends | 62 | 37 | 99 |

WEEKDAY

Trip Rate: 9.44

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 472 | 472 | 944 |

SATURDAY

Trip Rate: 9.54

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 477 | 477 | 954 |

Source: Trip Generation Manual, Tenth Edition

All Traffic Data Services, Inc.
alltrafficdata.net

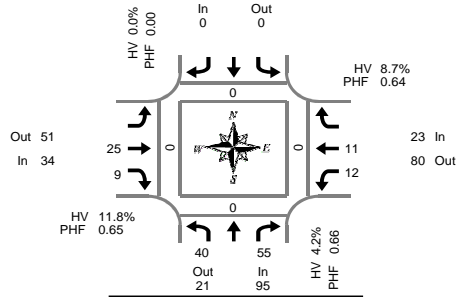
Melissa Ave S-O Dubarko Rd

| Start Time | 25-Apr-19 Thu | NB | SB | Total | | | | | |
|-------------|---------------|------------|-------------|------------|---|---|---|---|-------|
| 12:00 AM | | 2 | 5 | 7 | | | | | |
| 01:00 | | 1 | 1 | 2 | | | | | |
| 02:00 | | 1 | 0 | 1 | | | | | |
| 03:00 | | 7 | 2 | 9 | | | | | |
| 04:00 | | 20 | 1 | 21 | | | | | |
| 05:00 | | 30 | 5 | 35 | | | | | |
| 06:00 | | 57 | 11 | 68 | | | | | |
| 07:00 | | 67 | 15 | 82 | | | | | |
| 08:00 | | 37 | 17 | 54 | | | | | |
| 09:00 | | 30 | 17 | 47 | | | | | |
| 10:00 | | 25 | 18 | 43 | | | | | |
| 11:00 | | 23 | 22 | 45 | | | | | |
| 12:00 PM | | 35 | 25 | 60 | | | | | |
| 01:00 | | 16 | 24 | 40 | | | | | |
| 02:00 | | 29 | 46 | 75 | | | | | |
| 03:00 | | 35 | 58 | 93 | | | | | |
| 04:00 | | 44 | 64 | 108 | | | | | |
| 05:00 | | 30 | 54 | 84 | | | | | |
| 06:00 | | 32 | 74 | 106 | | | | | |
| 07:00 | | 28 | 40 | 68 | | | | | |
| 08:00 | | 16 | 36 | 52 | | | | | |
| 09:00 | | 9 | 30 | 39 | | | | | |
| 10:00 | | 5 | 12 | 17 | | | | | |
| 11:00 | | 0 | 4 | 4 | | | | | |
| Total | | 579 | 581 | 1160 | | | | | |
| Percent | | 49.9% | 50.1% | | | | | | |
| AM Peak | - | 07:00 | 11:00 | - | - | - | - | - | 07:00 |
| Vol. | - | 67 | 22 | - | - | - | - | - | 82 |
| PM Peak | - | 16:00 | 18:00 | - | - | - | - | - | 16:00 |
| Vol. | - | 44 | 74 | - | - | - | - | - | 108 |
| Grand Total | | 579 | 581 | | | | | | 1160 |
| Percent | | 49.9% | 50.1% | | | | | | |
| ADT | | ADT 11,874 | AADT 11,874 | | | | | | |

Total Vehicle Summary



Clay Carney
(603) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 3 | 4 | 0 | | | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:05 AM | 1 | 8 | 0 | | | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:10 AM | 3 | 7 | 0 | | | 0 | 5 | 1 | 0 | 2 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 6 | 0 | | | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:25 AM | 6 | 7 | 0 | | | 0 | 3 | 2 | 0 | 4 | 2 | 0 | 24 | 0 | 0 | 0 | 0 |
| 7:30 AM | 3 | 2 | 0 | | | 0 | 6 | 1 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:35 AM | 1 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:40 AM | 3 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 2 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| 7:50 AM | 5 | 6 | 0 | | | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 0 | 0 | 0 |
| 7:55 AM | 4 | 2 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:00 AM | 2 | 1 | 0 | | | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:05 AM | 2 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 5 | 0 | | | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:15 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:20 AM | 3 | 2 | 0 | | | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 5 | 0 | | | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 5 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:35 AM | 3 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 8:40 AM | 3 | 2 | 0 | | | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:45 AM | 1 | 1 | 0 | | | 0 | 1 | 1 | 0 | 3 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| 8:55 AM | 1 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 7 | 19 | 0 | | | 0 | 9 | 2 | 0 | 3 | 2 | 0 | 42 | 0 | 0 | 0 | 0 |
| 7:15 AM | 16 | 20 | 0 | | | 0 | 7 | 2 | 0 | 5 | 4 | 0 | 54 | 0 | 0 | 0 | 0 |
| 7:30 AM | 7 | 6 | 0 | | | 0 | 8 | 2 | 0 | 3 | 2 | 0 | 28 | 0 | 0 | 0 | 0 |
| 7:45 AM | 10 | 10 | 0 | | | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 28 | 0 | 0 | 0 | 0 |
| 8:00 AM | 5 | 7 | 0 | | | 0 | 3 | 3 | 0 | 3 | 2 | 0 | 23 | 0 | 0 | 0 | 0 |
| 8:15 AM | 8 | 14 | 0 | | | 0 | 4 | 3 | 0 | 4 | 1 | 0 | 34 | 0 | 0 | 0 | 0 |
| 8:30 AM | 6 | 7 | 0 | | | 0 | 0 | 6 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 2 | 0 | | | 0 | 1 | 4 | 0 | 4 | 1 | 0 | 14 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-------|-----------------------|-----|-------|-------|--------------------|-----|-------|-------|--------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 95 | 21 | 116 | 0 | 0 | 0 | 0 | 0 | 34 | 51 | 85 | 0 | 23 | 80 | 103 | 0 | 0 | 0 | 0 | 0 | |
| %HV | 4.2% | | | | 0.0% | | | | 11.8% | | | | 8.7% | | | | 6.6% | | | | |
| PHF | 0.66 | | | | 0.00 | | | | 0.65 | | | | 0.64 | | | | 0.70 | | | | |

| By Movement | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total |
|-------------|-----------------------|------|-------|-------|-----------------------|----|-------|-------|--------------------|-------|-------|-------|--------------------|------|-------|-------|-------|
| | L | R | Total | Bikes | | | Total | Bikes | T | R | Total | Bikes | L | T | Total | Bikes | |
| Volume | 40 | 55 | 95 | 0 | NA | NA | NA | 0.0% | NA | 25 | 9 | 34 | 12 | 11 | 23 | 152 | |
| %HV | 2.5% | NA | 5.5% | 4.2% | NA | NA | NA | 0.0% | NA | 12.0% | 11.1% | 11.8% | 8.3% | 9.1% | NA | 8.7% | 6.6% |
| PHF | 0.63 | 0.65 | 0.66 | 0.00 | | | 0.00 | | 0.57 | 0.75 | 0.65 | 0.50 | 0.69 | 0.64 | 0.70 | | |

Rolling Hour Summary

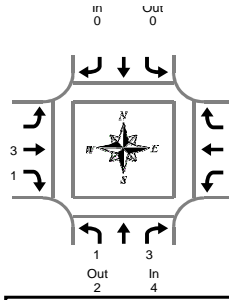
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 55 | 0 | | | 0 | 25 | 9 | 0 | 12 | 11 | 0 | 152 | 0 | 0 | 0 | 0 |
| 7:15 AM | 38 | 43 | 0 | | | 0 | 19 | 10 | 0 | 12 | 11 | 0 | 133 | 0 | 0 | 0 | 0 |
| 7:30 AM | 30 | 37 | 0 | | | 0 | 16 | 11 | 0 | 11 | 8 | 0 | 113 | 0 | 0 | 0 | 0 |
| 7:45 AM | 29 | 38 | 0 | | | 0 | 8 | 15 | 0 | 9 | 7 | 0 | 106 | 0 | 0 | 0 | 0 |
| 8:00 AM | 21 | 30 | 0 | | | 0 | 8 | 16 | 0 | 12 | 5 | 0 | 92 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:05 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:10 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| 7:20 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 7:35 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:40 AM | 0 | 0 | 0 | | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:20 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:25 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:35 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 1 | 1 | | | 0 | 1 | 0 | 1 | 1 | 1 | 2 | 4 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| 7:30 AM | 0 | 1 | 1 | | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 7:45 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 1 | 2 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 3 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 4 | 2 | 6 | 0 | 0 | 0 | 4 | 2 | 6 | 2 | 6 | 8 | 10 |
| PHF | 0.50 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|--|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| PHF | 0.25 | 0.75 | 0.50 | | | 0.00 | 0.38 | 0.25 | 0.50 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| 7:15 AM | 1 | 3 | 4 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 7 |
| 7:30 AM | 1 | 4 | 5 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 8 |
| 7:45 AM | 1 | 4 | 5 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| 8:00 AM | 1 | 3 | 4 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

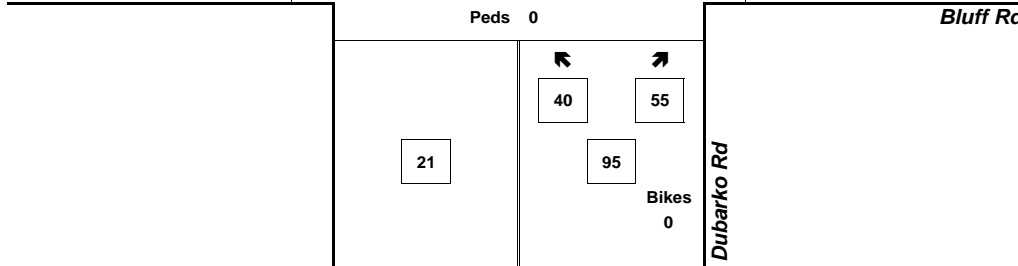
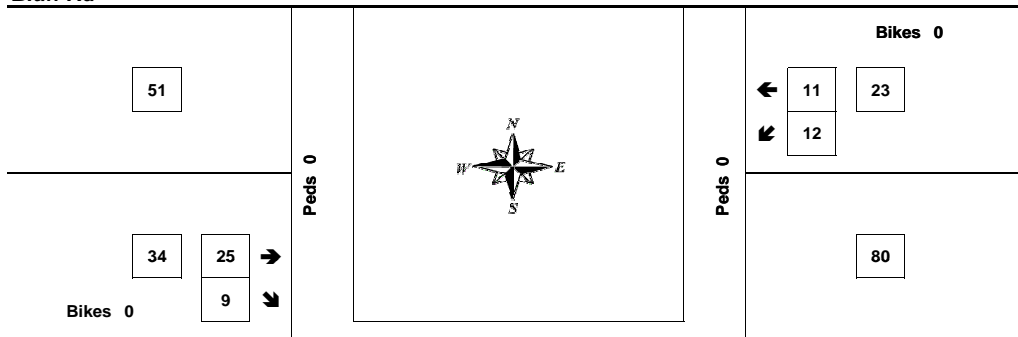
Dubarko Rd & Bluff Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019

Bikes
0

Bluff Rd

Peds 0



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.65 | 11.8% | 34 |
| WB | 0.64 | 8.7% | 23 |
| NB | 0.66 | 4.2% | 95 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.70 | 6.6% | 152 |

Count Period: 7:00 AM to 9:00 AM

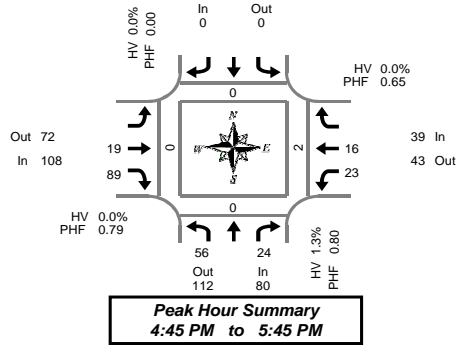
Total Vehicle Summary



Clay Carney
(603) 833-2740

Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM



**5-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 4 | 0 | 0 | | | 0 | | | 0 | 4 | 7 | 0 | 5 | 0 | 0 | 0 | 0 |
| 4:05 PM | 2 | 0 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 0 |
| 4:10 PM | 7 | 1 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 |
| 4:15 PM | 5 | 1 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 1 | 0 | 0 | 0 |
| 4:20 PM | 3 | 0 | 0 | | | 0 | | | 0 | 0 | 5 | 0 | 2 | 3 | 0 | 0 | 0 |
| 4:25 PM | 7 | 2 | 0 | | | 0 | | | 0 | 3 | 8 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:30 PM | 6 | 2 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:35 PM | 2 | 2 | 0 | | | 0 | | | 0 | 3 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:40 PM | 7 | 3 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:45 PM | 7 | 0 | 0 | | | 0 | | | 0 | 0 | 10 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:50 PM | 8 | 4 | 0 | | | 0 | | | 0 | 2 | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:55 PM | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:00 PM | 4 | 3 | 0 | | | 0 | | | 0 | 1 | 5 | 0 | 3 | 2 | 0 | 0 | 0 |
| 5:05 PM | 6 | 1 | 1 | | | 0 | | | 0 | 3 | 8 | 0 | 1 | 2 | 0 | 1 | 0 |
| 5:10 PM | 1 | 0 | 0 | | | 0 | | | 0 | 4 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:15 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 9 | 0 | 1 | 2 | 0 | 0 | 0 |
| 5:20 PM | 7 | 4 | 0 | | | 0 | | | 0 | 3 | 6 | 0 | 1 | 3 | 0 | 0 | 0 |
| 5:25 PM | 1 | 2 | 0 | | | 0 | | | 0 | 0 | 8 | 0 | 3 | 1 | 0 | 0 | 0 |
| 5:30 PM | 5 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 5 | 1 | 0 | 0 | 0 |
| 5:35 PM | 3 | 0 | 0 | | | 0 | | | 0 | 2 | 9 | 0 | 2 | 3 | 0 | 0 | 0 |
| 5:40 PM | 8 | 7 | 0 | | | 0 | | | 0 | 2 | 8 | 0 | 2 | 1 | 0 | 1 | 0 |
| 5:45 PM | 7 | 1 | 0 | | | 0 | | | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:50 PM | 6 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:55 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

**15-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 13 | 1 | 0 | | | 0 | | | 0 | 6 | 15 | 0 | 10 | 3 | 0 | 0 | 0 |
| 4:15 PM | 15 | 3 | 0 | | | 0 | | | 0 | 5 | 20 | 0 | 6 | 4 | 0 | 0 | 0 |
| 4:30 PM | 15 | 7 | 0 | | | 0 | | | 0 | 5 | 22 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:45 PM | 18 | 5 | 0 | | | 0 | | | 0 | 2 | 21 | 0 | 4 | 1 | 0 | 0 | 0 |
| 5:00 PM | 11 | 4 | 1 | | | 0 | | | 0 | 8 | 22 | 0 | 5 | 4 | 0 | 1 | 0 |
| 5:15 PM | 11 | 6 | 0 | | | 0 | | | 0 | 4 | 23 | 0 | 5 | 6 | 0 | 0 | 0 |
| 5:30 PM | 16 | 9 | 0 | | | 0 | | | 0 | 5 | 23 | 0 | 9 | 5 | 0 | 1 | 0 |
| 5:45 PM | 16 | 3 | 0 | | | 0 | | | 0 | 2 | 11 | 0 | 2 | 3 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

**Peak Hour Summary
4:45 PM to 5:45 PM**

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-----------------------|------|-----|--------------------|-------|------|--------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 80 | 112 | 192 | 1 | 0 | 0 | 0 | 0 | 108 | 72 | 180 | 0 | 39 | 43 | 82 | 0 | 227 |
| %HV | 1.3% | | | | 0.0% | | | | 0.0% | | | | 0.0% | | | 0.4% | |
| PHF | 0.80 | | | | 0.00 | | | | 0.79 | | | | 0.65 | | | 0.85 | |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|----|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 56 | 24 | 80 | | | 0 | 19 | 89 | 108 | 23 | 16 | 39 | 227 |
| %HV | 1.8% | NA | 0.0% | 1.3% | NA | NA | 0.0% | NA | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% |
| PHF | 0.78 | 0.67 | 0.80 | | | 0.00 | 0.59 | 0.86 | 0.79 | 0.58 | 0.67 | 0.65 | 0.85 |

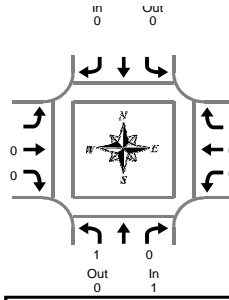
**Rolling Hour Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 61 | 16 | 0 | | | 0 | | | 0 | 18 | 78 | 0 | 23 | 8 | 0 | 0 | 0 |
| 4:15 PM | 59 | 19 | 1 | | | 0 | | | 0 | 20 | 85 | 0 | 18 | 9 | 0 | 1 | 0 |
| 4:30 PM | 55 | 22 | 1 | | | 0 | | | 0 | 19 | 88 | 0 | 17 | 11 | 0 | 1 | 0 |
| 4:45 PM | 56 | 24 | 1 | | | 0 | | | 0 | 19 | 89 | 0 | 23 | 16 | 0 | 2 | 0 |
| 5:00 PM | 54 | 22 | 1 | | | 0 | | | 0 | 19 | 79 | 0 | 21 | 18 | 0 | 2 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 0

Peak Hour Summary
4:45 PM to 5:45 PM

Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle Peak Hour Summary 4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | | 0.00 | | | 0.00 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|---|-------|-----------------------|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Peak Hour Summary



Clay Carney
(503) 833-2740

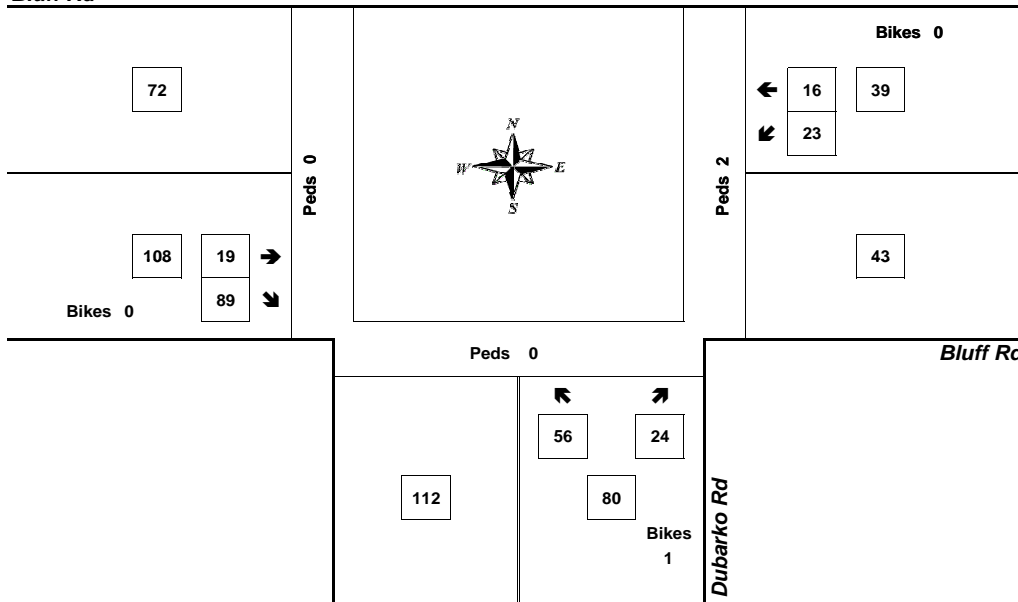
Dubarko Rd & Bluff Rd

4:45 PM to 5:45 PM
Wednesday, May 22, 2019

Bikes
0

Bluff Rd

Peds 0



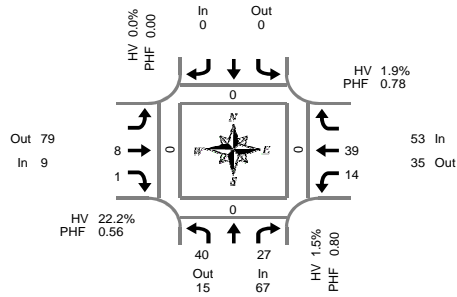
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.79 | 0.0% | 108 |
| WB | 0.65 | 0.0% | 39 |
| NB | 0.80 | 1.3% | 80 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 227 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|---|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 5 | 2 | 0 | | | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:05 AM | 4 | | 6 | | | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 16 | 0 | 0 | 0 | 0 |
| 7:10 AM | 2 | | 2 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:15 AM | 4 | | 1 | | | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | | 3 | | | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:25 AM | 2 | | 3 | | | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:30 AM | 6 | | 4 | | | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 17 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | | 0 | | | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 5 | 0 | 0 | 0 | 0 |
| 7:40 AM | 2 | | 1 | | | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 4 | | 1 | | | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:50 AM | 6 | | 1 | | | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:55 AM | 3 | | 3 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 10 | 0 | 0 | 0 | 0 |
| 8:00 AM | 3 | | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:05 AM | 4 | | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:10 AM | 3 | | 1 | | | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | | 0 | | | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:20 AM | 1 | | 3 | | | 0 | 3 | 1 | 0 | 1 | 4 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | | 2 | | | 0 | 2 | 0 | 0 | 1 | 4 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:30 AM | 3 | | 3 | | | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:35 AM | 2 | | 1 | | | 0 | 4 | 1 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | | 2 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | | 2 | | | 0 | 5 | 1 | 0 | 0 | 5 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | | 1 | | | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:55 AM | 2 | | 0 | | | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 8 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | | 42 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|---|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 11 | | 10 | | | 0 | 1 | 0 | 0 | 5 | 9 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | | 7 | | | 0 | 2 | 1 | 0 | 2 | 13 | 0 | 33 | 0 | 0 | 0 | 0 |
| 7:30 AM | 8 | | 5 | | | 0 | 3 | 0 | 0 | 4 | 10 | 0 | 30 | 0 | 0 | 0 | 0 |
| 7:45 AM | 13 | | 5 | | | 0 | 2 | 0 | 0 | 3 | 7 | 0 | 30 | 0 | 0 | 0 | 0 |
| 8:00 AM | 10 | | 1 | | | 0 | 1 | 1 | 0 | 1 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 8:15 AM | 5 | | 5 | | | 0 | 6 | 2 | 0 | 3 | 11 | 0 | 32 | 0 | 0 | 0 | 0 |
| 8:30 AM | 5 | | 6 | | | 0 | 13 | 2 | 0 | 1 | 6 | 0 | 33 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | | 3 | | | 0 | 7 | 3 | 0 | 4 | 10 | 0 | 29 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | | 42 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|------------------------|------|-----|----------------------|-------|-------|----------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 67 | 15 | 82 | 0 | 0 | 0 | 0 | 0 | 9 | 79 | 88 | 0 | 53 | 35 | 88 | 0 | 129 |
| %HV | 1.5% | | | | 0.0% | | | | 22.2% | | | | 1.9% | | | 3.1% | |
| PHF | 0.80 | | | | 0.00 | | | | 0.56 | | | | 0.78 | | | 0.79 | |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | | | | |
|-------------|------------------------|----|-------|------------------------|----|-------|----------------------|------|-------|----------------------|-------|-------|-------|------|----|------|------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | | | | | |
| Volume | 40 | | 27 | 67 | | | 0 | 8 | 1 | 9 | 14 | 39 | 53 | 129 | | | |
| %HV | 2.5% | NA | 0.0% | 1.5% | NA | NA | NA | 0.0% | NA | 12.5% | ##### | 22.2% | 7.1% | 0.0% | NA | 1.9% | 3.1% |
| PHF | 0.77 | | 0.68 | 0.80 | | | 0.00 | 0.67 | 0.25 | 0.56 | 0.70 | 0.75 | 0.78 | 0.79 | | | |

Rolling Hour Summary

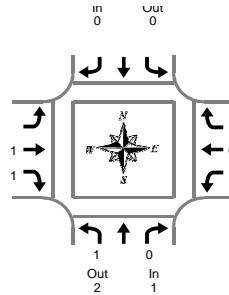
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|---|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | | 27 | | | 0 | 8 | 1 | 0 | 14 | 39 | 0 | 129 | 0 | 0 | 0 | 0 |
| 7:15 AM | 39 | | 18 | | | 0 | 8 | 2 | 0 | 10 | 35 | 0 | 112 | 0 | 0 | 0 | 0 |
| 7:30 AM | 36 | | 16 | | | 0 | 12 | 3 | 0 | 11 | 33 | 0 | 111 | 0 | 0 | 0 | 0 |
| 7:45 AM | 33 | | 17 | | | 0 | 22 | 5 | 0 | 8 | 29 | 0 | 114 | 0 | 0 | 0 | 0 |
| 8:00 AM | 22 | | 15 | | | 0 | 27 | 8 | 0 | 9 | 32 | 0 | 113 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 2

Peak Hour Summary
7:00 AM to 8:00 AM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:10 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 8:20 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:25 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 1 | 2 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 2 | 3 | 0 | 0 | 0 | 2 | 1 | 3 | 1 | 1 | 2 | 4 |
| PHF | 0.25 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|---|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.25 | 0.25 | 0.50 | 0.25 | 0.00 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| 7:15 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 7:30 AM | 2 | 1 | 3 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 5 |
| 7:45 AM | 2 | 2 | 4 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 6 |
| 8:00 AM | 2 | 2 | 4 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

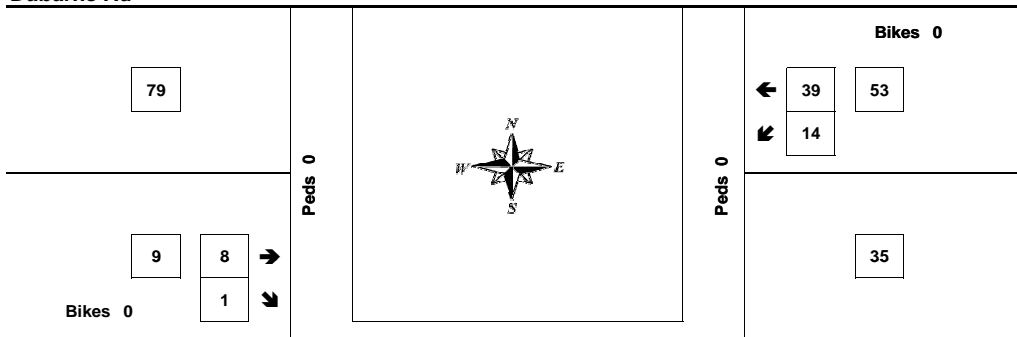
Melissa Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

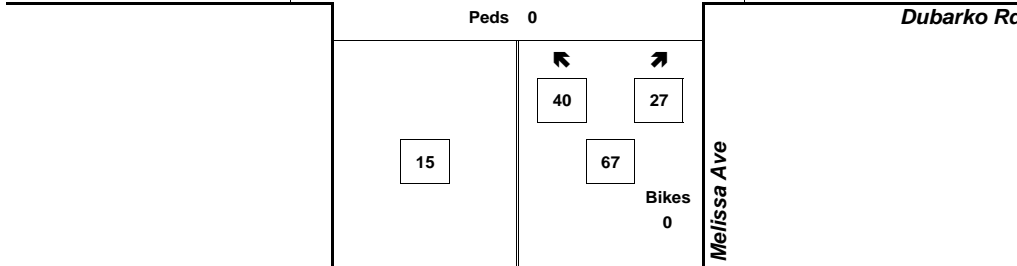
Peds 0



Bikes 0

Bikes 0

Peds 0



Dubarko Rd

Bikes
0

Melissa Ave

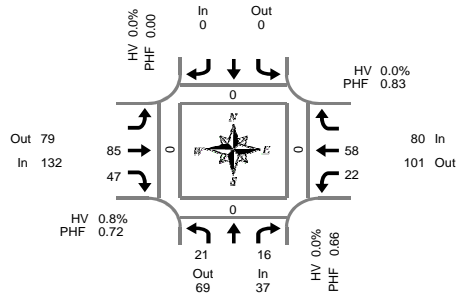
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.56 | 22.2% | 9 |
| WB | 0.78 | 1.9% | 53 |
| NB | 0.80 | 1.5% | 67 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.79 | 3.1% | 129 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 1 | 3 | 0 | | | 0 | 12 | 4 | 0 | 3 | 6 | 0 | 29 | 0 | 0 | 0 | 0 |
| 4:05 PM | 0 | 2 | 0 | | | 0 | 4 | 2 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 4:10 PM | 4 | 2 | 0 | | | 0 | 3 | 2 | 0 | 0 | 7 | 0 | 18 | 0 | 0 | 0 | 1 |
| 4:15 PM | 2 | 2 | 0 | | | 0 | 5 | 4 | 0 | 2 | 2 | 0 | 17 | 0 | 1 | 0 | 0 |
| 4:20 PM | 2 | 2 | 0 | | | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 4:25 PM | 3 | 2 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 17 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 1 | 0 | | | 0 | 7 | 4 | 0 | 2 | 4 | 0 | 18 | 0 | 0 | 0 | 0 |
| 4:35 PM | 1 | 0 | 0 | | | 0 | 8 | 2 | 0 | 3 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 4:40 PM | 1 | 2 | 0 | | | 0 | 5 | 7 | 0 | 5 | 6 | 0 | 26 | 0 | 0 | 0 | 0 |
| 4:45 PM | 5 | 2 | 0 | | | 0 | 4 | 5 | 0 | 0 | 4 | 0 | 20 | 0 | 0 | 0 | 0 |
| 4:50 PM | 2 | 1 | 0 | | | 0 | 7 | 8 | 0 | 3 | 6 | 0 | 27 | 0 | 0 | 0 | 0 |
| 4:55 PM | 2 | 2 | 0 | | | 0 | 7 | 5 | 0 | 0 | 5 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | | 0 | 14 | 5 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | | 0 | 9 | 1 | 0 | 0 | 5 | 0 | 16 | 0 | 0 | 0 | 0 |
| 5:10 PM | 2 | 1 | 0 | | | 0 | 5 | 3 | 0 | 3 | 7 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 1 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 10 | 0 | 0 | 0 | 0 |
| 5:20 PM | 3 | 3 | 0 | | | 0 | 10 | 4 | 0 | 3 | 4 | 0 | 27 | 0 | 0 | 0 | 0 |
| 5:25 PM | 1 | 1 | 0 | | | 0 | 4 | 2 | 0 | 1 | 5 | 0 | 14 | 0 | 0 | 0 | 0 |
| 5:30 PM | 2 | 1 | 0 | | | 0 | 7 | 3 | 0 | 3 | 7 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:35 PM | 2 | 2 | 0 | | | 0 | 9 | 3 | 0 | 2 | 5 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:40 PM | 3 | 0 | 0 | | | 0 | 3 | 6 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 5:45 PM | 1 | 1 | 0 | | | 0 | 8 | 2 | 0 | 4 | 5 | 0 | 21 | 0 | 0 | 0 | 1 |
| 5:50 PM | 3 | 0 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 15 | 0 | 0 | 0 | 0 |
| 5:55 PM | 2 | 0 | 0 | | | 0 | 9 | 4 | 0 | 0 | 2 | 0 | 17 | 0 | 0 | 0 | 1 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 5 | 7 | 0 | | | 0 | 19 | 8 | 0 | 3 | 16 | 0 | 58 | 0 | 0 | 0 | 1 |
| 4:15 PM | 7 | 6 | 0 | | | 0 | 17 | 7 | 0 | 2 | 8 | 0 | 47 | 0 | 1 | 0 | 0 |
| 4:30 PM | 2 | 3 | 0 | | | 0 | 20 | 13 | 0 | 10 | 15 | 0 | 63 | 0 | 0 | 0 | 0 |
| 4:45 PM | 9 | 5 | 0 | | | 0 | 18 | 18 | 0 | 3 | 15 | 0 | 68 | 0 | 0 | 0 | 0 |
| 5:00 PM | 3 | 1 | 0 | | | 0 | 28 | 9 | 0 | 4 | 13 | 0 | 58 | 0 | 0 | 0 | 0 |
| 5:15 PM | 4 | 5 | 0 | | | 0 | 18 | 7 | 0 | 5 | 12 | 0 | 51 | 0 | 0 | 0 | 0 |
| 5:30 PM | 7 | 3 | 0 | | | 0 | 19 | 12 | 0 | 5 | 13 | 0 | 59 | 0 | 0 | 0 | 0 |
| 5:45 PM | 6 | 1 | 0 | | | 0 | 22 | 8 | 0 | 4 | 12 | 0 | 53 | 0 | 0 | 0 | 2 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

Peak Hour Summary

4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | | Southbound Melissa Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|-------|------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 37 | 69 | 106 | 0 | 0 | 0 | 0 | 132 | 79 | 211 | 0 | 80 | 101 | 181 | 0 | 249 | 0 | 0 | 0 | 0 | |
| %HV | 0.0% | | | | 0.0% | | | | 0.8% | | | | 0.0% | | | | 0.4% | | | | |
| PHF | 0.66 | | | | 0.00 | | | | 0.72 | | | | 0.83 | | | | 0.85 | | | | |

| By Movement | Northbound Melissa Ave | | | | Southbound Melissa Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|------------------------|------|-------|-------|------------------------|----|-------|-------|----------------------|------|-------|-------|----------------------|------|-------|-------|-------|
| | L | R | Total | Bikes | | | Total | Bikes | T | R | Total | Bikes | L | T | Total | Bikes | |
| Volume | 21 | 16 | 37 | 0 | NA | NA | NA | 0.0% | NA | 85 | 47 | 132 | 22 | 58 | 80 | 249 | |
| %HV | 0.0% | NA | 0.0% | 0.0% | NA | NA | NA | 0.0% | NA | 1.2% | 0.0% | 0.8% | 0.0% | 0.0% | NA | 0.4% | |
| PHF | 0.58 | 0.80 | 0.66 | 0.00 | | | 0.00 | | 0.71 | 0.59 | 0.72 | 0.69 | 0.85 | 0.83 | 0.85 | | |

Rolling Hour Summary

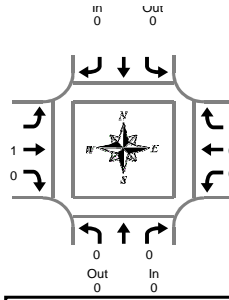
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 23 | 21 | 0 | | | 0 | 74 | 46 | 0 | 18 | 54 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:15 PM | 21 | 15 | 0 | | | 0 | 83 | 47 | 0 | 19 | 51 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:30 PM | 18 | 14 | 0 | | | 0 | 84 | 47 | 0 | 22 | 55 | 0 | 240 | 0 | 0 | 0 | 0 |
| 4:45 PM | 23 | 14 | 0 | | | 0 | 83 | 46 | 0 | 17 | 53 | 0 | 236 | 0 | 0 | 0 | 0 |
| 5:00 PM | 20 | 10 | 0 | | | 0 | 87 | 36 | 0 | 18 | 50 | 0 | 221 | 0 | 0 | 0 | 2 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 1

Peak Hour Summary
4:40 PM to 5:40 PM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 4:10 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle Peak Hour Summary 4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| PHF | 0.00 | | | 0.00 | | | 0.25 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|------|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.00 | 0.00 | 0.00 | | 0.00 | 0.25 | 0.00 | 0.25 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |

Peak Hour Summary



Clay Carney
(503) 833-2740

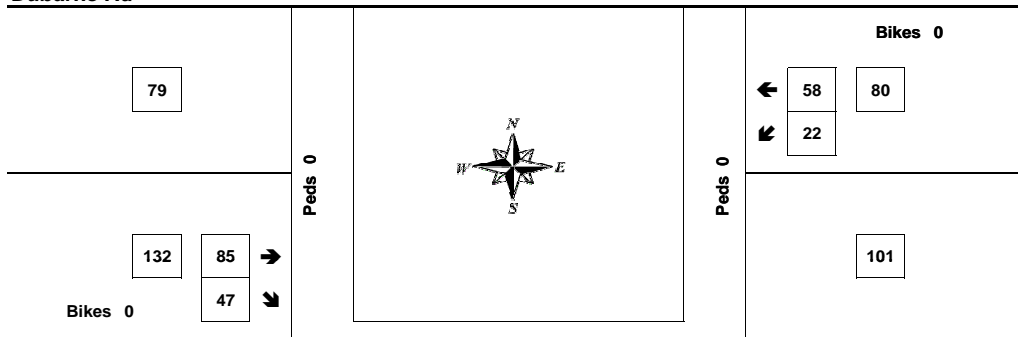
Melissa Ave & Dubarko Rd

4:40 PM to 5:40 PM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

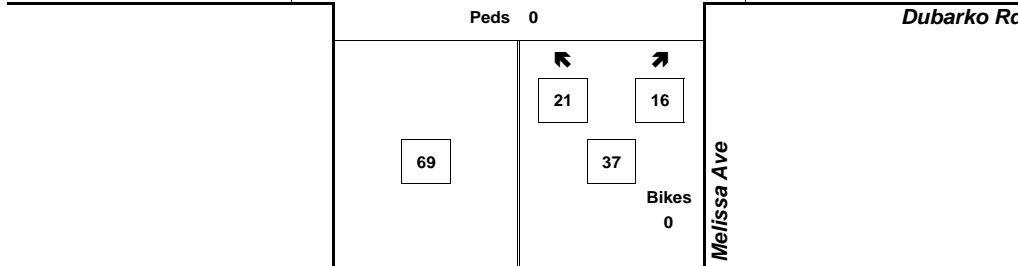
Peds 0



Bikes 0

Bikes 0

Peds 0



Dubarko Rd

Bikes
0

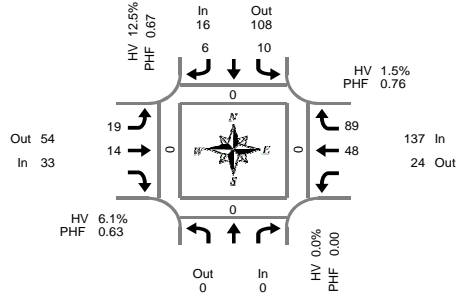
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.72 | 0.8% | 132 |
| WB | 0.83 | 0.0% | 80 |
| NB | 0.66 | 0.0% | 37 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 249 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:55 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:55 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

15-Minute Interval Summary
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

Peak Hour Summary
7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 16 | 108 | 124 | 0 | 33 | 54 | 87 | 0 | 137 | 24 | 161 | 0 | 186 | 0 | 0 | 0 | 0 |
| %HV | 0.0% | | | | 12.5% | | | | 6.1% | | | | 1.5% | | | | 3.2% | | | | |
| PHF | 0.00 | | | | 0.67 | | | | 0.63 | | | | 0.76 | | | | 0.89 | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|---------------------|------|------|------|---------------------|------|------|-------|----------------------|-------|------|------|----------------------|------|------|------|-------|
| | | | | | | | | | | | | | | | | | |
| Volume | 0 | 10 | 6 | 16 | 19 | 14 | 33 | | 48 | 89 | 137 | | 33 | | | | 186 |
| %HV | NA | NA | NA | 0.0% | 20.0% | NA | 0.0% | 12.5% | 0.0% | 14.3% | NA | 6.1% | NA | 2.1% | 1.1% | 1.5% | 3.2% |
| PHF | | 0.00 | 0.50 | 0.30 | 0.67 | 0.59 | 0.70 | | 0.63 | 0.75 | 0.77 | 0.76 | | | | | 0.89 |

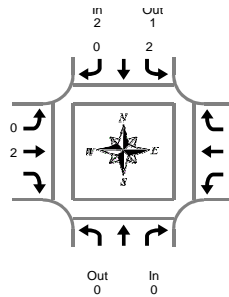
Rolling Hour Summary
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:10 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 7:20 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 8:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Total Survey | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 3 |
| 7:15 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Total Survey | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 4 | 6 | 6 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | 6 |
| PHF | 0.00 | 0.25 | | 0.00 | 0.25 | | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 2 | 3 | 7 |
| 7:15 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 0 | 1 | 4 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 |

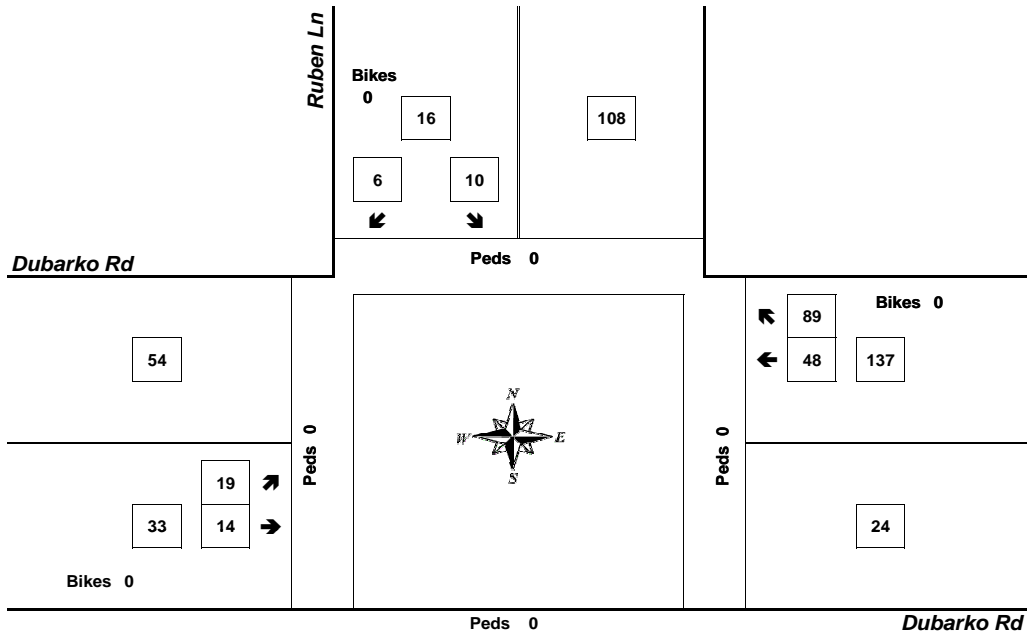
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

7:05 AM to 8:05 AM
Thursday, May 23, 2019



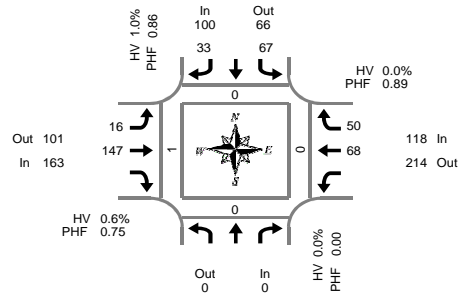
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.63 | 6.1% | 33 |
| WB | 0.76 | 1.5% | 137 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.67 | 12.5% | 16 |
| Intersection | 0.89 | 3.2% | 186 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|---|-------|-------|-------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | T | R | Total | North | South |
| 4:00 PM | 0 | 3 | 3 | 0 | 1 | 0 | 1 | 6 | 0 | 6 | 2 | 0 | 0 | 6 | 2 | 0 | 0 | 19 | 0 | 0 | 0 | 0 |
| 4:05 PM | 0 | 5 | 5 | 0 | 0 | 0 | 1 | 7 | 0 | 3 | 4 | 0 | 0 | 3 | 4 | 0 | 0 | 20 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 8 | 8 | 0 | 2 | 0 | 1 | 11 | 0 | 5 | 4 | 0 | 0 | 5 | 4 | 0 | 0 | 31 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 10 | 10 | 0 | 2 | 0 | 1 | 4 | 0 | 4 | 4 | 0 | 0 | 4 | 4 | 0 | 0 | 25 | 0 | 0 | 0 | 0 |
| 4:20 PM | 0 | 9 | 9 | 0 | 0 | 0 | 0 | 13 | 0 | 4 | 2 | 0 | 0 | 4 | 2 | 0 | 0 | 28 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 5 | 5 | 0 | 3 | 0 | 1 | 16 | 0 | 5 | 5 | 0 | 0 | 5 | 5 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 6 | 6 | 0 | 2 | 0 | 0 | 15 | 0 | 7 | 6 | 0 | 0 | 7 | 6 | 0 | 0 | 36 | 0 | 0 | 0 | 1 |
| 4:35 PM | 0 | 3 | 3 | 0 | 2 | 0 | 0 | 5 | 0 | 4 | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 17 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 5 | 5 | 0 | 5 | 0 | 2 | 13 | 0 | 7 | 6 | 0 | 0 | 7 | 6 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 6 | 6 | 0 | 4 | 0 | 3 | 6 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 22 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 5 | 5 | 0 | 1 | 0 | 1 | 7 | 0 | 7 | 5 | 0 | 0 | 7 | 5 | 0 | 0 | 26 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 5 | 5 | 0 | 4 | 0 | 0 | 9 | 0 | 9 | 3 | 0 | 0 | 9 | 3 | 0 | 0 | 30 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 8 | 8 | 0 | 2 | 0 | 0 | 16 | 0 | 3 | 5 | 0 | 0 | 3 | 5 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 7 | 7 | 0 | 3 | 0 | 2 | 17 | 0 | 7 | 4 | 0 | 0 | 7 | 4 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 6 | 6 | 0 | 1 | 0 | 3 | 16 | 0 | 2 | 3 | 0 | 0 | 2 | 3 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 6 | 6 | 0 | 3 | 0 | 1 | 13 | 0 | 8 | 5 | 0 | 0 | 8 | 5 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 5 | 5 | 0 | 3 | 0 | 3 | 14 | 0 | 7 | 4 | 0 | 0 | 7 | 4 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 4 | 4 | 0 | 5 | 0 | 1 | 10 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 23 | 1 | 0 | 0 | 0 |
| 5:30 PM | 0 | 2 | 2 | 0 | 2 | 0 | 1 | 14 | 0 | 7 | 4 | 0 | 0 | 7 | 4 | 0 | 0 | 30 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 6 | 6 | 0 | 1 | 0 | 0 | 6 | 0 | 4 | 3 | 0 | 0 | 4 | 3 | 0 | 0 | 20 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 3 | 3 | 0 | 2 | 0 | 0 | 7 | 0 | 6 | 11 | 0 | 0 | 6 | 11 | 0 | 0 | 29 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 8 | 8 | 0 | 1 | 0 | 0 | 13 | 0 | 7 | 2 | 0 | 0 | 7 | 2 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 6 | 6 | 0 | 3 | 0 | 2 | 12 | 0 | 5 | 3 | 0 | 0 | 5 | 3 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 5 | 5 | 0 | 0 | 0 | 2 | 19 | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 0 | 31 | 1 | 0 | 0 | 0 |
| Total Survey | | | | 0 | 136 | | 52 | 0 | 26 | 269 | | 0 | | 124 | 92 | 0 | 0 | 699 | 2 | 0 | 0 | 2 |

15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------|-----------------------|---|-------|-------|-------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | T | R | Total | North | South |
| 4:00 PM | 0 | 16 | 16 | 0 | 3 | 0 | 3 | 24 | 0 | 14 | 10 | 0 | 0 | 14 | 10 | 0 | 0 | 70 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 24 | 24 | 0 | 5 | 0 | 2 | 33 | 0 | 13 | 11 | 0 | 0 | 13 | 11 | 0 | 0 | 88 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 14 | 14 | 0 | 9 | 0 | 2 | 33 | 0 | 18 | 15 | 0 | 0 | 18 | 15 | 0 | 0 | 91 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 16 | 16 | 0 | 9 | 0 | 4 | 22 | 0 | 18 | 9 | 0 | 0 | 18 | 9 | 0 | 0 | 78 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 21 | 21 | 0 | 6 | 0 | 5 | 49 | 0 | 12 | 12 | 0 | 0 | 12 | 12 | 0 | 0 | 105 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 15 | 15 | 0 | 11 | 0 | 5 | 37 | 0 | 17 | 10 | 0 | 0 | 17 | 10 | 0 | 0 | 95 | 1 | 0 | 0 | 0 |
| 5:30 PM | 0 | 11 | 11 | 0 | 5 | 0 | 1 | 27 | 0 | 17 | 18 | 0 | 0 | 17 | 18 | 0 | 0 | 79 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 19 | 19 | 0 | 4 | 0 | 4 | 44 | 0 | 15 | 7 | 0 | 0 | 15 | 7 | 0 | 0 | 93 | 1 | 0 | 0 | 0 |
| Total Survey | | | | 0 | 136 | | 52 | 0 | 26 | 269 | | 0 | | 124 | 92 | 0 | 0 | 699 | 2 | 0 | 0 | 2 |

Peak Hour Summary

4:25 PM to 5:25 PM

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 100 | 66 | 166 | 0 | 163 | 101 | 264 | 0 | 118 | 214 | 332 | 0 | 381 | 0 | 0 | 0 | 1 |
| %HV | 0.0% | | | | 1.0% | | | | 0.6% | | | | 0.0% | | | | 0.5% | | | | |
| PHF | 0.00 | | | | 0.86 | | | | 0.75 | | | | 0.89 | | | | 0.89 | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|---------------------|-----|-------|-------|---------------------|------|-------|-------|----------------------|------|-------|-------|----------------------|------|-------|------|-------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | | |
| Volume | 0 | 67 | 67 | 0 | 33 | 100 | 16 | 147 | 163 | 101 | 264 | 0 | 118 | 68 | 50 | 118 | 381 |
| %HV | NA | NA | NA | 0.0% | 0.0% | NA | 3.0% | 1.0% | 6.3% | 0.0% | NA | 0.6% | NA | 0.0% | 0.0% | 0.0% | 0.5% |
| PHF | | | | 0.00 | 0.80 | 0.75 | 0.86 | 0.57 | 0.75 | 0.75 | 0.75 | 0.75 | | 0.89 | 0.83 | 0.89 | 0.89 |

Rolling Hour Summary

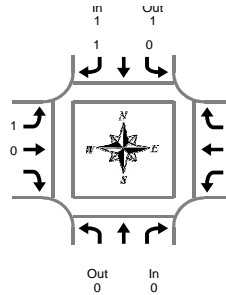
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|----|-------|-------|----------------------|----|-------|-------|----------------|-----------------------|---|-------|-------|-------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | T | R | Total | North | South |
| 4:00 PM | 0 | 70 | 70 | 0 | 26 | 0 | 11 | 112 | 0 | 63 | 45 | 0 | 0 | 63 | 45 | 0 | 0 | 327 | 0 | 0 | 0 | 2 |
| 4:15 PM | 0 | 75 | 75 | 0 | 29 | 0 | 13 | 137 | 0 | 61 | 47 | 0 | 0 | 61 | 47 | 0 | 0 | 362 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 66 | 66 | 0 | 35 | 0 | 16 | 141 | 0 | 65 | 46 | 0 | 0 | 65 | 46 | 0 | 0 | 369 | 1 | 0 | 0 | 1 |
| 4:45 PM | 0 | 63 | 63 | 0 | 31 | 0 | 15 | 135 | 0 | 64 | 49 | 0 | 0 | 64 | 49 | 0 | 0 | 357 | 1 | 0 | 0 | 0 |
| 5:00 PM | 0 | 66 | 66 | 0 | 26 | 0 | 15 | 157 | 0 | 61 | 47 | 0 | 0 | 61 | 47 | 0 | 0 | 372 | 2 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:25 PM to 5:25 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 4:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| 5:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle Peak Hour Summary 4:25 PM to 5:25 PM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.00 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|---|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | 0.00 | | 0.25 | 0.25 | 0.25 | 0.00 | | 0.25 | 0.00 | 0.00 | 0.00 | 0.50 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 2 | 3 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| 4:15 PM | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 3 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 0 | 1 | 1 | 4 |

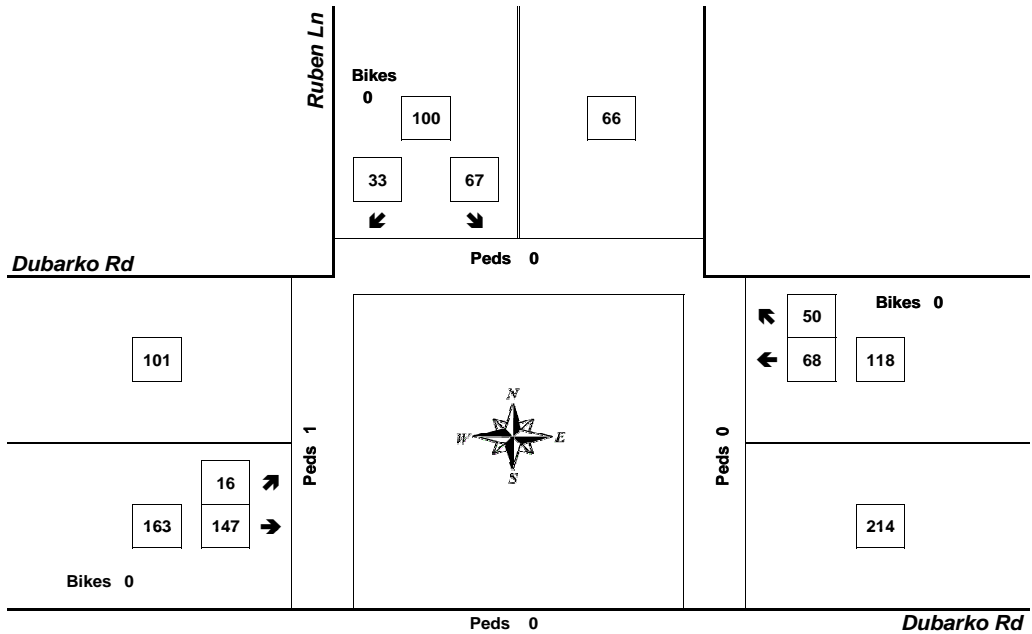
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

4:25 PM to 5:25 PM
Wednesday, May 22, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.75 | 0.6% | 163 |
| WB | 0.89 | 0.0% | 118 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.86 | 1.0% | 100 |
| Intersection | 0.89 | 0.5% | 381 |

Count Period: 4:00 PM to 6:00 PM

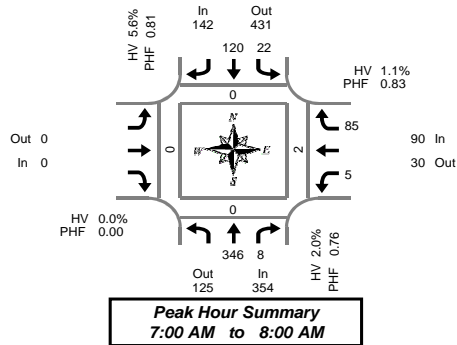
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM



5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 33 | 0 | 0 | 0 | 10 | 0 | | 0 | 1 | 11 | 0 | 55 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 50 | 1 | 0 | 1 | 7 | 0 | | 0 | 0 | 8 | 0 | 67 | 0 | 0 | 0 | 0 | |
| 7:10 AM | 32 | 0 | 0 | 3 | 9 | 0 | | 0 | 1 | 6 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 34 | 0 | 0 | 3 | 6 | 0 | | 0 | 0 | 9 | 0 | 52 | 0 | 0 | 1 | 0 | |
| 7:20 AM | 32 | 1 | 0 | 4 | 13 | 0 | | 0 | 0 | 6 | 0 | 56 | 0 | 0 | 0 | 0 | |
| 7:25 AM | 25 | 1 | 0 | 1 | 12 | 0 | | 0 | 0 | 9 | 0 | 48 | 0 | 0 | 1 | 0 | |
| 7:30 AM | 21 | 0 | 0 | 2 | 12 | 0 | | 0 | 1 | 7 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 7:35 AM | 24 | 1 | 0 | 4 | 8 | 0 | | 0 | 0 | 7 | 0 | 44 | 0 | 0 | 0 | 0 | |
| 7:40 AM | 34 | 0 | 0 | 1 | 8 | 0 | | 0 | 2 | 4 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 26 | 2 | 0 | 1 | 17 | 0 | | 0 | 0 | 5 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:50 AM | 17 | 2 | 0 | 2 | 11 | 0 | | 0 | 0 | 10 | 0 | 42 | 0 | 0 | 0 | 0 | |
| 7:55 AM | 18 | 0 | 0 | 0 | 7 | 0 | | 0 | 0 | 3 | 0 | 28 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 26 | 0 | 0 | 4 | 7 | 0 | | 0 | 1 | 8 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:05 AM | 27 | 2 | 0 | 2 | 15 | 0 | | 0 | 1 | 4 | 0 | 51 | 0 | 0 | 1 | 0 | |
| 8:10 AM | 33 | 0 | 0 | 1 | 6 | 0 | | 0 | 1 | 0 | 0 | 41 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 24 | 2 | 0 | 4 | 16 | 0 | | 0 | 0 | 3 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:20 AM | 29 | 0 | 0 | 4 | 6 | 0 | | 0 | 1 | 6 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 33 | 1 | 0 | 3 | 7 | 0 | | 0 | 0 | 4 | 0 | 48 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 21 | 2 | 0 | 3 | 11 | 0 | | 0 | 0 | 6 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 24 | 2 | 0 | 2 | 15 | 0 | | 0 | 0 | 6 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:40 AM | 21 | 2 | 0 | 1 | 12 | 0 | | 0 | 1 | 2 | 0 | 39 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 21 | 2 | 0 | 5 | 16 | 0 | | 0 | 1 | 7 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:50 AM | 26 | 2 | 0 | 5 | 16 | 0 | | 0 | 0 | 3 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:55 AM | 16 | 1 | 0 | 1 | 18 | 0 | | 0 | 1 | 5 | 0 | 42 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 115 | 1 | 0 | 4 | 26 | 0 | | 0 | 2 | 25 | 0 | 173 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 91 | 2 | 0 | 8 | 31 | 0 | | 0 | 0 | 24 | 0 | 156 | 0 | 0 | 2 | 0 | |
| 7:30 AM | 79 | 1 | 0 | 7 | 28 | 0 | | 0 | 3 | 18 | 0 | 136 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 61 | 4 | 0 | 3 | 35 | 0 | | 0 | 0 | 18 | 0 | 121 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 86 | 2 | 0 | 7 | 28 | 0 | | 0 | 3 | 12 | 0 | 138 | 0 | 0 | 1 | 0 | |
| 8:15 AM | 86 | 3 | 0 | 11 | 29 | 0 | | 0 | 1 | 13 | 0 | 143 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 66 | 6 | 0 | 6 | 38 | 0 | | 0 | 1 | 14 | 0 | 131 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 63 | 5 | 0 | 11 | 50 | 0 | | 0 | 2 | 15 | 0 | 146 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | | Southbound SE 362nd Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------|-------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 354 | 125 | 479 | 0 | 142 | 431 | 573 | 0 | 0 | 0 | 0 | 0 | 90 | 30 | 120 | 0 | 586 | 0 | 0 | 2 | 0 |
| %HV | 2.0% | | | | 5.6% | | | | 0.0% | | | | 1.1% | | | | 2.7% | | | | |
| PHF | 0.76 | | | | 0.81 | | | | 0.00 | | | | 0.83 | | | | 0.85 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|-------|-------|----------------------|-------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | | Total | L | R | Total | | |
| Volume | 346 | 8 | 354 | 22 | 120 | 142 | | 0 | 5 | 85 | 90 | 586 | |
| %HV | NA | 2.0% | 0.0% | 2.0% | 13.6% | 4.2% | NA | 5.6% | NA | NA | NA | 2.7% | |
| PHF | 0.75 | 0.50 | 0.76 | 0.55 | 0.81 | 0.81 | | 0.00 | 0.42 | 0.85 | 0.83 | 0.85 | |

Rolling Hour Summary

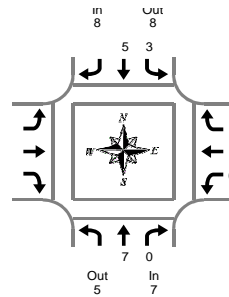
7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|---|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 346 | 8 | 0 | 22 | 120 | 0 | | 0 | 5 | 85 | 0 | 586 | 0 | 0 | 2 | 0 | |
| 7:15 AM | 317 | 9 | 0 | 25 | 122 | 0 | | 0 | 6 | 72 | 0 | 551 | 0 | 0 | 3 | 0 | |
| 7:30 AM | 312 | 10 | 0 | 28 | 120 | 0 | | 0 | 7 | 61 | 0 | 538 | 0 | 0 | 1 | 0 | |
| 7:45 AM | 299 | 15 | 0 | 27 | 130 | 0 | | 0 | 5 | 57 | 0 | 533 | 0 | 0 | 1 | 0 | |
| 8:00 AM | 301 | 16 | 0 | 35 | 145 | 0 | | 0 | 7 | 54 | 0 | 558 | 0 | 0 | 1 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

Peak Hour Summary
7:00 AM to 8:00 AM

SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|---|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 7:10 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:15 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:20 AM | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 3 | |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | |
| 7:35 AM | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | |
| 7:50 AM | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | |
| 8:05 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 5 | |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 3 | |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | |
| 8:40 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:45 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:50 AM | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 8:55 AM | 6 | 0 | 6 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 8 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 16 | 0 | 0 | 3 | 3 | 40 | |

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|---|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 7:00 AM | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:15 AM | 2 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 4 | |
| 7:30 AM | 1 | 0 | 1 | 2 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 5 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 4 | |
| 8:00 AM | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 3 | 3 | 3 | 0 | 0 | 1 | 1 | 8 | |
| 8:30 AM | 1 | 0 | 1 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | |
| 8:45 AM | 8 | 0 | 8 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 11 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 16 | 0 | 0 | 3 | 3 | 40 | |

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 7 | 5 | 12 | 8 | 8 | 16 | 0 | 0 | 0 | 1 | 3 | 4 | 16 |
| PHF | 0.44 | | | 0.50 | | | 0.00 | | | 0.25 | | | 0.67 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|------|----------------------|------|----|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| Volume | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 0 | 1 | 1 | 16 | |
| PHF | 0.44 | 0.00 | 0.44 | 0.38 | 0.42 | 0.50 | 0.00 | 0.00 | 0.25 | 0.25 | 0.67 | | |

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|---|----------------------|---|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 7:00 AM | 7 | 0 | 7 | 3 | 5 | 8 | 8 | 0 | 0 | 1 | 1 | 16 | |
| 7:15 AM | 5 | 0 | 5 | 3 | 6 | 9 | 9 | 0 | 0 | 1 | 1 | 15 | |
| 7:30 AM | 6 | 1 | 7 | 2 | 9 | 11 | 11 | 0 | 0 | 1 | 1 | 19 | |
| 7:45 AM | 6 | 1 | 7 | 0 | 9 | 9 | 9 | 0 | 0 | 1 | 1 | 17 | |
| 8:00 AM | 13 | 1 | 14 | 0 | 8 | 8 | 8 | 0 | 0 | 2 | 2 | 24 | |

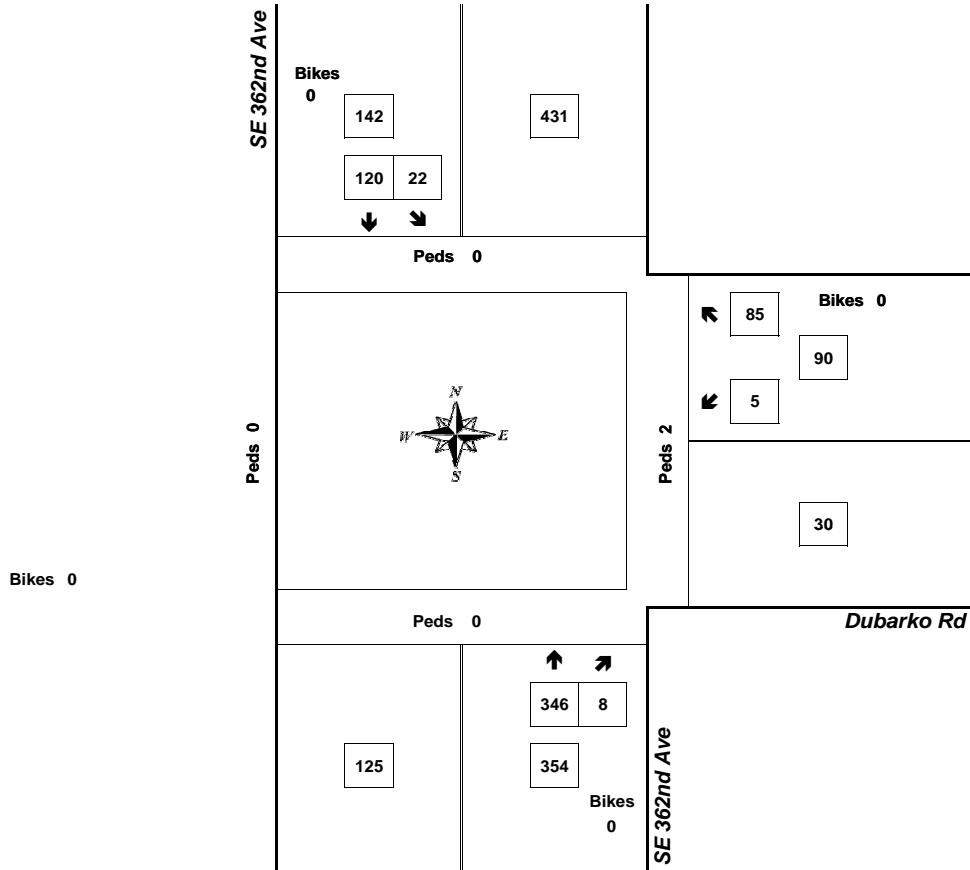
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.83 | 1.1% | 90 |
| NB | 0.76 | 2.0% | 354 |
| SB | 0.81 | 5.6% | 142 |
| Intersection | 0.85 | 2.7% | 586 |

Count Period: 7:00 AM to 9:00 AM

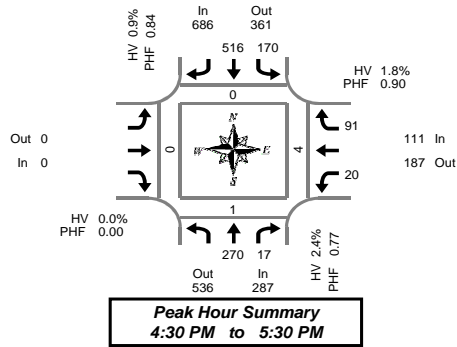
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM



5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|----|-----|----------------------|-------|-------|----------------|-----------------------|------|--|--|
| | T | R | Bikes | L | T | Bikes | Bikes | L | R | Bikes | North | South | | East | West | | |
| 4:00 PM | 25 | 0 | 0 | 11 | 35 | 0 | 0 | 1 | 6 | 0 | 78 | 1 | 0 | 3 | 0 | | |
| 4:05 PM | 21 | 2 | 0 | 7 | 36 | 0 | 0 | 1 | 5 | 0 | 72 | 0 | 0 | 0 | 0 | | |
| 4:10 PM | 19 | 2 | 0 | 8 | 36 | 0 | 0 | 1 | 6 | 0 | 72 | 0 | 0 | 0 | 0 | | |
| 4:15 PM | 26 | 3 | 0 | 8 | 32 | 0 | 0 | 0 | 4 | 0 | 73 | 0 | 0 | 1 | 0 | | |
| 4:20 PM | 22 | 1 | 0 | 14 | 45 | 0 | 0 | 3 | 4 | 0 | 89 | 0 | 0 | 0 | 0 | | |
| 4:25 PM | 21 | 2 | 0 | 15 | 34 | 0 | 0 | 0 | 5 | 0 | 77 | 0 | 0 | 0 | 0 | | |
| 4:30 PM | 19 | 2 | 0 | 18 | 30 | 0 | 0 | 1 | 8 | 0 | 78 | 0 | 0 | 2 | 0 | | |
| 4:35 PM | 27 | 0 | 0 | 9 | 42 | 0 | 0 | 0 | 9 | 0 | 87 | 0 | 0 | 0 | 0 | | |
| 4:40 PM | 17 | 3 | 0 | 12 | 33 | 0 | 0 | 2 | 9 | 0 | 76 | 0 | 0 | 0 | 0 | | |
| 4:45 PM | 28 | 0 | 0 | 7 | 46 | 0 | 0 | 1 | 6 | 0 | 88 | 0 | 0 | 0 | 0 | | |
| 4:50 PM | 28 | 2 | 0 | 14 | 33 | 0 | 0 | 3 | 7 | 0 | 87 | 0 | 0 | 0 | 0 | | |
| 4:55 PM | 30 | 2 | 0 | 10 | 51 | 0 | 0 | 4 | 3 | 0 | 100 | 0 | 0 | 0 | 0 | | |
| 5:00 PM | 30 | 1 | 0 | 15 | 42 | 0 | 0 | 3 | 11 | 0 | 102 | 0 | 0 | 0 | 0 | | |
| 5:05 PM | 21 | 4 | 0 | 16 | 45 | 0 | 0 | 0 | 7 | 0 | 93 | 0 | 0 | 0 | 0 | | |
| 5:10 PM | 21 | 1 | 0 | 20 | 49 | 0 | 0 | 2 | 6 | 0 | 99 | 0 | 0 | 0 | 0 | | |
| 5:15 PM | 16 | 1 | 0 | 14 | 60 | 0 | 0 | 1 | 7 | 0 | 99 | 0 | 0 | 0 | 0 | | |
| 5:20 PM | 17 | 1 | 0 | 19 | 42 | 0 | 0 | 2 | 12 | 0 | 93 | 0 | 1 | 0 | 0 | | |
| 5:25 PM | 16 | 0 | 0 | 16 | 43 | 0 | 0 | 1 | 6 | 0 | 82 | 0 | 0 | 2 | 0 | | |
| 5:30 PM | 19 | 0 | 0 | 16 | 24 | 0 | 0 | 2 | 4 | 0 | 65 | 0 | 0 | 0 | 0 | | |
| 5:35 PM | 16 | 1 | 0 | 12 | 33 | 0 | 0 | 2 | 7 | 0 | 71 | 0 | 0 | 0 | 0 | | |
| 5:40 PM | 26 | 0 | 0 | 9 | 39 | 0 | 0 | 1 | 6 | 0 | 81 | 0 | 0 | 0 | 0 | | |
| 5:45 PM | 18 | 2 | 0 | 13 | 36 | 0 | 0 | 2 | 5 | 0 | 76 | 0 | 0 | 0 | 0 | | |
| 5:50 PM | 19 | 2 | 0 | 17 | 43 | 0 | 0 | 1 | 7 | 0 | 89 | 0 | 0 | 0 | 0 | | |
| 5:55 PM | 17 | 3 | 0 | 17 | 29 | 0 | 0 | 1 | 7 | 0 | 74 | 0 | 0 | 0 | 0 | | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | | |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|----|-----|----------------------|-------|-------|----------------|-----------------------|------|--|--|
| | T | R | Bikes | L | T | Bikes | Bikes | L | R | Bikes | North | South | | East | West | | |
| 4:00 PM | 65 | 4 | 0 | 26 | 107 | 0 | 0 | 3 | 17 | 0 | 222 | 1 | 0 | 3 | 0 | | |
| 4:15 PM | 69 | 6 | 0 | 37 | 111 | 0 | 0 | 3 | 13 | 0 | 239 | 0 | 0 | 1 | 0 | | |
| 4:30 PM | 63 | 5 | 0 | 39 | 105 | 0 | 0 | 3 | 26 | 0 | 241 | 0 | 0 | 2 | 0 | | |
| 4:45 PM | 86 | 4 | 0 | 31 | 130 | 0 | 0 | 8 | 16 | 0 | 275 | 0 | 0 | 0 | 0 | | |
| 5:00 PM | 72 | 6 | 0 | 51 | 136 | 0 | 0 | 5 | 24 | 0 | 294 | 0 | 0 | 0 | 0 | | |
| 5:15 PM | 49 | 2 | 0 | 49 | 145 | 0 | 0 | 4 | 25 | 0 | 274 | 0 | 1 | 2 | 0 | | |
| 5:30 PM | 61 | 1 | 0 | 37 | 96 | 0 | 0 | 5 | 17 | 0 | 217 | 0 | 0 | 0 | 0 | | |
| 5:45 PM | 54 | 7 | 0 | 47 | 108 | 0 | 0 | 4 | 19 | 0 | 239 | 0 | 0 | 0 | 0 | | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | | |

Peak Hour Summary
4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|-----------------------|-------|-------|------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | | North | South | East | West |
| Volume | 287 | 536 | 823 | 0 | 686 | 361 | 1,047 | 0 | 0 | 0 | 0 | 111 | 187 | 298 | 0 | 1,084 | |
| %HV | 2.4% | | | 0.9% | | | 0.0% | | | 1.8% | | | 1.4% | | | | |
| PHF | 0.77 | | | 0.84 | | | 0.00 | | | 0.90 | | | 0.92 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|------|----------------------|-------|--|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| Volume | 270 | 17 | 287 | 170 | 516 | 686 | 0 | 20 | 91 | 111 | 1,084 | | |
| %HV | NA | 2.6% | 0.0% | 2.4% | 1.2% | 0.8% | NA | 0.9% | NA | NA | 1.4% | | |
| PHF | 0.77 | 0.61 | 0.77 | 0.80 | 0.84 | 0.84 | 0.00 | 0.50 | 0.88 | 0.90 | 0.92 | | |

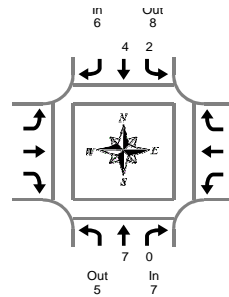
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|----|----|----------------------|-------|-------|----------------|-----------------------|------|--|--|
| | T | R | Bikes | L | T | Bikes | Bikes | L | R | Bikes | North | South | | East | West | | |
| 4:00 PM | 283 | 19 | 0 | 133 | 453 | 0 | 0 | 17 | 72 | 0 | 977 | 1 | 0 | 6 | 0 | | |
| 4:15 PM | 290 | 21 | 0 | 158 | 482 | 0 | 0 | 19 | 79 | 0 | 1,049 | 1 | 0 | 3 | 0 | | |
| 4:30 PM | 270 | 17 | 0 | 170 | 516 | 0 | 0 | 20 | 91 | 0 | 1,084 | 0 | 1 | 4 | 0 | | |
| 4:45 PM | 268 | 13 | 0 | 168 | 507 | 0 | 0 | 22 | 82 | 0 | 1,060 | 0 | 1 | 2 | 0 | | |
| 5:00 PM | 236 | 16 | 0 | 184 | 485 | 0 | 0 | 18 | 85 | 0 | 1,024 | 0 | 1 | 2 | 0 | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| 4:00 PM | 2 | 0 | 2 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 3 |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 1 |
| 4:10 PM | 2 | 0 | 2 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 3 |
| 4:15 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| 4:20 PM | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 3 | 3 | | 0 | 0 | 0 | 0 | 3 |
| 4:35 PM | 1 | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 |
| 4:40 PM | 0 | 0 | 0 | 1 | 0 | 1 | | 0 | 1 | 0 | 1 | 2 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 2 | 0 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 1 | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 |
| 5:20 PM | 1 | 0 | 1 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 2 |
| 5:25 PM | 2 | 0 | 2 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 3 |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 5:55 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| 4:00 PM | 4 | 0 | 4 | 0 | 2 | 2 | | 0 | 0 | 1 | 1 | 7 |
| 4:15 PM | 1 | 0 | 1 | 0 | 2 | 2 | | 0 | 0 | 0 | 0 | 3 |
| 4:30 PM | 1 | 0 | 1 | 1 | 3 | 4 | | 0 | 1 | 0 | 1 | 6 |
| 4:45 PM | 0 | 0 | 0 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 2 | 0 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 |
| 5:15 PM | 4 | 0 | 4 | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 6 |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 2 |
| 5:45 PM | 1 | 0 | 1 | 1 | 1 | 2 | | 0 | 0 | 0 | 0 | 3 |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle Peak Hour Summary 4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|----------------------|---|---|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | | | |
| Volume | 7 | 5 | 12 | 6 | 8 | 14 | 0 | 0 | 0 | 2 | 4 | 15 |
| PHF | 0.44 | | | 0.38 | | | 0.00 | | 0.50 | | | 0.63 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| Volume | 7 | 0 | 7 | 2 | 4 | 6 | 0 | 1 | 1 | 2 | 15 | |
| PHF | 0.44 | 0.00 | 0.44 | 0.50 | 0.33 | 0.38 | 0.00 | 0.25 | 0.25 | 0.50 | 0.63 | |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | |
| 4:00 PM | 6 | 0 | 6 | 1 | 8 | 9 | | 0 | 1 | 1 | 2 | 17 |
| 4:15 PM | 4 | 0 | 4 | 1 | 6 | 7 | | 0 | 1 | 0 | 1 | 12 |
| 4:30 PM | 7 | 0 | 7 | 2 | 4 | 6 | | 0 | 1 | 1 | 2 | 15 |
| 4:45 PM | 7 | 0 | 7 | 1 | 2 | 3 | | 0 | 0 | 1 | 1 | 11 |
| 5:00 PM | 8 | 0 | 8 | 2 | 2 | 4 | | 0 | 0 | 1 | 1 | 13 |

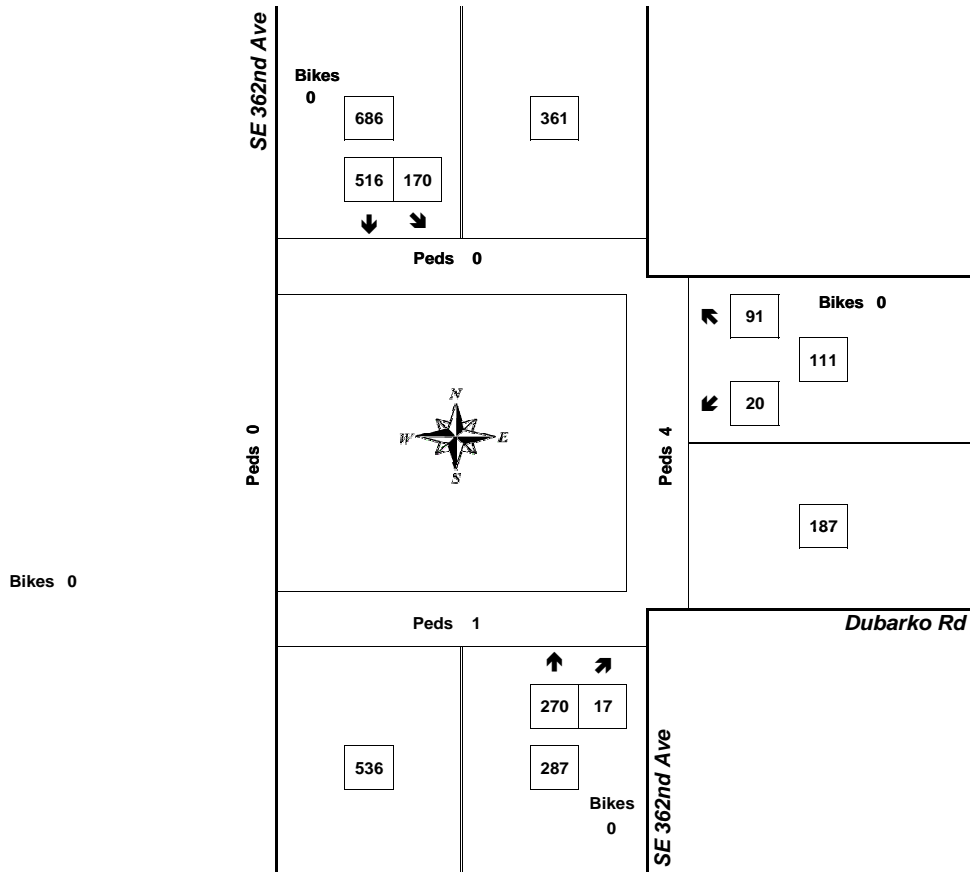
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

4:30 PM to 5:30 PM
Wednesday, May 22, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|--------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.90 | 1.8% | 111 |
| NB | 0.77 | 2.4% | 287 |
| SB | 0.84 | 0.9% | 686 |
| Intersection | 0.92 | 1.4% | 1,084 |

Count Period: 4:00 PM to 6:00 PM

CDS380
05/17/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF SANDY, CLACKAMAS COUNTY

362ND DR at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

1 - 1 of 1 Crash records shown.

| SER# | S P R J S W DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | INT-REL | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A S | ACT | EVENT | CAUSE | | | | | | | |
|--------|------------------|-----------------|---------------|---------|----------|-----------|-------|-------|---------|-----------|--------|---------|-------|-----------|-------|-------|-----|--|--|-----|-----|----|
| INVEST | E A U I C O DAY | DIST | FIRST STREET | RD CHAR | (MEDIAN) | INT-REL | OFFRD | WTHR | CRASH | TRLR QTY | MOVE | A S | | | | | | | | | | |
| RD DPT | E L G N H R TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G E LICNS | PED | | | | | | | |
| UNLOC? | D C S V L K LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# TYPE | TO | P# TYPE | SVRTY | E X RES | LOC | ERROR | | | | | | |
| 00737 | N N N 02/27/2015 | 17 | DUBARKO RD | INTER | 3-LEG | N | N | UNK | S-1STOP | 01 NONE 0 | STRGHT | | | | | | | | | 29 | | |
| NONE | FR 0 | | 362ND DR | E | | STOP SIGN | N | WET | SS-O | PRVTE | E -W | | | | | | | | | 000 | 00 | |
| N | 12P | | | 06 | 0 | | N | DAY | PDO | PSNGR CAR | | 01 DRVR | NONE | 00 M | UNK | | 026 | | | 000 | 29 | |
| N | 45 23 57.42 | -122 17 27.9 | | | | | | | | | | | | | OR<25 | | | | | | | |
| | | | | | | | | | | 02 NONE 0 | STOP | | | | | | | | | | | |
| | | | | | | | | | | PRVTE | E -W | | | | | | | | | | 011 | 00 |
| | | | | | | | | | | PSNGR CAR | | 01 DRVR | NONE | 22 M | OR-Y | | 000 | | | | 000 | 00 |
| | | | | | | | | | | | | | | | OR<25 | | | | | | | |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/17/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
362ND DR at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 1

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | | | | | | | | | | | |
|--------|---|---|---|---|---|------|-------|---------------|---------|----------|---------|-------|-------|----------|------|------|-----|----|------|-------|-----|---|-----|-----|-------|-----|-------|-------|
| INVEST | E | A | U | I | C | O | DIST | FIRST STREET | | (MEDIAN) | INT-REL | | | TRLR QTY | | | | | | | | | | | | | | |
| RD DPT | E | L | G | N | H | R | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | | | | | | | |
| UNLOC? | D | C | S | V | L | K | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF SANDY, CLACKAMAS COUNTY

DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

1 - 2 of 2 Crash records shown.

| SER# | S | D | M | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | PRTC | INJ | A | S | ACT | EVENT | CAUSE | | | | | |
|--------|---|---|---|---|---|---|----------------------|----------------------|---------------|---------|-------------|-----------|----------|-------|----------|----------|-----------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-----|-------|-------|--|
| INVEST | E | A | U | I | C | O | DAY | DIST | FIRST STREET | RD CHAR | (MEDIAN) | INT-REL | OFFRD | WTHR | CRASH | TRLR QTY | MOVE | PRTC | INJ | A | S | ACT | EVENT | CAUSE | | | | | | |
| RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | ACT | EVENT | CAUSE | | | | |
| UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE | |
| 00557 | N | N | N | | | | 02/07/2014 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | SNOW | ANGL-STP | 01 | NONE | 0 | TURN-L | | | | | 124 | 08 | | | | | |
| NONE | | | | | | | FR | 0 | MELISSA AVE | S | | STOP SIGN | N | ICE | TURN | | PRVTE | SE-S | | | | | 000 | 124 | 00 | | | | | |
| N | | | | | | | 3P | | | 06 | 0 | | N | DAY | PDO | | PSNGR CAR | | 01 | DRVR | NONE | 59 | M | OR-Y | 002 | 017 | 08 | | | |
| N | | | | | | | 45 23 30.2562959 | -122 16 36.081048 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 02 | NONE | 0 | STOP | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | PRVTE | S -N | | | | | | 011 | 00 | | | | | |
| | | | | | | | | | | | | | | | | | PSNGR CAR | | 01 | DRVR | NONE | 57 | F | OR-Y | 000 | 000 | 00 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01045 | N | N | N | | | | 03/26/2015 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | CLR | ANGL-OTH | 01 | NONE | 0 | STRGHT | | | | | | 02 | | | | | |
| NONE | | | | | | | TH | 0 | MELISSA AVE | CN | | STOP SIGN | N | DRY | TURN | | PRVTE | NW-SE | | | | | 000 | 00 | | | | | | |
| N | | | | | | | 8A | | | 04 | 0 | | N | DAWN | PDO | | PSNGR CAR | | 01 | DRVR | NONE | 23 | F | OR-Y | 000 | 000 | 00 | | | |
| N | | | | | | | 45 23 30.26 36.08 | -122 16 36.08 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 02 | NONE | 0 | TURN-L | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | PRVTE | S -NW | | | | | | 015 | 00 | | | | | |
| | | | | | | | | | | | | | | | | | PSNGR CAR | | 01 | DRVR | NONE | 00 | F | UNK | 028 | 000 | 02 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING
 DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | | | | | | | | | | | |
|--------|---|---|---|---|---|------|-------|---------------|---------|----------|---------|-------|-------|----------|------|------|-----|----|------|-------|-----|---|-----|-----|-------|-----|-------|-------|
| INVEST | E | A | U | I | C | O | DIST | FIRST STREET | | (MEDIAN) | INT-REL | | | TRLR QTY | | | | | | | | | | | | | | |
| RD DPT | E | L | G | N | H | R | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | | | | | | | |
| UNLOC? | D | C | S | V | L | K | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 538 PM Peak Hour Volumes: 103

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 5,380 | 8,850 | |
| Minor Street* | 1,030 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 5,380 | 13,300 | |
| Minor Street* | 1,030 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 5,380 | 10,640 | |
| Minor Street* | 1,030 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 248 PM Peak Hour Volumes: 19

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,480 | 8,850 | |
| Minor Street* | 190 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,480 | 13,300 | |
| Minor Street* | 190 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,480 | 10,640 | |
| Minor Street* | 190 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 84 PM Peak Hour Volumes: 113

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 840 | 8,850 | |
| Minor Street* | 1,130 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 840 | 13,300 | |
| Minor Street* | 1,130 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 840 | 10,640 | |
| Minor Street* | 1,130 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 164 PM Peak Hour Volumes: 36

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 1,640 | 8,850 | |
| Minor Street* | 360 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 1,640 | 13,300 | |
| Minor Street* | 360 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 1,640 | 10,640 | |
| Minor Street* | 360 | 2,120 | No |

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 1073 PM Peak Hour Volumes: 114

Warrant Used:

 X 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 10,730 | 8,850 | |
| Minor Street* | 1,140 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 10,730 | 13,300 | |
| Minor Street* | 1,140 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 10,730 | 10,640 | |
| Minor Street* | 1,140 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 374 PM Peak Hour Volumes: 116

Warrant Used:

 X 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 3,740 | 8,850 | |
| Minor Street* | 1,160 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 3,740 | 13,300 | |
| Minor Street* | 1,160 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 3,740 | 10,640 | |
| Minor Street* | 1,160 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 287 PM Peak Hour Volumes: 68

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,870 | 8,850 | |
| Minor Street* | 680 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,870 | 13,300 | |
| Minor Street* | 680 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,870 | 10,640 | |
| Minor Street* | 680 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 220 PM Peak Hour Volumes: 61

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,200 | 8,850 | |
| Minor Street* | 610 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,200 | 13,300 | |
| Minor Street* | 610 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,200 | 10,640 | |
| Minor Street* | 610 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout AM

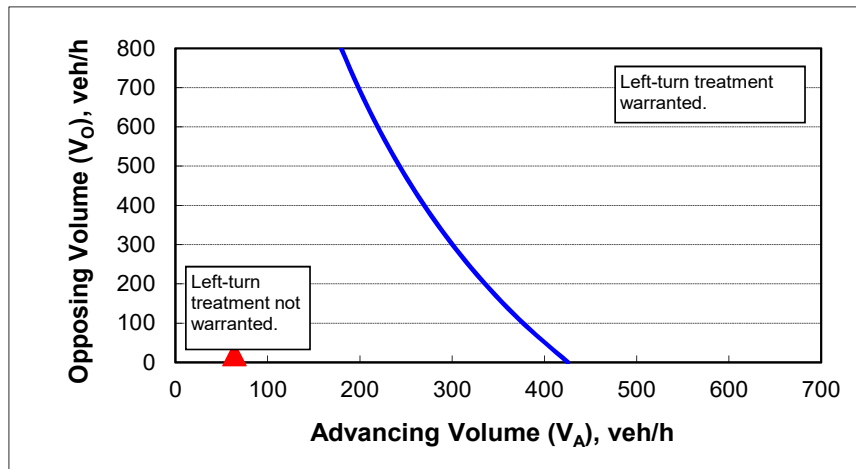
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 23 |
| Advancing volume (V_A), veh/h: | 64 |
| Opposing volume (V_O), veh/h: | 20 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 415 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout PM

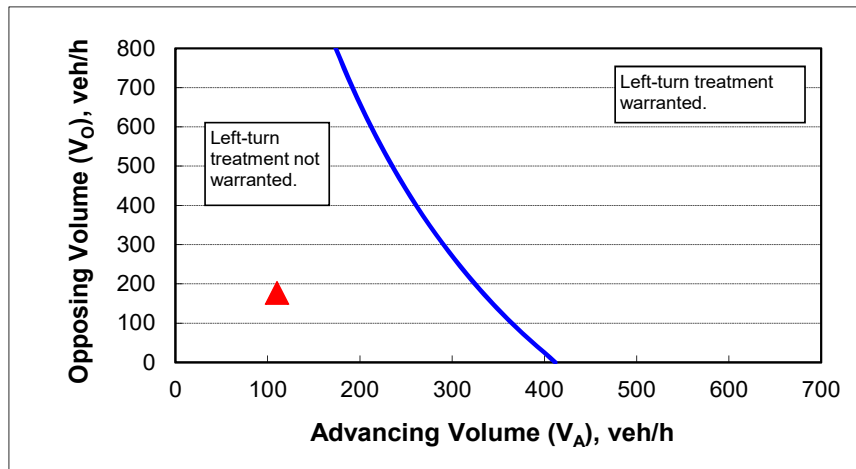
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 48 |
| Advancing volume (V_A), veh/h: | 110 |
| Opposing volume (V_O), veh/h: | 177 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 333 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.1 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Future Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 6 | 100 | 407 | 9 | 26 | 141 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 605 | 412 | 0 | 0 | 416 |
| Stage 1 | 412 | - | - | - | - |
| Stage 2 | 193 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 462 | 642 | - | - | 1122 |
| Stage 1 | 671 | - | - | - | - |
| Stage 2 | 842 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 451 | 642 | - | - | 1122 |
| Mov Cap-2 Maneuver | 451 | - | - | - | - |
| Stage 1 | 671 | - | - | - | - |
| Stage 2 | 822 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 11.9 | 0 | 1.3 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 627 | 1122 |
| HCM Lane V/C Ratio | - | - | 0.169 | 0.023 |
| HCM Control Delay (s) | - | - | 11.9 | 8.3 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.6 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 1.6 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Future Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 21 | 16 | 54 | 100 | 11 | 7 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 154 | 0 | - | 0 | 162 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 58 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1402 | - | - | - | 804 | 922 |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 937 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1402 | - | - | - | 792 | 922 |
| Mov Cap-2 Maneuver | - | - | - | - | 792 | - |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 923 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 4.4 | 0 | 9.4 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1402 | - | - | - | - | 836 |
| HCM Lane V/C Ratio | 0.015 | - | - | - | - | 0.022 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | - | 9.4 |
| HCM Lane LOS | A | A | - | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - | 0.1 |

HCM 2010 TWSC
3: Melissa Avenue & Dubarko Road

05/28/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|-------|-------|
| Int Delay, s/veh | 5.5 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Future Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 18 | 49 | 51 | 34 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 11 | 0 | 96 | 11 |
| Stage 1 | - | - | - | - | 11 | - |
| Stage 2 | - | - | - | - | 85 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 903 | 1070 |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 938 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 892 | 1070 |
| Mov Cap-2 Maneuver | - | - | - | - | 892 | - |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 927 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 1.9 | 9.1 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 956 | - | - | 1608 | - | |
| HCM Lane V/C Ratio | 0.089 | - | - | 0.011 | - | |
| HCM Control Delay (s) | 9.1 | - | - | 7.3 | 0 | |
| HCM Lane LOS | A | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - | |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Future Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 36 | 13 | 17 | 16 | 57 | 79 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.7 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 42% | 0% | 52% |
| Vol Thru, % | 0% | 74% | 48% |
| Vol Right, % | 58% | 26% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 95 | 34 | 23 |
| LT Vol | 40 | 0 | 12 |
| Through Vol | 0 | 25 | 11 |
| RT Vol | 55 | 9 | 0 |
| Lane Flow Rate | 136 | 49 | 33 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.145 | 0.057 | 0.04 |
| Departure Headway (Hd) | 3.844 | 4.21 | 4.435 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 927 | 844 | 801 |
| Service Time | 1.892 | 2.267 | 2.495 |
| HCM Lane V/C Ratio | 0.147 | 0.058 | 0.041 |
| HCM Control Delay | 7.6 | 7.5 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.1 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Future Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 22 | 99 | 293 | 18 | 185 | 561 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1233 | 303 | 0 | 0 | 312 | 0 |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 930 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 195 | 737 | - | - | 1254 | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 384 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 166 | 737 | - | - | 1254 | - |
| Mov Cap-2 Maneuver | 166 | - | - | - | - | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 327 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 15.7 | 0 | 2.1 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 455 | 1254 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.147 | - |
| HCM Control Delay (s) | - | - | 15.7 | 8.4 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.5 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.1 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Future Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 18 | 165 | 76 | 56 | 75 | 37 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 133 | 0 | - | 0 | 305 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 201 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1458 | - | - | - | 689 | 953 |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 835 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1458 | - | - | - | 679 | 953 |
| Mov Cap-2 Maneuver | - | - | - | - | 679 | - |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 823 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.7 | 0 | 10.6 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1458 | - | - | - | 750 | |
| HCM Lane V/C Ratio | 0.012 | - | - | - | 0.15 | |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 10.6 | |
| HCM Lane LOS | A | A | - | - | B | |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.5 | |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Future Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 100 | 55 | 26 | 68 | 25 | 19 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 155 | 0 | 248 | 128 |
| Stage 1 | - | - | - | - | 128 | - |
| Stage 2 | - | - | - | - | 120 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1438 | - | 745 | 927 |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 910 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1438 | - | 731 | 927 |
| Mov Cap-2 Maneuver | - | - | - | - | 731 | - |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 893 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.1 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 805 | - | - | 1438 | - |
| HCM Lane V/C Ratio | 0.054 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.4 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Future Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 22 | 105 | 27 | 19 | 66 | 28 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.2 | 7.6 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 70% | 0% | 59% |
| Vol Thru, % | 0% | 18% | 41% |
| Vol Right, % | 30% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 80 | 108 | 39 |
| LT Vol | 56 | 0 | 23 |
| Through Vol | 0 | 19 | 16 |
| RT Vol | 24 | 89 | 0 |
| Lane Flow Rate | 94 | 127 | 46 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.109 | 0.127 | 0.055 |
| Departure Headway (Hd) | 4.175 | 3.606 | 4.282 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 853 | 983 | 829 |
| Service Time | 2.228 | 1.668 | 2.345 |
| HCM Lane V/C Ratio | 0.11 | 0.129 | 0.055 |
| HCM Control Delay | 7.7 | 7.2 | 7.6 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.4 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 2.5

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Future Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 119 | 432 | 11 | 32 | 149 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 650 | 437 | 0 | 0 | 442 | 0 |
| Stage 1 | 437 | - | - | - | - | - |
| Stage 2 | 213 | - | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | - |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | - |
| Pot Cap-1 Maneuver | 435 | 622 | - | - | 1097 | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 825 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 422 | 622 | - | - | 1097 | - |
| Mov Cap-2 Maneuver | 422 | - | - | - | - | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 801 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 12.7 | 0 | 1.5 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 599 | 1097 | - |
| HCM Lane V/C Ratio | - | - | 0.216 | 0.029 | - |
| HCM Control Delay (s) | - | - | 12.7 | 8.4 | - |
| HCM Lane LOS | - | - | B | A | - |
| HCM 95th %tile Q(veh) | - | - | 0.8 | 0.1 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.5

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Future Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 22 | 74 | 113 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 188 | 0 | - | 0 | 198 | 131 |
| Stage 1 | - | - | - | - | 131 | - |
| Stage 2 | - | - | - | - | 67 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1362 | - | - | - | 766 | 890 |
| Stage 1 | - | - | - | - | 869 | - |
| Stage 2 | - | - | - | - | 929 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1362 | - | - | - | 754 | 890 |
| Mov Cap-2 Maneuver | - | - | - | - | 754 | - |
| Stage 1 | - | - | - | - | 869 | - |
| Stage 2 | - | - | - | - | 914 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 3.8 | 0 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1362 | - | - | - | 790 |
| HCM Lane V/C Ratio | 0.016 | - | - | - | 0.028 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 5.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Future Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 19 | 52 | 53 | 37 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 101 | 11 |
| Stage 1 | - | - | - | - | 11 | - |
| Stage 2 | - | - | - | - | 90 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 898 | 1070 |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 934 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 887 | 1070 |
| Mov Cap-2 Maneuver | - | - | - | - | 887 | - |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.2 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 954 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.094 | - | - | 0.012 | - |
| HCM Control Delay (s) | 9.2 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Future Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 39 | 14 | 27 | 17 | 60 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.6 | 7.8 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 41% | 0% | 61% |
| Vol Thru, % | 0% | 73% | 39% |
| Vol Right, % | 59% | 27% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 102 | 37 | 31 |
| LT Vol | 42 | 0 | 19 |
| Through Vol | 0 | 27 | 12 |
| RT Vol | 60 | 10 | 0 |
| Lane Flow Rate | 146 | 53 | 44 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.156 | 0.062 | 0.055 |
| Departure Headway (Hd) | 3.864 | 4.233 | 4.475 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 919 | 838 | 794 |
| Service Time | 1.923 | 2.299 | 2.54 |
| HCM Lane V/C Ratio | 0.159 | 0.063 | 0.055 |
| HCM Control Delay | 7.6 | 7.6 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.2 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Future Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 114 | 312 | 24 | 208 | 596 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 1335 | 324 | 0 | 0 | 336 |
| Stage 1 | 324 | - | - | - | - |
| Stage 2 | 1011 | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 |
| Pot Cap-1 Maneuver | 169 | 717 | - | - | 1229 |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 352 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 140 | 717 | - | - | 1229 |
| Mov Cap-2 Maneuver | 140 | - | - | - | - |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 292 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 18.1 | 0 | 2.2 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 412 | 1229 |
| HCM Lane V/C Ratio | - | - | 0.338 | 0.169 |
| HCM Control Delay (s) | - | - | 18.1 | 8.5 |
| HCM Lane LOS | - | - | C | A |
| HCM 95th %tile Q(veh) | - | - | 1.5 | 0.6 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 3.2

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Future Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 192 | 92 | 64 | 88 | 39 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 156 | 0 | - | 0 | 354 | 124 |
| Stage 1 | - | - | - | - | 124 | - |
| Stage 2 | - | - | - | - | 230 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1430 | - | - | - | 646 | 929 |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 811 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1430 | - | - | - | 636 | 929 |
| Mov Cap-2 Maneuver | - | - | - | - | 636 | - |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 799 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.7 | 0 | 11.2 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1430 | - | - | - | 705 |
| HCM Lane V/C Ratio | 0.013 | - | - | - | 0.18 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.2 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.7 |

HCM 2010 TWSC
3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Future Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 59 | 27 | 73 | 26 | 20 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 165 | 0 | 262 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 127 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1426 | - | 731 | 919 |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 904 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1426 | - | 716 | 919 |
| Mov Cap-2 Maneuver | - | - | - | - | 716 | - |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 886 | - |

Approach EB WB NB

| | | | |
|----------------------|---|---|-----|
| HCM Control Delay, s | 0 | 2 | 9.8 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 792 | - | - | 1426 | - |
| HCM Lane V/C Ratio | 0.058 | - | - | 0.019 | - |
| HCM Control Delay (s) | 9.8 | - | - | 7.6 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Future Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 24 | 111 | 33 | 20 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.3 | 7.7 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 62% |
| Vol Thru, % | 0% | 18% | 38% |
| Vol Right, % | 34% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 114 | 45 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 20 | 17 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 134 | 53 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.122 | 0.135 | 0.063 |
| Departure Headway (Hd) | 4.162 | 3.631 | 4.314 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 854 | 975 | 822 |
| Service Time | 2.222 | 1.7 | 2.385 |
| HCM Lane V/C Ratio | 0.124 | 0.137 | 0.064 |
| HCM Control Delay | 7.8 | 7.3 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Future Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 18 | 138 | 432 | 13 | 39 | 149 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 665 | 438 | 0 | 0 | 445 | 0 |
| Stage 1 | 438 | - | - | - | - | - |
| Stage 2 | 227 | - | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | - |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | - |
| Pot Cap-1 Maneuver | 427 | 621 | - | - | 1094 | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 813 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 412 | 621 | - | - | 1094 | - |
| Mov Cap-2 Maneuver | 412 | - | - | - | - | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 784 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 13.3 | 0 | 1.7 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 587 | 1094 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.035 | - |
| HCM Control Delay (s) | - | - | 13.3 | 8.4 | - |
| HCM Lane LOS | - | - | B | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.1 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.3

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 31 | 99 | 126 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 225 | 0 | - | 0 | 238 | 162 |
| Stage 1 | - | - | - | - | 162 | - |
| Stage 2 | - | - | - | - | 76 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1320 | - | - | - | 727 | 855 |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 920 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1320 | - | - | - | 715 | 855 |
| Mov Cap-2 Maneuver | - | - | - | - | 715 | - |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 904 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 3.2 | 0 | 9.9 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1320 | - | - | - | 752 |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.03 |
| HCM Control Delay (s) | 7.8 | 0 | - | - | 9.9 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 6.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Future Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 15 | 29 | 52 | 95 | 65 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 25 | 0 | 128 | 18 |
| Stage 1 | - | - | - | - | 18 | - |
| Stage 2 | - | - | - | - | 110 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1589 | - | 866 | 1061 |
| Stage 1 | - | - | - | - | 1005 | - |
| Stage 2 | - | - | - | - | 915 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1589 | - | 850 | 1061 |
| Mov Cap-2 Maneuver | - | - | - | - | 850 | - |
| Stage 1 | - | - | - | - | 1005 | - |
| Stage 2 | - | - | - | - | 898 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.6 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 924 | - | - | 1589 | - |
| HCM Lane V/C Ratio | 0.173 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.6 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.8 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Future Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 26 | 27 | 24 | 64 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.9 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 43% | 0% | 53% |
| Vol Thru, % | 0% | 69% | 47% |
| Vol Right, % | 57% | 31% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 105 | 59 | 36 |
| LT Vol | 45 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 18 | 0 |
| Lane Flow Rate | 150 | 84 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.164 | 0.099 | 0.064 |
| Departure Headway (Hd) | 3.944 | 4.224 | 4.488 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 897 | 838 | 788 |
| Service Time | 2.024 | 2.302 | 2.572 |
| HCM Lane V/C Ratio | 0.167 | 0.1 | 0.065 |
| HCM Control Delay | 7.8 | 7.8 | 7.9 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.3 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Future Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 29 | 126 | 312 | 30 | 228 | 596 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1379 | 327 | 0 | 0 | 342 | 0 |
| Stage 1 | 327 | - | - | - | - | - |
| Stage 2 | 1052 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 159 | 714 | - | - | 1223 | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 336 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 129 | 714 | - | - | 1223 | - |
| Mov Cap-2 Maneuver | 129 | - | - | - | - | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 273 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 20.5 | 0 | 2.4 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 385 | 1223 | - |
| HCM Lane V/C Ratio | - | - | 0.404 | 0.187 | - |
| HCM Control Delay (s) | - | - | 20.5 | 8.6 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.9 | 0.7 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.2 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 220 | 109 | 72 | 101 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 181 | 0 | - | 0 | 403 | 145 |
| Stage 1 | - | - | - | - | 145 | - |
| Stage 2 | - | - | - | - | 258 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1400 | - | - | - | 605 | 905 |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 787 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1400 | - | - | - | 596 | 905 |
| Mov Cap-2 Maneuver | - | - | - | - | 596 | - |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 775 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.6 | 0 | 11.9 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1400 | - | - | - | - | 659 |
| HCM Lane V/C Ratio | 0.014 | - | - | - | - | 0.213 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | - | 11.9 |
| HCM Lane LOS | A | A | - | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - | 0.8 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.3

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Future Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 102 | 56 | 73 | 52 | 38 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 208 | 0 | 343 | 157 |
| Stage 1 | - | - | - | - | 157 | - |
| Stage 2 | - | - | - | - | 186 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1375 | - | 657 | 894 |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 851 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1375 | - | 629 | 894 |
| Mov Cap-2 Maneuver | - | - | - | - | 629 | - |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 815 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|------|
| HCM Control Delay, s | 0 | 3.4 | 10.7 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 719 | - | - | 1375 | - |
| HCM Lane V/C Ratio | 0.124 | - | - | 0.041 | - |
| HCM Control Delay (s) | 10.7 | - | - | 7.7 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

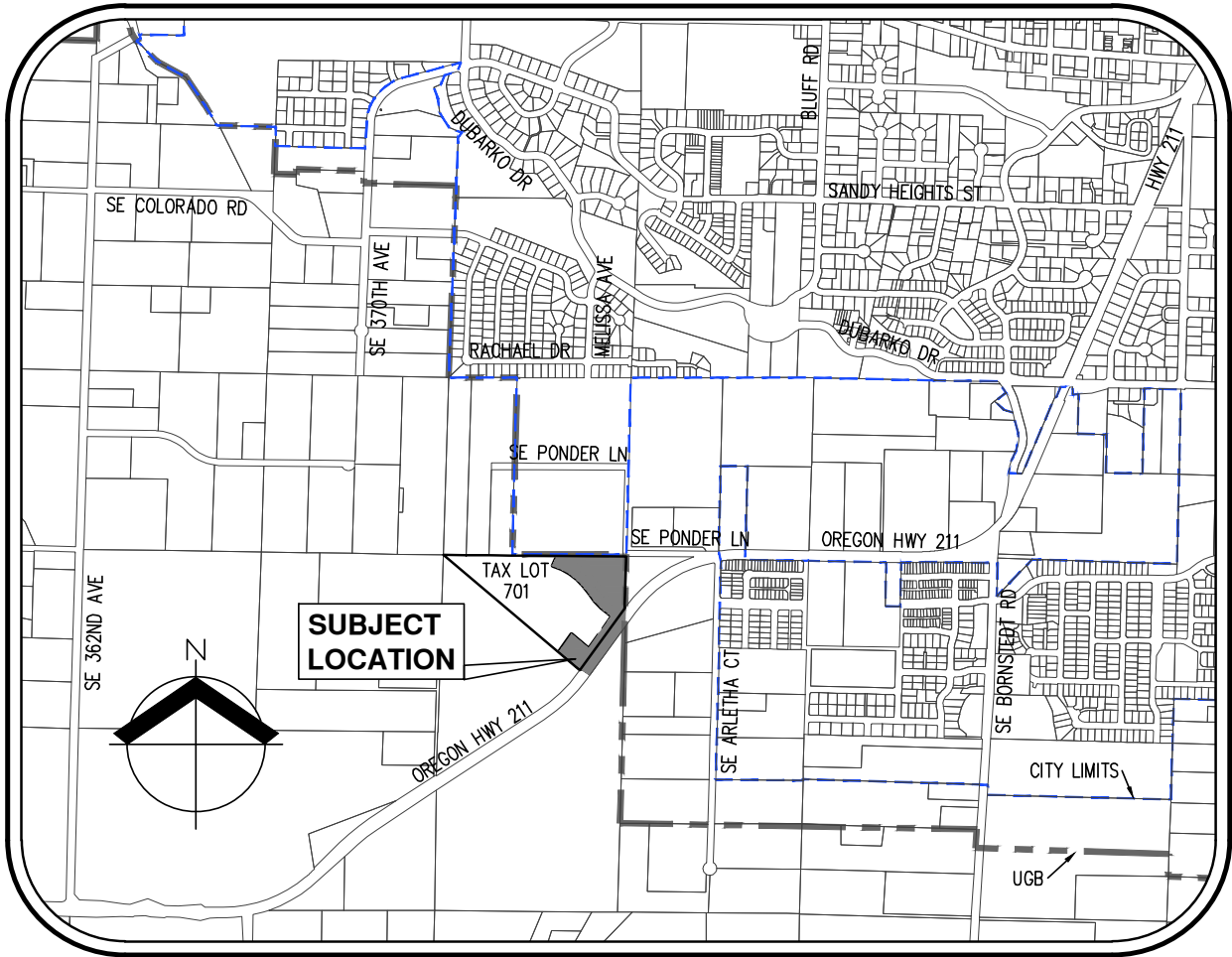
| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Future Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 118 | 33 | 39 | 80 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.8 | 8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 69% | 0% | 46% |
| Vol Thru, % | 0% | 22% | 54% |
| Vol Right, % | 31% | 78% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 99 | 129 | 61 |
| LT Vol | 68 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 100 | 0 |
| Lane Flow Rate | 116 | 152 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.137 | 0.156 | 0.086 |
| Departure Headway (Hd) | 4.249 | 3.695 | 4.316 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 833 | 955 | 819 |
| Service Time | 2.33 | 1.78 | 2.401 |
| HCM Lane V/C Ratio | 0.139 | 0.159 | 0.088 |
| HCM Control Delay | 8 | 7.5 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.6 | 0.3 |

Exhibit G: Supplemental Materials



VICINITY MAP
 NOT TO SCALE



AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 | www.aks-eng.com

AKS Job #7107

OFFICES IN: BEND, OR - KEIZER, OR - TUALATIN, OR - VANCOUVER, WA

EXHIBIT A

Legal Description

A tract of land, and a portion of right-of-way, located in the Northeast One-Quarter of Section 23, Township 2 South, Range 4 East, Willamette Meridian, Clackamas County, Oregon, and being more particularly described as follows:

Commencing at the northeast corner of Parcel 1 of Partition Plat 2018-030, Clackamas County Plat Records; thence along the north line of Document Number 93-28438, Clackamas County Deed Records, South 89°52'25" East 823.67 feet to the Point of Beginning; thence continuing along said north line, South 89°52'25" East 495.53 feet to the northeast corner of said deed; thence along the east line of said deed and the southerly extension thereof, South 01°24'04" West 532.91 feet to the southeasterly right-of-way line of Woodburn-Sandy Highway (40.00 feet from centerline); thence along said southeasterly right-of-way line, South 35°02'39" West 438.40 feet; thence leaving said southeasterly right-of-way line, North 54°57'21" West 80.00 feet to the northwesterly right-of-way line of Woodburn-Sandy Highway (40.00 feet from centerline), also being the southwesterly corner of said deed; thence along the southwesterly line of said deed, North 49°21'56" West 200.96 feet; thence leaving said southwesterly line, North 35°02'39" East 150.72 feet; thence South 49°21'56" East 160.76 feet to a line which is parallel with and 40.00 feet northwesterly of, when measured at right angles to, said northwesterly right-of-way line; thence along said parallel line, North 35°02'39" East 295.25 feet; thence leaving said parallel line, North 54°57'21" West 25.00 feet; thence along a curve to the right with a Radius of 533.00 feet, a Delta of 23°05'54", a Length of 214.88 feet, and a Chord of North 43°24'23" West 213.42 feet; thence along a curve to the left with a Radius of 467.00 feet, a Delta of 41°16'55", a Length of 336.48 feet, and a Chord of North 52°29'54" West 329.25 feet to a point of non-tangency (Radial Bearing of South 16°51'38" West); thence North 23°37'27" East 93.53 feet to the Point of Beginning.

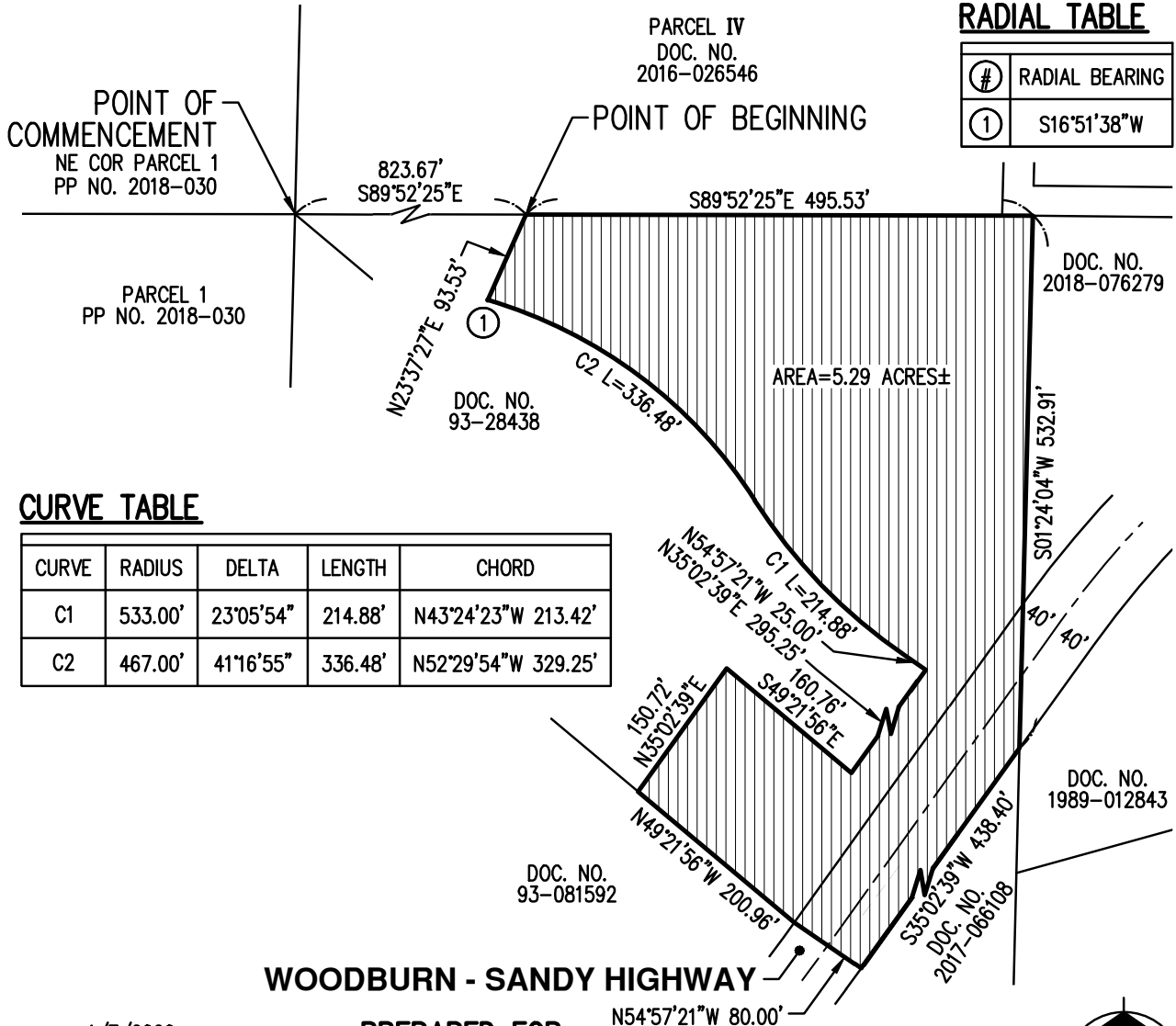
The above described tract of land contains 5.29 acres, more or less.

1/7/2020



EXHIBIT B

A TRACT OF LAND, AND A PORTION OF RIGHT-OF-WAY,
 LOCATED IN THE NORTHEAST 1/4 OF SECTION 23,
 TOWNSHIP 2 SOUTH, RANGE 4 EAST, WILLAMETTE MERIDIAN,
 CLACKAMAS COUNTY, OREGON



RADIAL TABLE

| # | RADIAL BEARING |
|---|----------------|
| ① | S16°51'38"W |

CURVE TABLE

| CURVE | RADIUS | DELTA | LENGTH | CHORD |
|-------|---------|-----------|---------|---------------------|
| C1 | 533.00' | 23°05'54" | 214.88' | N43°24'23"W 213.42' |
| C2 | 467.00' | 41°16'55" | 336.48' | N52°29'54"W 329.25' |

1/7/2020

REGISTERED
 PROFESSIONAL
 LAND SURVEYOR

Benjamin R Huff
 OREGON
 MARCH 14, 2017
 BENJAMIN R HUFF
 84738PLS

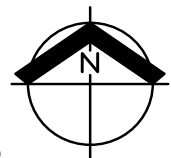
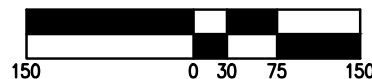
RENEWS: 6/30/21

PREPARED FOR

ALLIED HOMES & DEVELOPMENT
 12042 SE SUNNYSIDE ROAD, SUITE 706
 CLACKAMAS, OR 97015

N54°57'21"W 80.00'

SCALE: 1" = 150 FEET



| | | |
|--|--|--|
| EXHIBIT MAP | | EXHIBIT B |
| AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM | | DRWN: WCB CHKD: BRH AKS JOB: 7107 |



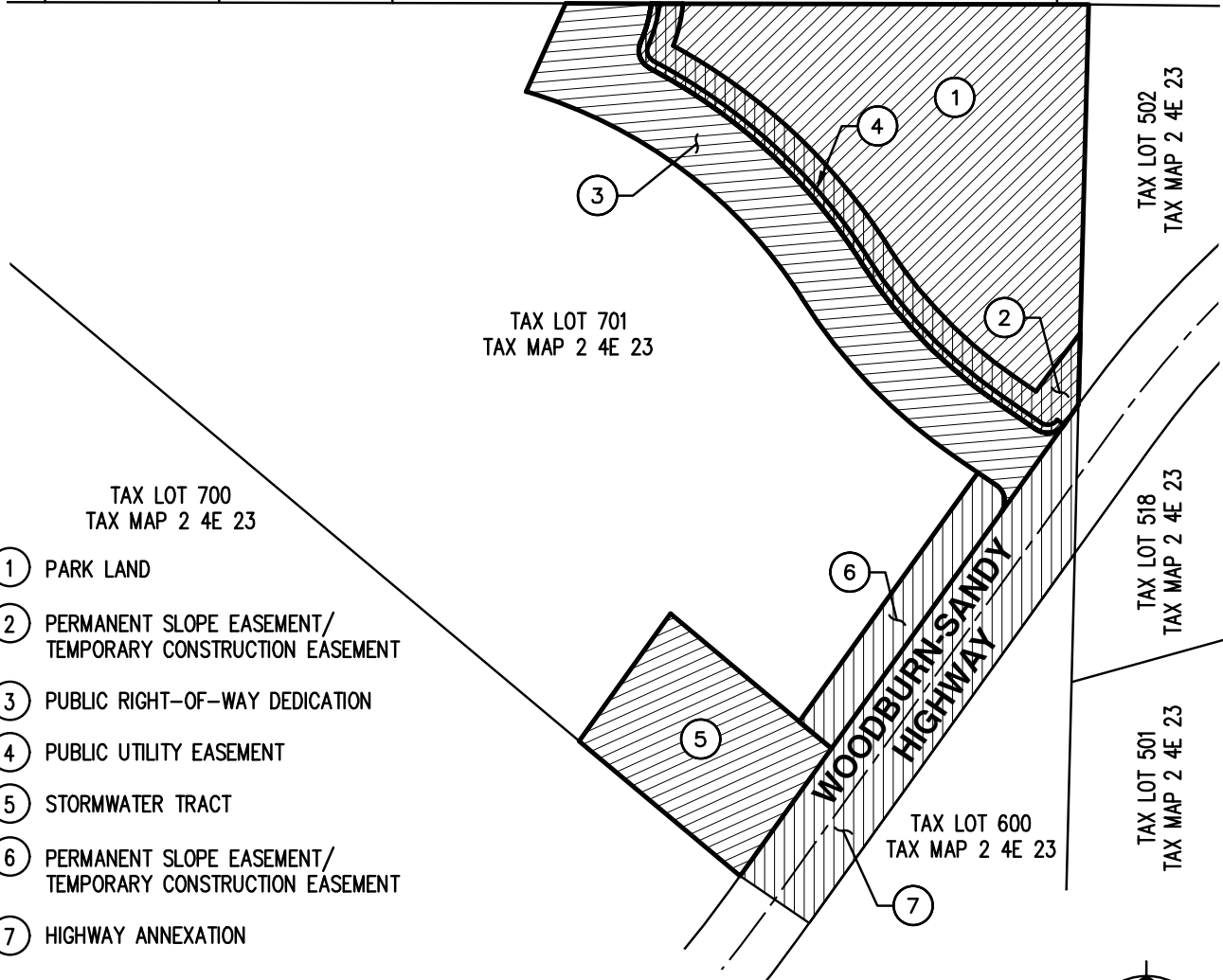
EXHIBIT KEY MAP

TAX LOT 807
TAX MAP 2 4E 23

TAX LOT 800
TAX MAP 2 4E 23

TAX LOT 803
TAX MAP 2 4E 23

PONDER LANE



TAX LOT 502
TAX MAP 2 4E 23

TAX LOT 701
TAX MAP 2 4E 23

TAX LOT 700
TAX MAP 2 4E 23

TAX LOT 518
TAX MAP 2 4E 23

TAX LOT 501
TAX MAP 2 4E 23

TAX LOT 600
TAX MAP 2 4E 23

- ① PARK LAND
- ② PERMANENT SLOPE EASEMENT/
TEMPORARY CONSTRUCTION EASEMENT
- ③ PUBLIC RIGHT-OF-WAY DEDICATION
- ④ PUBLIC UTILITY EASEMENT
- ⑤ STORMWATER TRACT
- ⑥ PERMANENT SLOPE EASEMENT/
TEMPORARY CONSTRUCTION EASEMENT
- ⑦ HIGHWAY ANNEXATION

1/7/2020

**REGISTERED
PROFESSIONAL
LAND SURVEYOR**

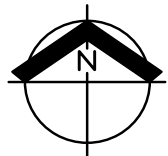
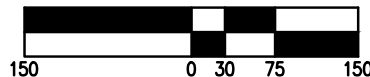
Benjamin R Huff
OREGON
MARCH 14, 2017
BENJAMIN R HUFF
84738PLS

RENEWS: 6/30/21

PREPARED FOR

ALLIED HOMES & DEVELOPMENT
12042 SE SUNNYSIDE ROAD, SUITE 706
CLACKAMAS, OR 97015

SCALE: 1" = 150 FEET



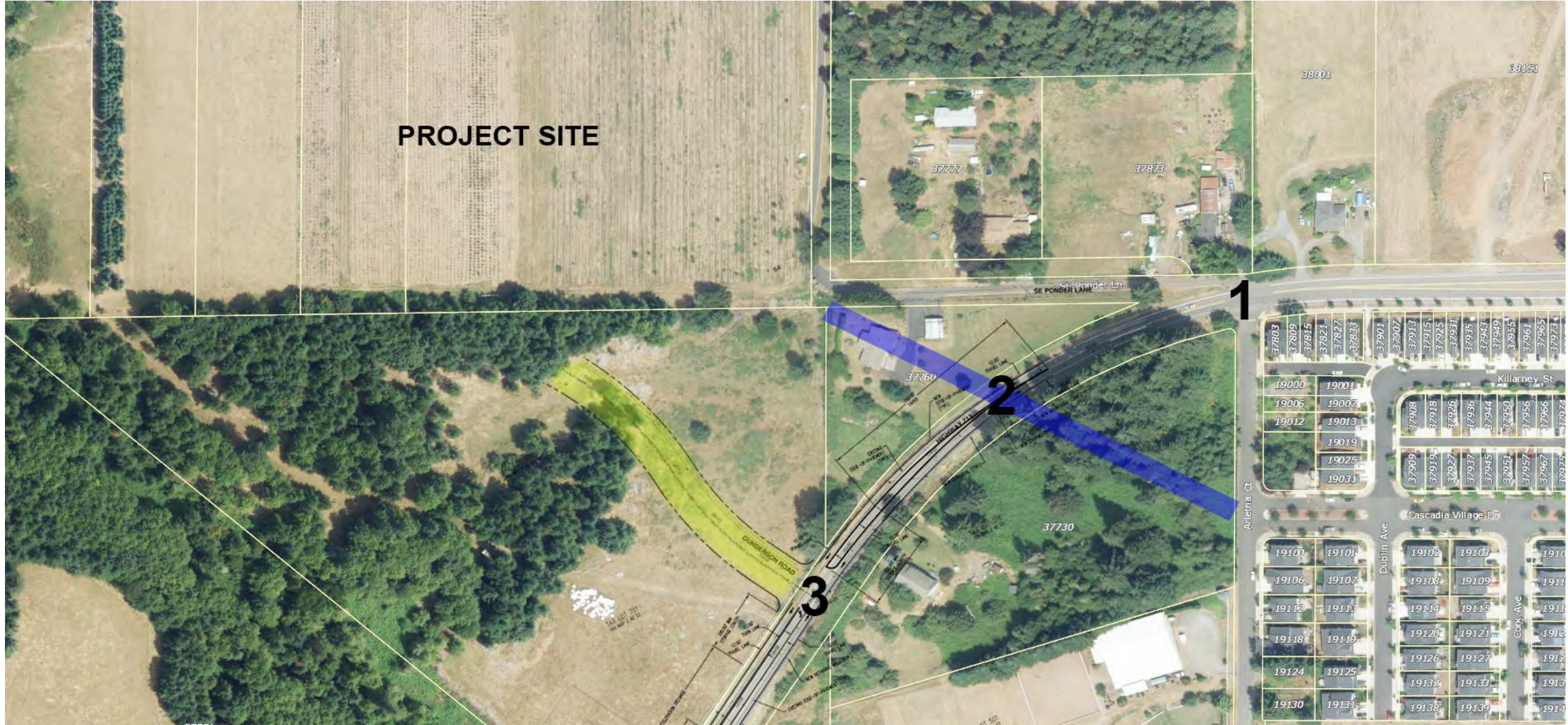
SE PONDER LANE - SANDY

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM



**EXHIBIT
KEY**

DRWN: WCB
CHKD: BRH
AKS JOB:
7107



- 1. Existing Intersection Location
- 2. TSP-Identified Alignment
- 3. Proposed Alignment

1. Existing Intersection Location



- Intersection not usable for new development given available width, very flat skew angle of approach, and topography.
- Rebuilding a new street and intersection in this location would involve properties that are not under control of the applicant or the City of Sandy

3. Proposed Alignment



Looking South



Looking North

- Location is far enough south to have adequate sight distance looking back to the north toward the curve. Excellent sight lines looking south.
- Superelevation is minimal due to location south of curve.

2. TSP-Identified Alignment



Looking North



Looking South



- Sight distance limited by horizontal and vertical curves in both directions. Sight distance is particularly poor for the future south leg, which would connect to Cascadia Village Drive.
- Superelevation (banking of the roadway around the curve) is very steep and makes this location problematic for an intersection due to difficult turning and crossing movements across the steep curve.

Exhibit FFFF

City of Sandy Annexation, Comprehensive Plan, and Zone Map Amendment

Date: January 2020

Submitted to: City of Sandy
Planning Department
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12402 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

AKS Job Number: 7107



AKS
ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

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Exhibits

- Exhibit A:** City Application Forms and Checklists
 - Exhibit B:** Annexation Written Consent Form
 - Exhibit C:** Site Maps and Legal Description
 - Exhibit D:** Lancaster Mobley Engineering Traffic Documentation
 - Exhibit E:** Property Ownership Information
 - Exhibit F:** Clackamas County Assessor’s Map
 - Exhibit G:** Noticing Materials
-

Land Use Application for Annexation, Comprehensive Plan, and Zone Map Amendment

Submitted to: City of Sandy
Planning Department
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12402 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

Property Owners: Lawrence Pullen
36940 Deming Road
Sandy, OR 97055

Richard Pullen
36969 Deming Road
Sandy, OR 97055

Sherrene TenEyck
37020 SE Deming Road
Sandy, OR 97055

Applicant's Consultant: AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Contact: Chris Goodell, AICP, LEED^{AP}
Email: chrisg@aks-eng.com
Phone: (503) 563-6151

Applicant's Legal Counsel: Schwabe, Williamson & Wyatt
Pacwest Center 1211 SW 5th Avenue, Suite 190
Portland, OR 97204

Contact: Michael Robinson
Email: mrobinson@schwabe.com
Phone: (503) 796-3756

Site Location: North of Highway 211 and south of Ponder Lane



**Clackamas County
Assessor's Map:**

2 4E 23, Tax Lot 701

Site Size:

±14.30 acres

Land Use District:

Exclusive Farm Use (EFU)



I. Executive Summary

The City of Sandy is currently processing a land use application for the Bailey Meadows subdivision (local file No. 19-023 SUB/VAR/TREE) and the amendment of the Sandy Urban Growth Boundary (UGB) to accommodate a future public transportation facility (i.e., Gunderson Road) and parkland dedication on Tax Lot 701 that is currently outside the City limits and UGB. The alignment for the Gunderson Road extension falls within property that is located outside of Sandy's City limits and UGB. This property is currently designated Exclusive Farm Use (EFU) by Clackamas County, but is within the City of Sandy's Urban Reserve Area (URA). The portion of the property that is planned to be included within the amended UGB is limited to areas necessary to construct the Gunderson Road extension, including land for the roadway, associated storm drainage improvements, accompanying utilities, grading, etc. and area for parkland dedication.

Allied Homes & Development (Applicant) is submitting this application for an Annexation, Comprehensive Plan Map Amendment, and Zone Map Amendment for the subject portion of Tax Lot 701 to allow for the public facilities. This consolidated application involves updating the City's comprehensive plan map designation for the subject portion of the property from existing Clackamas County Exclusive Farm Use (EFU) designation to Low Density Residential (LDR) and Single Family Residential (SFR) zoning designation.

The City of Sandy Land Development Code (LDC) requires this application be considered through a Quasi-Judicial Type IV procedure, which applies to an individual property, involving hearings before the Planning Commission and the City Council. The City should also comply with the Type III noticing requirements outlined in LDC Chapter 17.12. This application includes the City application forms and written materials necessary for the City of Sandy staff to review and determine compliance with the applicable approval criteria. The evidence is substantial and supports the approval of the application.

II. Site Description/Setting

The property (Tax Lot 701) included in this application has a total area of ±14.30 acres, though only the acreage required for the road right-of-way and associated improvements and parkland dedication are planned to be incorporated within the Sandy UGB. Tax Lot 701 is located outside of, but adjacent to the UGB, immediately south of the active Bailey Meadows Subdivision application (City of Sandy Local Case File No. 19-023 SUB/VAR/TREE), northwest of OR 211, and west of the intersection of SE Ponder Lane and OR 211.

The property is fairly flat with vegetated areas on the northwest half and pasture on the eastern half. The property does not contain structures and access is served from OR 211 on the south side of the site.

III. Applicable Review Criteria

SANDY COMPREHENSIVE PLAN GOALS AND POLICIES

Goal 1 – Citizen Involvement

- POLICY 1:** The City of Sandy shall maintain a citizen involvement program to allow opportunity for citizen involvement in the ongoing planning process.
- POLICY 2:** Comprehensive Plan changes shall include the opportunity for participation of citizens affected by the change.
- POLICY 4:** The City shall disseminate information and public notice to the residents of the Sandy area concerning on-going planning activities and pending actions.



Response: The City of Sandy has an established citizen involvement program. The application will be processed according to Chapter 17.12 of the LDC, which involves public notification, public hearings, and decision appeal procedures, as established in City of Sandy LDC Section 17.12.30 and 17.12.40. Therefore, the application is consistent with Goal 1.

Goal 2 – Land Use Planning

POLICY 2: Changes to the Comprehensive Plan Map shall be consistent with the policies of the Comprehensive Plan, state law, and intergovernmental agreements.

Response: Changes to the Comprehensive Plan Map are consistent with SDC Chapter 17.12 and the applicable policies of the Comprehensive Plan, as detailed in this written narrative. Consistency with applicable State statute and rules and the Urban Growth Management Agreement (UGMA) between City of Sandy and Clackamas County have been addressed in this document. Therefore, Policy 2 above is met.

POLICY 10: Due to the demand which new development places upon the community's infrastructure, the city may impose off-site improvement requirements necessitated by a development. Each development shall provide for all onsite needs, and in areas which represent a critical link in the facility and service delivery systems, the city may require the over-sizing of these systems. The City may negotiate late-comer fees or other arrangements to compensate developers for over-sizing of facilities.

Response: The Applicant is submitting this application to satisfy an anticipated condition of approval associated with City of Sandy Local File No. 19-023 SUB/VAR/TREE. Although Bailey Meadows Subdivision provides for and meets SDC criteria for on-site needs, in this case the City and Applicant agree to an off-site improvement requirement (i.e., Gunderson Road extension and parkland dedication). The off-site extension of Gunderson Road is outside the UGB, as described in this written document, and require a UGB amendment to allow an urban facility to be built on land currently within the County's jurisdiction. The policy above is understood and met by this application submittal.

POLICY 14: Proposed plan elements such as parks, roadways, schools, etc., are intended to be conceptual. Actual locations and quantities should be determined through the development process.

Response: The alignment of the extension of Gunderson Road to OR 211, a proposed plan element in the City's TSP, is conceptual. The actual location should be determined through the development process, as outlined above. To provide this public transportation facility improvement, the road should be extended to match the conceptual alignment in the Sandy TSP. However, due to geometrical issues, safety concerns, and potential for transportation hazards, the alignment illustrated in the Sandy TSP is not practicable for construction. This application provides for a solution to extend Gunderson Road and determine the actual functionable location through site analysis and development review. The location shown in Exhibit C can be improved to provide the required site characteristics and execute the extension of the transportation network to satisfy the needs of citizens in the general area. Please see the TIA and Supplemental Materials of Exhibit C for further details.

Additionally, according to the Sandy Parks Master Plan adopted May 15, 1997, there is not a conceptual location for a park on or near the subject site. Therefore, the location



for the improvement should be determined through the development process. Though parkland dedication is not required of the Bailey Meadows Subdivision application, the Applicant is providing it and it must be brought within the Sandy UGB and annexed to allow for it. Policy 14 above is met.

Goal 5 – Natural Resources

Response: Goal 5 is not applicable to the decision. The decision does not affect a Goal 5 resource under OAR 660-023-0250(3)(a)-(c) because:

- a) The decision does not “create or amend” a resource list or a portion of an acknowledged plan or land use regulation adopted in order to protect a significant Goal 5 resource or to address specific requirements of Goal 5.”
- b) The decision does not “allow” new uses that could be conflicting uses with a particular significant Goal 5 resource site on an acknowledged resource list.”
- c) While the decision “amends an acknowledged UGB” no “factual information [was] submitted demonstrating that a resource site, or the impact areas of such a site, is included in the amended UGB area.”

Goal 6 – Air, Water, and Land Resources Quality

POLICY 4: Reduce congestion and delay on major streets to lessen localized pollution impacts of automobile travel through methods such as signal timing, access management, intersection improvements, etc.

Response: The City’s Comprehensive Plan with respect to Goal 6 and its development regulations governing land, air, and water quality are not affected by the decision. The intent of extending Gunderson Road to OR 211 is to enhance neighborhood circulation and provide local parkland, thereby reducing congestion and delay in the area. This mitigates localized pollution impacts of vehicle activity in the area.

Goal 7 – Areas Subject to Natural Hazards

Response: The City’s Comprehensive Plan, with respect to Goal 7 and its development regulations governing natural hazards, is not affected by the decision. The subject site does not contain mapped areas of steep slopes 25 percent or greater or other known hazard areas.

Goal 8 – Recreational Needs

POLICY 1: Ensure that new residential development contributes equitably to park land acquisition, development, and maintenance.

POLICY 2: Establish methods to maintain and enhance the quality and quantity of parks, open space, and recreational facilities and services. Ensure that these facilities and services serve the diverse recreational needs and interests of area residents and are accessible to all members of the community.

POLICY 10: The conceptual location of community and neighborhood parks and areas of open space have been indicated on the City of Sandy Land Use Map. Actual park locations may be determined based on more site-specific information.

Response: According to the Sandy Parks Master Plan adopted May 15, 1997, there is not a conceptual location for a park on or near the subject site. Therefore, the location for the improvement should be determined through the development process. Though parkland



dedication is not required of the Bailey Meadows Subdivision application, the Applicant is providing it and it must be brought within the Sandy UGB and annexed to allow for it. The City's Comprehensive Plan with respect to Goal 8 above is met.

Goal 9 – Economic Development

Response: The City's Comprehensive Plan with respect to Goal 9 and its employment lands are not affected by the decision.

Goal 10 – Housing

Response: The subject property associated with this application to be incorporated within the UGB will be strictly for the purpose of constructing a public transportation facility and parkland improvements and is not planned to include land for residential use. Therefore, the City's Comprehensive Plan with respect to Goal 10 and residential land is not affected by the decision.

Goal 11 – Public Facilities and Services

Response: The City's Comprehensive Plan contains an acknowledged Goal 11 element that includes policies to ensure sufficient and adequate public services are available (or will be available as appropriate) to serve lands within the UGB. The property north of the subject site, Bailey Meadows Subdivision, was found to be sufficiently served by public services at the time it was annexed into the City in June 2017. This application involves amending the City's UGB to permit the extension of a public transportation facility (i.e., Gunderson Road) to allow for a future connection to OR 211. If approved, the extension is intended as an additional access to the subdivision and to distribute traffic from local streets to the surrounding area. The extension is not required for subdivision approval. Additionally, providing parkland on the northeast portion of Tax Lot 701 will enhance quality of life for the residents in the area. The parkland dedication is not required for subdivision approval. Goal 11 is satisfied.

POLICY 3: Consider the needs of emergency service providers in the review of all development. Particular attention should be paid to:

- a) Street and driveway layout and site design features that ensure emergency vehicle access and building identification.
- b) Fire hydrant locations and fire flow.
- c) Security through appropriate lighting and landscape design.

Response: Policy 3 above, regarding emergency service provider access, is discussed in detail under Goal 12, Policy 2.

Goal 12 – Transportation

POLICY 1: Support a pattern of connected streets, sidewalks, and bicycle routes to: a) provide safe and convenient options for cars, bikes, and pedestrians; b) create a logical, recognizable pattern of circulation; and, c) spread traffic over local streets so that collector and arterial streets are not overburdened.

Response: This application involves the extension of a public transportation facility (i.e., Gunderson Road) to allow Bailey Meadows Subdivision a future connection to OR 211, as illustrated in the City of Sandy TSP. If approved, the extension is intended as an additional access to



the subdivision and to distribute traffic from local streets to the surrounding area. The extension is planned to support a pattern of connected streets as stated above but is not required for subdivision approval.

POLICY 2: Work with fire district, police, and other emergency service providers to ensure that adequate emergency access is possible on all streets.

Response: Appendix D, Section D107 of the Oregon Fire Code addresses standards regarding fire apparatus access roads for one or two-family developments. As discussed in the Bailey Meadows Subdivision application (City of Sandy Local File No. 19-023 SUB/VAR/TREE), the subdivision currently provides two separate and approved fire apparatus access roads (Melissa Avenue and SE Ponder Lane) and shall meet the requirements of Section D104.3.

The extension of Gunderson Road would provide an additional access to the subdivision. Therefore, if approved, the Gunderson Road extension will provide the secondary access to the subdivision and SE Ponder Lane will not be utilized to serve as an emergency access as described above.

Additionally, the nature of Policy 2 above requires coordination of the application by the City with affected governmental entities. Coordination requires notice of an application, an opportunity for an affected governmental entity to comment on the application, and the City's incorporation of the comments to a reasonable extent. The City can find that coordination of this application will be accomplished in two ways: by the Applicant prior to application submittal, and by the City in the review process for the application. Goal 12, Policy 2 is satisfied.

POLICY 21: Work with ODOT to determine locations for necessary traffic control signals. Proposed locations for future traffic signals have been determined for the downtown area in the City of Sandy Transportation System Plan. Other locations need to be determined in order to improve the safety and convenience of pedestrians, bicycles, and automobiles. The location of traffic signals should be consistent with the street network indicated in the Comprehensive Plan Map and current traffic engineering standards.

POLICY 22: Submit notice of development proposals impacting Highways 26 and 211 to ODOT for review and comment.

Response: The above criteria applies to City processes for noticing and coordinating with ODOT, as applicable. The standards above apply as the project plans to extend Gunderson Road to OR 211. Direct action by the Applicant will be taken as applicable. Policy 21 and 22 can be satisfied.

Goal 13 – Energy Conservation

Response: The City's Comprehensive Plan with respect to Goal 13 and its standards governing energy conservation are not affected by the decision.

Goal 14 – Urbanization

POLICY 1: Maintain an urban growth boundary with sufficient residential, commercial, industrial, and public use lands necessary to support forecast population and employment for a 20-year horizon. The City will evaluate and update the 20-year land supply at each periodic review plan update.



Response: This application to amend the City UGB is necessary to provide a public transportation facility (i.e., Gunderson Road) to support residential land north of the project site which was included within the UGB and subsequently annexed in 2017. Additionally, this application provides parkland dedication which will benefit residential lands in the vicinity. As described above, the City is required to maintain a UGB with sufficient residential lands, as addressed in the February 2017 City of Sandy Urban Growth Boundary Expansion Analysis. This application will provide a public road as illustrated in the Sandy TSP that aligns with the existing transportation network in the area and implement a connection to OR 211.

POLICY 2: Urban growth should be directed in a generally contiguous manner consistent with the city's ability to economically maintain and extend public services and facilities.

POLICY 3: The City of Sandy shall encourage the development of land according to the following priorities:

- a) Vacant, buildable lands or underutilized lands located within developed or developing areas.
- b) Lands contiguous to development areas where services can be easily and economically extended.
- c) Lands which are significantly separated from developing areas by vacant land, or areas which would place an undue burden on the city's infrastructure.

Response: The project site is currently vacant, with pasture and vegetated areas. As stated above, urban growth should be directed in a contiguous manner and the planned Gunderson Road extension will facilitate growth north of the project site while having no impact on urban services or utilities. Per Goal 14, Policy 3(b) above, the City shall encourage the development of land which is contiguous to development areas where services can be easily and economically extended. The extension of Gunderson Road will provide access and distribute traffic from local streets to the surrounding area and provide parkland dedication, a benefit to lands north of the project site and those within the City limits.

POLICY 4: An Urban Growth Boundary (UGB) and Urban Reserve Area (URA) shall be jointly adopted by the City of Sandy and Clackamas County. Procedures for coordinated management of the unincorporated lands within the UGB and URA shall be specified in an intergovernmental agreement adopted by the Sandy City Council and the Clackamas County Board of Commissioners.

Response: The property involved in this application, Tax Lot 701, is associated with an UGMA, as it is within the Sandy Adopted URA. The applicable elements are addressed within this written narrative.

POLICY 6: Designated URA lands will be considered for inclusion within the UGB on a phased basis, primary at periodic review. Legislative amendments to the UGB shall be large enough to facilitate cohesive neighborhood framework planning and efficient provision of public facilities. Property owners will also have the opportunity to request that land within the designated URA be included within the Sandy UGB, based on the criteria outlined in LCDC Goal 14 and the Urban Growth Management Agreement with Clackamas County.

Response: This application involves a property owner's (i.e., the Applicant's) request that Tax Lot 701, land within the designated Sandy URA, be included with the Sandy UGB. The applicable criteria, including Land Conservation and Development Commission (LCDC)



Goal 14 noted above, have been addressed in this written document. Policy 6 is relevant and satisfied.

POLICY 7: The City of Sandy shall have the lead role in designating planned land uses and densities for incorporated and unincorporated lands within the UGB and the URA. The Comprehensive Plan shall constitute the comprehensive plan for all land within the Urban Growth Boundary and Urban Reserve Area.

Response: The subject application involves property which is located within the URA. This written document contains analysis of the City's comprehensive plan goals and policies associated with the property. Therefore, Policy 7 is applicable.

POLICY 8: The City of Sandy shall have the lead role in coordinating public facility planning (streets, sanitary and storm sewers, water, parks and open space, schools) within the UGB and the URA.

Response: Tax Lot 701 is located within the Sandy Adopted URA. Therefore, Policy 8 is applicable, and the City of Sandy shall have the lead role in coordinating this application for the planned public transportation and parkland facilities.

POLICY 9: County zoning shall apply to unincorporated lands within the UGB and URA until annexation to the City of Sandy.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation and a comprehensive plan amendment is necessary to apply City zoning to allow for the public transportation and parkland facilities. Policy 9 is applicable and satisfied.

POLICY 11: Clackamas County shall have the lead role in processing land use and development applications for unincorporated lands within the UGB and URA.

Response: Tax Lot 701 is located within the Sandy Adopted URA. Therefore, Policy 11 is applicable, and the City of Sandy shall coordinate with Clackamas County in processing the subject land use and development application for unincorporated lands within the URA.

POLICY 12: The City of Sandy will support development within the areas outside the city limits but within the Sandy Urban Growth Boundary or Urban Reserve Area based on the following standards and restrictions:

- a) County zoning in effect at the time of adoption of the Urban Reserve Area will be frozen until the unincorporated land is included within the UGB and annexed for urban development.
- b) New commercial and industrial uses will generally be discouraged outside the City limits and within the UGB or within the Urban Reserve Area.
- c) Agricultural and forest uses will be allowed in accordance with Clackamas County zoning.
- d) The City and County shall coordinate plans for interim rural residential development within the designated Urban Reserve Area. The following strategies will be used to ensure that interim rural development does not inhibit long-term urbanization of lands within the Sandy UGB and Urban Reserve Area:
 - 1) shadow plats
 - 2) cluster development



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- 3) redevelopment plans
 - 4) non-remonstrance agreements or deed restrictions for annexation and provision of urban facilities

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation and a comprehensive plan amendment is necessary to apply City zoning allowing this urban development (i.e., creation of a public transportation facility and a public parkland facility). Therefore, the subject application does not involve new commercial, industrial, or agricultural uses. The Applicant understands that City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations are intended for the property. Interim use and development, prior to annexation, is not associated with this application. The application complies with the applicable components of Policy 12 above.

SANDY DEVELOPMENT CODE – REVISED ORDINANCE 2019-01

CHAPTER 17.24 - COMPREHENSIVE PLAN AMENDMENT PROCEDURES

17.24.00 BACKGROUND

The adopted Comprehensive Plan is the official statement of the City that sets forth major policies concerning desired future development of the community. The Comprehensive Plan is the controlling land use planning instrument for the City, and as such land development regulations and related actions are required to conform to the plan.

This chapter pertains to lands within the City limits. Those portions of the Comprehensive Plan that apply to areas outside the City limits but within the urban growth boundary shall be amended in accordance with the provisions of Clackamas County and the Sandy Urban Growth Management Agreement.

Response: Tax Lot 701 is currently located outside of the City limits and within the City of Sandy's Urban Reserve Area (URA). This application involves amending the Urban Growth Boundary in accordance with the provisions of Clackamas County and the Sandy Urban Growth Management Agreement (UGMA). This chapter is relevant to the project.

17.24.10 INTENT

This chapter sets forth review criteria and procedural requirements in order to:

- A. Respond to changing conditions and community attitudes;
- B. Ensure flexibility while at the same time maintain the integrity of the Comprehensive Plan; and
- C. Establish procedures by which the Plan text and map may be amended.

17.24.20 INITIATION

Comprehensive Plan amendments may be initiated by one of the following:

- A. An application submitted by a property's owners or their authorized agents for a specific property; or
- B. A majority vote of the City Council.

Response: This application is submitted on behalf of the property owners of Tax Lot 701. The criteria are met.



17.24.30 FREQUENCY OF PLAN AMENDMENTS

Applications for Comprehensive Plan amendments initiated by property owners shall be reviewed semi-annually in March and September unless otherwise authorized by the City Council. The City Council may initiate amendments to the Comprehensive Plan at any time. Comprehensive Plan Amendments filed in conjunction with an annexation application shall be reviewed concurrently. Comprehensive Plan amendments are exempt from the time limits established in State law for development review processes and shall be exempt from time restrictions set in this Code.

Response: This application involves a Type C Annexation; therefore, the Comprehensive and Zone Map Amendments should be reviewed concurrently.

17.24.40 APPLICATION REQUIREMENTS

An application may be filed jointly by any or all of the property owners of record or their authorized agents within the area of the proposed Comprehensive Plan amendment. Applications shall be on forms provided by the Director and include a description and map of the area to be affected by the proposed change, a statement of the reasons for the change, and other information as may be necessary for an adequate review of the application. Notice shall be provided to the Land Conservation and Development Commission (LCDC) of any proposed amendment or new regulation as provided by State law. In addition, notice of any proposed amendment that may affect private access to state roads, or that may impact a state transportation facility, shall be provided to the Oregon Department of Transportation (ODOT).

Response: The application requirements are understood. Tax Lot 701 fronts on OR 211. It is understood that notice will be provided by the City to the Land Conservation and Development Commission (LCDC) and Oregon Department of Transportation (ODOT).

17.24.50 ACCEPTANCE OF APPLICATION

- A. The Director shall review the application in accordance with Chapter 17.20-Public Hearings;
- B. After accepting a complete application, the Director shall schedule a public hearing to be held by the Planning Commission. Notice of the hearing shall be provided in accordance with Chapter 17.22 Public Notices.

17.24.60 STAFF EVALUATION

The Director shall prepare a report that evaluates whether the proposal complies with the review criteria in Chapter 17.24.70. The report should include a recommendation for approval or denial.

17.24.70 REVIEW CRITERIA

Comprehensive Plan amendments shall be reviewed to assure consistency with the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City Council. Amendments shall be approved only when the following findings are made:

- A. The change being proposed is the best means of meeting the identified public need; and
- B. The change conforms to all applicable Statewide Planning Goals.

Response: This written document addresses applicable portions of the City of Sandy Land Development Code (SDC), Comprehensive Plan, and LCDC Statewide Planning Goals. The review criteria have been met.

17.24.80 ACTION BY THE HEARING BODY



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- A. Planning Commission. The Planning Commission shall conduct a public hearing in accordance with Chapter 17.20-Public Hearings. Following the close of the public hearing, the Commission shall make a recommendation to the City Council concerning the proposed Comprehensive Plan map amendment. The Commission's recommendations shall include findings that specify how the proposal has or has not complied with the above review criteria.
 - B. City Council. Upon receipt of the Planning Commission's recommendation the matter shall be set for a de novo public hearing before the City Council. Following the close of the public hearing, the City Council shall either deny the application or adopt an ordinance approving the proposed Comprehensive Plan map amendment or a modification thereof. The City Council's decision shall include findings that specify how the proposal has or has not complied with the above review criteria.
 - C. Notwithstanding any contrary code provision and in the City Council's sole discretion, it may allow an amendment to proceed directly to a public hearing before the City Council without a hearing or recommendation from the Planning Commission.

17.24.90 NOTICE OF DECISION

The Director shall provide the applicant with a notice of decision that includes a written statement of the City Council's decision, a reference to findings leading to it, and appeal period deadline. A notice of the decision shall also be mailed to persons who participated orally or in writing at the public hearing and who in writing requested notice of the decision.

Response: This above procedural standards are understood and do not require action by the Applicant.

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CHAPTER 17.26 - ZONING DISTRICT AMENDMENTS

17.26.00 INTENT

This chapter sets forth review criteria and procedural requirements for quasi-judicial and legislative zoning map amendments to accomplish the following: A. Maintain sound, stable, and desirable development within the City;

- B. Permit changes in zoning district boundaries where appropriate;
- C. Ensure zoning changes are consistent with the community's land use policies and goals; and
- D. Lessen the influence of private economic interests in the land use decision-making process.

17.26.10 BACKGROUND

The Zoning Map is consistent with the adopted Comprehensive Plan, as amended, and as such it is a reflection of the City's land use planning goals. The Zoning Map has been adopted as part of the Development Code. Frequent and piecemeal amendments to the Zoning Map can threaten the integrity of the Comprehensive Plan and the likelihood of its successful implementation. Nevertheless, it may be necessary to amend the Zoning Map from time to time to correct errors or to respond to changing conditions or unforeseen circumstances.



When a zoning district is amended there often must be a corresponding change to the Comprehensive Plan map. There are, however, instances where more than one zoning district matches the Comprehensive Plan designation. In these situations, the zoning district can be amended without a Plan map change. The table below illustrates the relationship between the Comprehensive Plan and the Zoning Map designations in the City.

Zoning district changes are classified as legislative or quasi-judicial, depending on the number of properties involved. Changes to the Zoning Map are reviewed initially by the Planning

Commission with a recommendation forwarded to the City Council. The City Council conducts a public hearing and considers adoption of changes. A Zoning Map application may be reviewed in conjunction with a Comprehensive Plan map amendment or other land use application.

17.26.20 COMPREHENSIVE PLAN & CORRESPONDING ZONING MAP DESIGNATIONS

| PLAN MAP DESIGNATION | ZONING MAP DESIGNATION |
|-------------------------------|--|
| RESIDENTIAL | RESIDENTIAL |
| LDR – Low Density Residential | SFR Single Family (3-5.8 units/net acre) R-1 Low Density (5-8 units/net acre) |
| MDR – Medium Density | R-2 Medium Density (8-14 units/net acre) |
| HDR – High Density | R-3 High Density (10-20 units/net acre) |
| COMMERCIAL | C-1 Central Business District |
| | C-2 General Commercial |
| | C-3 Village Commercial |
| INDUSTRIAL | INDUSTRIAL |
| | I-1 Industrial Park |
| | I-2 Light Industrial |
| | I-3 Heavy Industrial |

Response: It is understood that the portion of the property that is planned to be annexed will be designated Low Density Residential (LDR) and Single Family Residential (SFR).

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17.26.40 QUASI-JUDICIAL AMENDMENT PROCEDURES

All zoning district changes not deemed legislative shall be quasi-judicial.

- A. **Initiation-Quasi-Judicial.** Initiation of a zoning district change that is quasi-judicial in nature may be accomplished by one of the following ways:
 1. Filing of an application by the owner(s) of the subject property(ies); or
 2. A majority vote of the City Council or Planning Commission following the same procedures used for legislative amendments discussed above.

Where a motion by either the City Council or Planning Commission involves a Planned Development designation, the motion need not include a conceptual or detailed development plan.

- B. **Review Criteria.** Quasi-judicial zoning district changes shall be reviewed to:
 1. Determine the effects on City facilities and services;



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2. To assure consistency with the purposes of this chapter;
 3. To assure consistency with the policies of the Comprehensive Plan;
 4. To assure consistency with the Statewide Planning Goals as may be necessary, and any other applicable policies and standards adopted by the City Council.

Response: This application addresses City facilities and services, consistency with Chapter 17 and the policies of the Comprehensive Plan, and the applicable LCDC Statewide Planning Goals. The review criteria have been addressed and met.

- C. **Application Requirements.** An application for quasi-judicial zoning district change shall be made on forms provided by the Director and shall include the following where applicable:
 1. Description of the land (address, lot, block, or similar description);
 2. Narrative addressing how the application meets the review criteria;
 3. Maps, drawings, and such other information as may be needed for an adequate review of the application;
 4. List of affected property owners, from current Clackamas County Assessor's Office records, within 300 feet of the boundaries of the parcel(s) proposed for a zoning district change; and
 5. If a proposed zoning district change is to include land in more than one ownership, the application must be submitted jointly by all of the owners or authorized agents.

Response: The above-listed submittal items have been included within the application materials. The zoning district change involves land in more than one ownership; as such, the application is submitted jointly by the property owners.

17.26.60 ACTION BY THE HEARING BODY

- A. **Planning Commission.** The Planning Commission shall conduct a public hearing in accordance with Chapter 17.20-Public Hearings. Following the close of the public hearing the Commission shall make a recommendation to the City Council concerning the proposed Zoning Map amendment. The Commission's recommendations shall include findings that specify how the proposal has or has not complied with the above review criteria;
- B. **City Council.** Upon receipt of the Planning Commission's recommendation the matter shall be set for a public hearing before the City Council. Following the close of the public hearing the City Council shall either deny the application or adopt an ordinance approving the proposed Zoning Map amendment or a modification thereof. The City Council's decision shall include findings that specify how the proposal has or has not complied with the above review criteria.
- C. Notwithstanding any contrary code provision and in the City Council's sole discretion, it may allow an amendment to the zoning map or to the development code to proceed directly to a public hearing before the City Council without a hearing or recommendation from the Planning Commission.

17.26.70 NOTICE OF DECISION



The Director shall provide the applicant with a notice of decision that includes a written statement of the City Council's decision, a reference to findings leading to it, and appeal period deadline. A notice of the decision shall also be mailed to persons who participated orally or in writing at the public hearing and, for legislative zone amendments, who in writing requested notice of the decision.

17.26.80 APPEALS

The decision of the hearing authority may be appealed in accordance with Chapter 17.28 Appeals.

17.26.90 EFFECTIVE DATE

The decision of the City Council made in conjunction with a Zoning Map amendment shall become effective 30 days after passage of the ordinance. No zoning district changes will take effect, however, until and unless the necessary Comprehensive Plan amendment has been implemented by the City Council, if needed.

Response: The procedural standards listed above are understood.

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CHAPTER 17.78 - ANNEXATION

17.78.00 INTENT

The procedures and standards established in this chapter are required for review of proposed annexations in order to:

- A. Maximize citizen involvement in the annexation review process by holding a public hearing;
- B. Establish a system for measuring the physical, environmental, fiscal and related social effects of proposed annexations; and,
- C. Where possible and practical, avoid the creation of irregular boundaries or annexations that create "island," "cherry stem" or "shoestring" annexations.

Response: The above procedural standards are understood.

17.78.10 PROCEDURAL CONSIDERATIONS

- A. The corporate limits of the City shall include all territory encompassed by its boundaries as they now exist or are modified as provided herein unless mandated by State Law.
- B. The City may annex an island if it is less than 100 acres and has at least 80 percent of its boundary contiguous to the City; or the land is of any size and has at least 80 percent of its boundary contiguous to the City if the area to be annexed existed as an island before October 20, 1997.

Response: The subject property is not an island. The standard is not applicable.

- C. The City may annex land for public facilities. Public facilities include but are not limited to schools, senior centers, roads, police and fire stations, parks or open space, and public water, sewer and storm drainage facilities.

Response: This application involves annexation of land for the extension of a public transportation facility (i.e., Gunderson Road) as illustrated in the City of Sandy TSP and parkland dedication. The property (Tax Lot 701) has a total area of ±14.30 acres, though only the acreage required for the road right-of-way and associated improvements, and area for parkland dedication are planned to be annexed to the City of Sandy; the total area planned for annexation is approximately 5.40 acres.



17.78.15 TYPES OF ANNEXATION

- A. Type A: Annexation in conformance with conceptual zoning designation
- B. Type B: Annexation + zone change
- C. Type C: Annexation + plan map change + zone change

Response: This application involves a Type C Annexation.

17.78.20 CONDITIONS FOR ANNEXATION

The following conditions must be met prior to beginning an annexation request:

- A. The requirement of Oregon Revised Statutes, Chapters 199 and 222 for initiation of the annexation process are met;
- B. The site must be within the City of Sandy Urban Growth Boundary (UGB);
- C. The site must be contiguous to the city or separated from it only by a public right-of-way or a stream, bay, lake or other body of water.
- D. The site has not violated Section 17.78.25.

Response: An application for an amendment of the Sandy UGB to include Tax Lot 701 is being submitted for processing concurrently with this application. The site is contiguous to Tax Lot 803 of Clackamas County Assessor's Map 2 4E 23, which is located within the City limits, and has not violated Section 17.78.25.

17.78.25 TREE RETENTION

The intent of this section is to treat property with annexation potential (in the UGB) as if it had been subject, prior to annexation, to the tree retention provisions of the City's Urban Forestry Ordinance (Chapter 17.102) and Flood and Slope Hazard (FSH) Overlay District (Chapter 17.60), to discourage property owners from removing trees prior to annexation as a way of avoiding Urban Forestry Ordinance provisions, and to prevent unnecessary tree removal for future subdivision layout. In accordance with ORS 527.722, the State Forester shall provide the City with a copy of the notice or written plan when a forest operation is proposed within the UGB. The City shall review and comment on an individual forest operation and inform the landowner or operator of all other regulations that apply but that do not pertain to activities regulated under the Oregon Forest Practices Act.

- A. Properties shall not be considered for annexation for a minimum of five (5) years if any of the following apply:
 - 1. Where any trees six (6) inches or greater diameter at breast height (DBH) have been removed within 25 feet of the high water level along a perennial stream in the five years prior to the annexation application.
 - 2. Where more than two (2) trees (six (6) inches or greater DBH) per 500 linear feet have been removed in the area between 25 feet and 80 feet of the high water level of Tickle Creek in the five years prior to the annexation application.
 - 3. Where more than two (2) trees (six (6) inches or greater DBH) per 500 linear feet have been removed in the area between 25 feet and 50 feet of the high water level along other perennial streams in the five years prior to the annexation application.



-
4. Where any trees six (6) inches or greater DBH have been removed on 25 percent or greater slopes in the five years prior to the annexation application.
 5. Where more than ten (10) trees (11 inches or greater DBH) per gross acre have been removed in the five years prior to the annexation application, except as provided below:
 - a. Sites under one (1) acre in area shall not remove more than five (5) trees in the five years prior to the annexation application.
 - b. Sites where removal of ten (10) or fewer trees will result in fewer than three (3) trees per gross acre remaining on the site. Tree removal may not result in fewer than three (3) trees per gross acre remaining on the site. At least three (3) healthy, nonnuisance trees 11 inches DBH or greater must be retained for every one-acre of contiguous ownership.
 - c. For properties in or adjacent to the Bornstedt Village Overlay (BVO), tree removal must not result in fewer than six (6) healthy 11 inch DBH or greater trees per acre.

Response: The subject property has not violated Section 17.78.25, above, and the property should be considered for annexation.

B. Exceptions. The City Council may grant exceptions to this section where:

1. The property owner can demonstrate that Douglas Fir, Western Red Cedar, or other appropriate native trees were planted at a ratio of at least two trees for every one tree removed no less than five years prior to the submission of the annexation application, and at least 50 percent of these trees have remained healthy; or
2. The Council finds that tree removal was necessary due to hazards, or utility easements or access; or
3. The trees were removed because they were dead, dying, or diseased and their condition as such resulted from an accident or non-human cause, as determined by a certified arborist or other qualified professional; or
4. The trees removed were nuisance trees; or
5. The trees were removed as part of a stream restoration and enhancement program approved by the Oregon Department of Fish and Wildlife as improving riparian function; or
6. The trees removed were orchard trees, Christmas trees, or commercial nursery trees grown for commercial purposes; or
7. The application of this section will create an island of unincorporated area.

Response: This application does not require an exception to Section 17.78.25.

17.78.30 ZONING OF ANNEXED AREAS

- A.** All lands within the urban growth boundary of Sandy have been classified according to the appropriate city land use designation as noted on the comprehensive plan map (as per the city/county urban growth management area agreement). The zoning classification shall reflect the city land use classification as illustrated in Table 17.26.20.



-
- B. Where only a single city zoning designation corresponds to the comprehensive plan designation (Type A) and the rezoning decision does not require the exercise of legal or policy judgment on the part of the City Council, amendment of the zoning map shall be a ministerial decision of the Director made without notice or any opportunity for a hearing.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. This application includes a comprehensive plan amendment to apply City zoning to allow for creation of a public transportation facility and parkland dedication. Consistent with abutting property designations, the Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. The transportation facility/road and parkland are permitted uses under the above designation as minor public facilities.

17.78.40 EXISTING USE, ACTIVITY OR STRUCTURE

- A. As of the effective date of annexation, no use or activity shall be considered non-conforming if the use or activity: (1) violates or conflicts with county zoning regulations and (2) is not classified as non-conforming under county zoning regulations. Any such use or activity shall constitute a violation of this ordinance.
- B. Any use, activity or structure that is existing at the effective date of annexation, under a Clackamas County use permit with a time limit imposed, shall not be a non-conforming use, but may continue for the extent of the time limit. Such use permits may not be extended without City approval.
- C. Any lot or parcel of land duly recorded in the Clackamas County Recorder's Office prior to the effective date of this Ordinance and having an area, width, depth, or street frontage less than that required in the Zoning District regulations in which such lot or parcel is situated, shall be deemed to be a lot and may be used as a building site, provided that all other regulations for the Zoning District shall apply.

Response: The subject property is unimproved with vegetated and pastured areas and is not associated with a current use or activity. There are no structures on site. The purpose of this application is to implement an anticipated condition of approval from the City for the Bailey Meadows Subdivision application. Together with an amendment to the City's UGB, this suite of applications (i.e., annexation, comprehensive plan map amendment, and zone map amendment), an offsite transportation facility improvement (e.g. Gunderson Road extension) can be realized. The configuration, area, and geometry of the land to be annexed is reflective of the Gunderson Road extension and not intended for other uses.

17.78.50 ANNEXATION CRITERIA

Requests for annexation shall not have an adverse impact on the citizens of Sandy, either financially or in relation to the livability of the city or any neighborhoods within the annexation area. Generally, it is desirable for the city to annex an area if the annexation meets any of the following criteria:

- A. A necessary control for development form and standards of an area adjacent to the city; or
- B. A needed solution for existing problems, resulting from insufficient sanitation, water service, or other urban service related problems; or



- C. Land for development to meet urban needs and that meets a logical growth pattern of the city and encourages orderly growth; or
- D. Needed routes for utility and transportation networks.

Response: This application involves an annexation to the to the Sandy UGB to allow the extension of Gunderson Road (i.e., an urban public transportation facility) pursuant to the Sandy TSP and dedication of parkland. The extension would provide an additional access to the Bailey Meadows Subdivision and distribute traffic in the area and meet needs for an area of planned, logical urban growth.

17.78.60 APPLICATION SUBMISSION REQUIREMENTS

Requests for annexation shall be made on forms provided by the city for such purposes and shall be accompanied by the following:

- A. Written consent form to the annexation signed by the owners of all land to be annexed;
- B. A legal description certified by a registered surveyor or engineer;
- C. The application fee established by the city;
- D. A list of property owners within three hundred (300) feet of the subject property on mailing labels;
- E. Vicinity map showing the area to be annexed including adjacent city territory;

Response: The written consent form signed by the property owners, a legal description, fee, list of adjacent property owners, and vicinity map are included in the application materials. The submittal requirements have been met.

- F. Site Plan (Type A=15 copies; Type B or C = 25 copies) drawn to scale (not greater than one inch = fifty feet), indicating:
 1. The location of existing structures (if any);
 2. The location of streets, sewer, water, electric and other utilities, on or adjacent to the property to be annexed;
 3. Approximate location of areas subject to regulation under Chapter 17.60, Flood and Slope Hazard (FSH) Overlay District.

Response: The above listed information is provided, as applicable. There are no existing structures or areas of mapped Flood and Slope Hazard (FSH) overlay on the property. The submittal criteria are met.

- G. Narrative Statement explaining the proposal and addressing:
 1. Availability, capacity and status of existing water, sewer, drainage, transportation, fire, park and school facilities;

Response: The project involves annexation for the purpose of providing public facilities (e.g. transportation facility and parkland). Although Bailey Meadows Subdivision provides for and meets Sandy Development Code criteria for on-site needs, in this case the City and Applicant agree to off-site improvements (i.e., Gunderson Road extension and parkland dedication). Annexation will not create a demand for sewer, water, utility fire, or school needs, nor will the project allow residential density. The submittal criteria are met.



-
2. Additional facilities, if any, required to meet the increased demand and any proposed phasing of such facilities in accordance with projected demand; and,

Response: The project involves annexation for the purpose of providing public facilities as described above. Annexation will not create a demand for sewer, water, utility fire, or school needs, nor will the project allow residential density. The project is not planned to be phased. The submittal criteria are met.

3. Method and source of financing required to provide additional facilities, if any.

Response: As described above, the purpose of this annexation application is to provide public facilities (e.g. transportation and parkland dedication) that should be located within the City. Annexation does not create the need for additional facilities. Therefore, financing methods are not applicable.

17.78.70 REVIEW PROCEDURE

Type A, B & C

1. Pre-application conference;
2. Submission of completed application;
3. Review by Planning Commission with recommendation to City Council;
4. Review by City Council.

Response: The pre-application conference requirement was waived by the Sandy Planning Director in an email dated December 9, 2019. The applicable above procedural review items are understood.

17.78.80 EXCEPTIONS

Exceptions may be granted for identified health hazards and for those matters which the City Council determines that the public interest would not be served by undertaking the entire annexation process. The City Council may authorize an exception to any of the requirements of this chapter. An exception shall require a statement of findings that indicates the basis for the exception.

Response: This application does not require exceptions. The above criterion is understood and not applicable.

17.78.90 ANNEXATION CONDITIONS

- A. All properties annexed are subject to inclusion within applicable advance financing districts and urban renewal districts.
- B. These conditions apply to all annexed properties regardless of transfers of the ownership of such properties.

Response: The subject property may be included within applicable districts, if any apply. The criteria can be met.



IV. Conclusion

The required findings have been made and this written narrative and accompanying documentation demonstrate that the application is consistent with the applicable provisions of the City of Sandy Development Code. The evidence in the record supports approval of the application and the City can rely upon it for its approval of the application.





Exhibit A: City Application Forms and Checklists



LAND USE APPLICATION FORM

(Please print or type the information below)

Planning Department
39250 Pioneer Blvd.
Sandy OR 97055
503-489-2160

Name of Project City of Sandy UGB Annexation, Comp. Plan, and Zone Map Amendments

Location or Address Southeast of Ponder Lane, northwest of Oregon Highway 211

Map & Tax Lot Number T 25 , R 4E , Section 23 ; Tax Lot(s) 701

Request: This application involves the Annexation, Comp Plan, and Zone Map Amendments regarding the expansion of the City of Sandy's Urban Growth Boundary to accommodate a public transportation facility (e.g. Gunderson Road).

Please contact the Applicant's consultant and legal counsel (below) with any inquiries:

AKS Engineering & Forestry, LLC - Chris Goodell: (503) 563-6151; chrisg@aks-eng.com
Schwabe, Williamson & Wyatt - Michael Robinson: (503) 796-3756; mrobinson@schwabe.com

I am the (check one) owner lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

| | |
|--|--|
| Applicant (if different than owner) Allied Homes & Development | Owner Richard L Pullen, Lawrence Pullen, Sherrene Teneyck |
| Address 12404 SE Sunnyside Road, Suite 706 | Address 37020 SE Deming Road |
| City/State/Zip Clackamas, OR 97015 | City/State/Zip Sandy, OR 97055 |
| Phone Please contact Applicant's consultant | Phone Please contact Applicant's consultant |
| Email Please contact Applicant's consultant | Email Please contact Applicant's consultant |
| Signature <small>DocuSigned by:</small> <i>Cody Bugan</i> | Signature <small>DocuSigned by:</small> <small>DocuSigned by:</small> <small>DocuSigned by:</small> <i>[Signatures]</i> |

If signed by Agent, owner's written authorization must be attached.

| | | | |
|--|------|----------|--------|
| File No. | Date | Rec. No. | Fee \$ |
| Type of Review (circle one): Type I Type II Type III Type IV | | | |

W:\City Hall\Planning\Planning Forms\Forms Updated 2018\General Land Use Application - updated 2019.doc

Fees Included: \$6,033 (Annexation Type IV, Type C)



SUPPLEMENTAL LAND USE APPLICATION FORM (No. 1)

(Please print or type the information below)

Planning Department
 39250 Pioneer Blvd.
 Sandy OR 97055
 503-668-4886

ANNEXATION
 ZONE CHANGE
 COMPREHENSIVE PLAN AMENDMENT

| Property Identification | | | |
|-------------------------|----------|-------|---------|
| Tax Lot Number | Township | Range | Section |
| | | | |
| | | | |
| | | | |
| | | | |

| Existing and Proposed Land Use Designations | | | | |
|---|--------------------|----------|------------|----------|
| Tax Lot Number(s) | Comprehensive Plan | | Zoning Map | |
| | Existing | Proposed | Existing | Proposed |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

IMPORTANT: Each section on this application must be fully completed or your application could be deemed incomplete.

| Tax Lot Number | Clackamas County Recording Number | Assessed Land Value | Size in Acres or Sq. Ft. |
|----------------|-----------------------------------|---------------------|--------------------------|
| | | | |
| | | | |
| | | | |
| | | | |

LEGAL DESCRIPTION: Attach a separate page with the written metes and bounds legal description. Accuracy of the legal description(s) must be certified by a registered land surveyor for all annexation applications.

A legal description and map is included in Exhibit C.

| DESCRIBE EXISTING USES |
|-------------------------------|
| |

| DESCRIBE EXISTING BUILDINGS |
|---|
| How many buildings are located on the property? |
| Number of Total Dwelling Units : |
| |

| DESCRIBE EXISTING TOPOGRAPHY | |
|--|--|
| Approximate acreage with slopes less than 14.9% | |
| Approximate acreage with slopes 15% to 24.9% | |
| Approximately acreage with slope in excess of 25% | |
| Any creeks, water sources, drainageways or wetlands within the property? Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Any steep slopes, ravines, draws or bluffs within or abutting the property? Yes <input type="checkbox"/> No <input type="checkbox"/> | |

DESCRIBE EXISTING ACCESS

Does the subject property abut a public right-of-way? **Yes** **No**

Name of public right-of-way:

Does the property abut a private road? **Yes** **No**

Name of abutting private road(s):

Describe any unusual difficulties in accessing the property:

DESCRIBE SURROUNDING USES ON ADJACENT PROPERTIES

DESCRIBE PROPOSED USE OF THE PROPERTY OR LAND DIVISIONS
Include number of lots, densities, etc.



SUPPLEMENTAL ANNEXATION LAND USE APPLICATION FORM (No. 2)

List of all owners of property included in the application

| Owner Information | Property Description TL, Section, Township, Range |
|---|--|
| Owner Sherrene TenEyck Address 37020 SE Deming Road City/State/Zip Sandy, OR 97055 Phone Please contact Applicant's consultant | TL 24E23 00701 Section 23, Township 2S, Range 4E |
| Owner Richard Pullen Address 36969 Deming Road City/State/Zip Sandy, OR 97055 Phone Please contact Applicant's consultant | TL 24E23 00701 Section 23, Township 2S, Range 4E |
| Owner Lawrence Pullen Address 36940 Deming Road City/State/Zip Sandy, OR 97055 Phone Please contact Applicant's consultant | TL 24E23 00701 Section 23, Township 2S, Range 4E |
| Owner Address City/State/Zip Phone | |
| Owner Address City/State/Zip Phone | |



TYPE A, B or C ANNEXATIONS SUBMISSION REQUIREMENTS

All of the following materials must be submitted with your application. Prior to submitting application materials, a pre-application conference with City staff is required to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services.

- ✓ A. **One (1) copy of:**
 1. Land Use Application Form
 2. Supplemental Land Use Application Form No. 1
 3. Supplemental Annexation Land Use Application Form No. 2
 4. Narrative specifying the nature of the request and how it relates to the Comprehensive Plan goals and policies, the Development Code requirements in Chapter 17.78, urban services and financing methods, and the Zoning Map change criteria.
 5. Vicinity map showing the area to be annexed including adjacent city territory.
 6. A legal description and map certified by a registered surveyor or engineer.
- ✓ B. **Written consent form** signed by the owners of all land to be annexed.
- ✓ C. **Twenty (20) copies of the Site Plan** drawn to scale (not greater than one inch = fifty feet or as approved by the Director), indicating:
 1. The location of existing structures (if any);
 2. The location of streets, sewer, water, electric and other utilities, on or adjacent to the property to be annexed; and,
 3. Approximate location of areas subject to regulation under Chapter 17.60, Flood and Slope Hazard Overlay District.
- ✓ D. **Twenty (20) copies** of other documents as required by the Planning Director.
- ✓ E. **List of affected property owners** within 300 feet of the boundaries of the subject site and **mailing labels** for property owners within 300 feet of the site, excluding rights-of-way.
- ✓ F. **Filing Fee** per Fees and Charges Resolution
FEE INCLUDED: \$6,033 (ANNEXATION TYPE IV, TYPE C)



COMPREHENSIVE PLAN MAP AMENDMENTS

SUBMISSION REQUIREMENTS

All of the following materials must be submitted with your application. All plans should be drawn to engineering scale (1" = 10' or 1" = 20' preferred). Prior to submitting application materials, a pre-application conference with City Staff is required to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services.

- ✓ A. **One (1) copy of:**
 1. Land Use Application Form
 2. Supplemental Land Use Application Form No. 1
 3. 8-1/2" x 11" reduction of site plan
- ✓ B. **Twenty (20) copies of:**
 1. Site Plan showing the applicant's entire property and the surrounding area to a distance sufficient to determine the relationship between the applicant's property and proposed development, and adjacent property and its developed areas.
 2. Other required documents (traffic study, etc.).
 3. Narrative specifying the nature of the request and how it relates to the Comprehensive Plan goals and policies, the Development Code requirements, and the Comprehensive Plan Amendment Procedure review criteria in Section 17.24.70.
- ✓ C. **List of affected property owners** within 300 feet of the boundaries of the subject site and **mailing labels** for property owners within 300 feet of the site, excluding rights-of-way.
- ✓ D. **Filing Fee** per Fees and Charges Resolution
FEE INCLUDED: \$6,033 (ANNEXATION TYPE IV, TYPE C)



ZONING MAP AMENDMENTS SUBMISSION REQUIREMENTS

All of the following materials must be submitted with your application. All plans should be drawn to engineering scale (1" = 10' or 1" = 20' preferred). Prior to submitting application materials, a pre-application conference with City Staff is required to discuss procedures for approval, applicable state and local requirements, objectives and policies of the Sandy Comprehensive Plan, and the availability of services.

- ✓ A. **One (1) copy of:**
 1. Land Use Application Form
 2. Supplemental Land Use Application Form No. 1
 3. 8-1/2" x 11" reduction of site plan
- ✓ B. **Twenty (20) copies of (and digital version):**
 1. Site Plan showing the applicant's entire property and the surrounding area to a distance sufficient to determine the relationship between the applicant's property and proposed development and adjacent property and development.
 2. Other required documents (traffic study, etc.).
 3. Narrative specifying the nature of the request and how it relates to the Comprehensive Plan goals and policies, the Development Code requirements, and the Zoning Map change criteria in Section 17.26.40.
- ✓ C. **List of affected property owners** within 300 feet of the boundaries of the subject site and **mailing labels** for property owners within 300 feet of the site, excluding rights-of-way
- ✓ D. **Filing Fee** per Fees and Charges Resolution
FEE INCLUDED: \$6,033 (ANNEXATION TYPE IV, TYPE C)


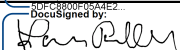
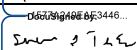


Exhibit B: Annexation Written Consent Form

Written Consent Form

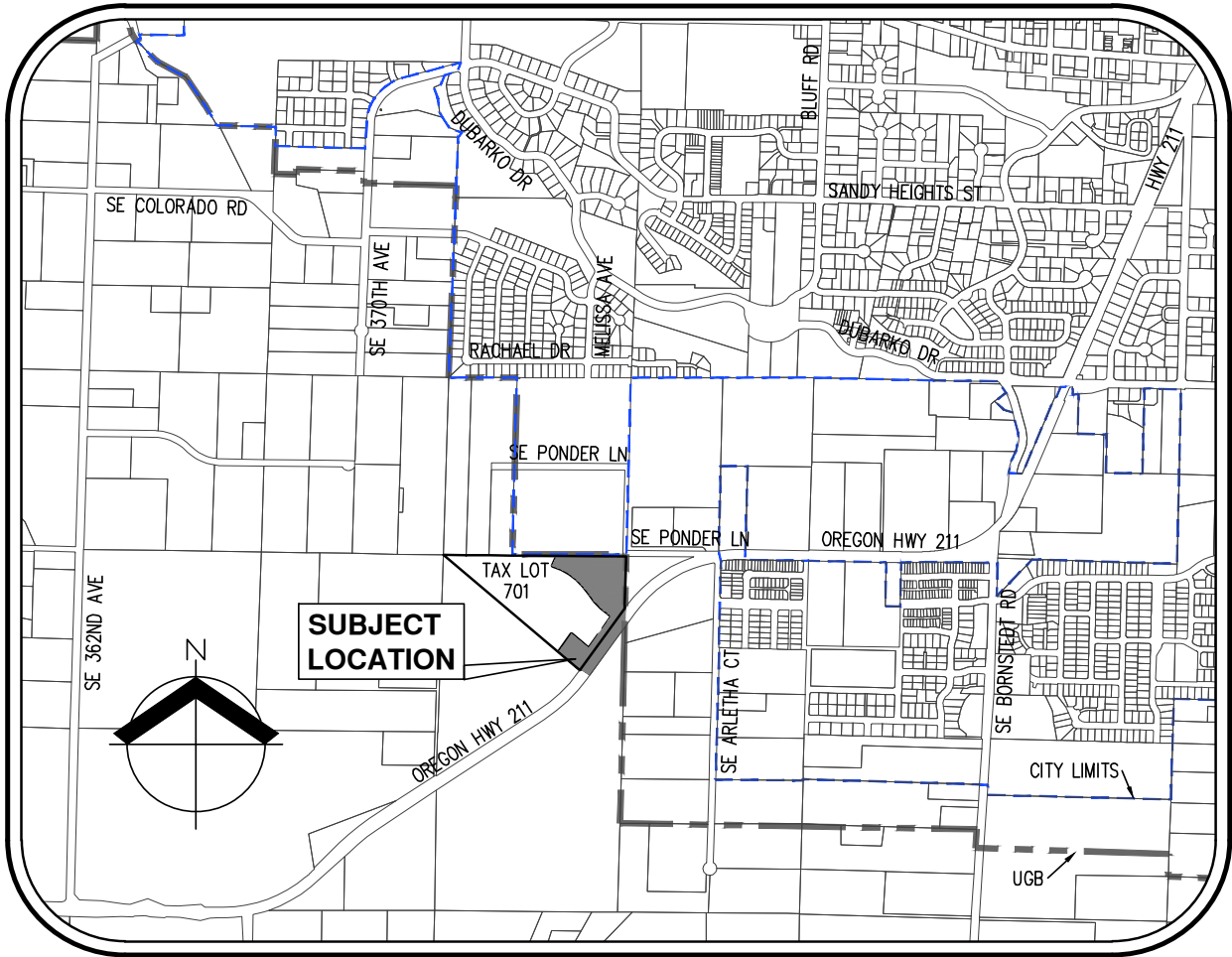
We, the undersigned property owners of and/or registered voters in the area described below, hereby petition for, and give our consent to, annexation of the area to the City of Sandy.

Note: This petition may be signed by qualified persons even though they may not know their property description or precinct number.

| Date | Signature | Printed Name | I am a: | | | Address | Property Description or Parcel ID | Precinct Number |
|------------|---|--------------------------|---------|----|----|--|-----------------------------------|-----------------|
| | | | PO | RV | OV | | | |
| 12/20/2019 |  | Richard L Pullen | X | | | 36969 Deming Road, Sandy, OR 97055 | | |
| 12/27/2019 |  | Lawrence Pullen | X | | | 36940 Deming Road, Sandy, OR 97055 | | |
| 12/21/2019 |  | Sherrene Lanette TenEyck | X | | | 37020 SE Deming Rd, Sandy, OR 97055 | | |
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PO- Property Owner
 RV – Registered Voter
 OV – Owner and Registered Voter

Exhibit C: Site Maps and Legal Description



VICINITY MAP
 NOT TO SCALE



AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 | www.aks-eng.com

AKS Job #7107

OFFICES IN: BEND, OR - KEIZER, OR - TUALATIN, OR - VANCOUVER, WA

EXHIBIT A

Legal Description

A tract of land, and a portion of right-of-way, located in the Northeast One-Quarter of Section 23, Township 2 South, Range 4 East, Willamette Meridian, Clackamas County, Oregon, and being more particularly described as follows:

Commencing at the northeast corner of Parcel 1 of Partition Plat 2018-030, Clackamas County Plat Records; thence along the north line of Document Number 93-28438, Clackamas County Deed Records, South 89°52'25" East 823.67 feet to the Point of Beginning; thence continuing along said north line, South 89°52'25" East 495.53 feet to the northeast corner of said deed; thence along the east line of said deed and the southerly extension thereof, South 01°24'04" West 532.91 feet to the southeasterly right-of-way line of Woodburn-Sandy Highway (40.00 feet from centerline); thence along said southeasterly right-of-way line, South 35°02'39" West 438.40 feet; thence leaving said southeasterly right-of-way line, North 54°57'21" West 80.00 feet to the northwesterly right-of-way line of Woodburn-Sandy Highway (40.00 feet from centerline), also being the southwesterly corner of said deed; thence along the southwesterly line of said deed, North 49°21'56" West 200.96 feet; thence leaving said southwesterly line, North 35°02'39" East 150.72 feet; thence South 49°21'56" East 160.76 feet to a line which is parallel with and 40.00 feet northwesterly of, when measured at right angles to, said northwesterly right-of-way line; thence along said parallel line, North 35°02'39" East 295.25 feet; thence leaving said parallel line, North 54°57'21" West 25.00 feet; thence along a curve to the right with a Radius of 533.00 feet, a Delta of 23°05'54", a Length of 214.88 feet, and a Chord of North 43°24'23" West 213.42 feet; thence along a curve to the left with a Radius of 467.00 feet, a Delta of 41°16'55", a Length of 336.48 feet, and a Chord of North 52°29'54" West 329.25 feet to a point of non-tangency (Radial Bearing of South 16°51'38" West); thence North 23°37'27" East 93.53 feet to the Point of Beginning.

The above described tract of land contains 5.29 acres, more or less.

1/7/2020

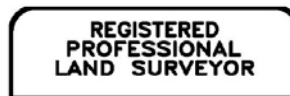
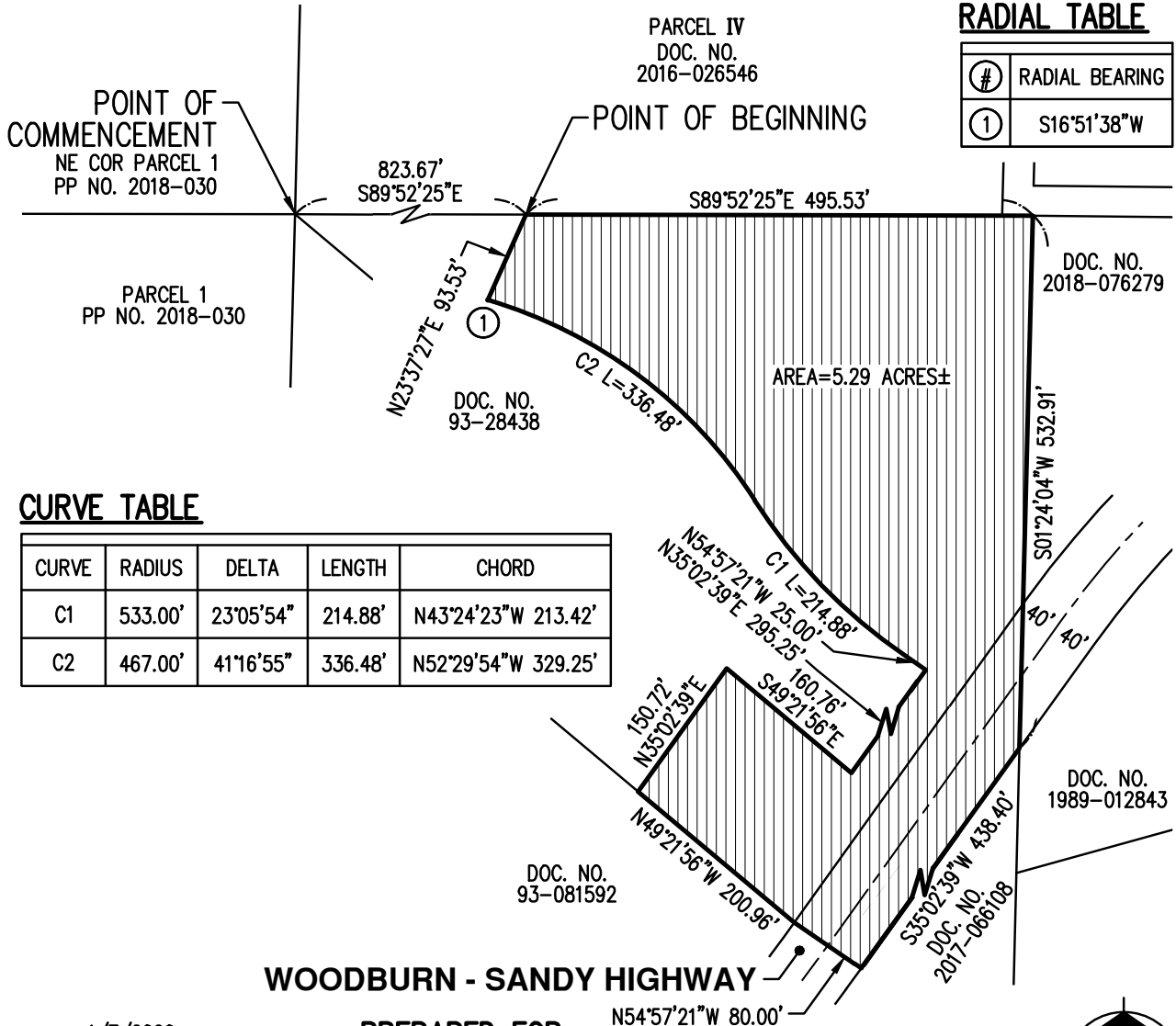


EXHIBIT B

A TRACT OF LAND, AND A PORTION OF RIGHT-OF-WAY,
 LOCATED IN THE NORTHEAST 1/4 OF SECTION 23,
 TOWNSHIP 2 SOUTH, RANGE 4 EAST, WILLAMETTE MERIDIAN,
 CLACKAMAS COUNTY, OREGON



RADIAL TABLE

| # | RADIAL BEARING |
|---|----------------|
| ① | S16°51'38"W |

CURVE TABLE

| CURVE | RADIUS | DELTA | LENGTH | CHORD |
|-------|---------|-----------|---------|---------------------|
| C1 | 533.00' | 23°05'54" | 214.88' | N43°24'23"W 213.42' |
| C2 | 467.00' | 41°16'55" | 336.48' | N52°29'54"W 329.25' |

1/7/2020

REGISTERED
 PROFESSIONAL
 LAND SURVEYOR

Benjamin R Huff

OREGON
 MARCH 14, 2017
 BENJAMIN R HUFF
 84738PLS

RENEWS: 6/30/21

PREPARED FOR

ALLIED HOMES & DEVELOPMENT
 12042 SE SUNNYSIDE ROAD, SUITE 706
 CLACKAMAS, OR 97015

N54°57'21"W 80.00'

SCALE: 1"=150 FEET

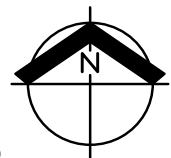
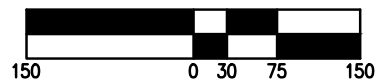


EXHIBIT MAP

AKS ENGINEERING & FORESTRY, LLC
 12965 SW HERMAN RD, STE 100
 TUALATIN, OR 97062
 503.563.6151 WWW.AKS-ENG.COM



EXHIBIT
B

DRWN: WCB
 CHKD: BRH

AKS JOB:
 7107

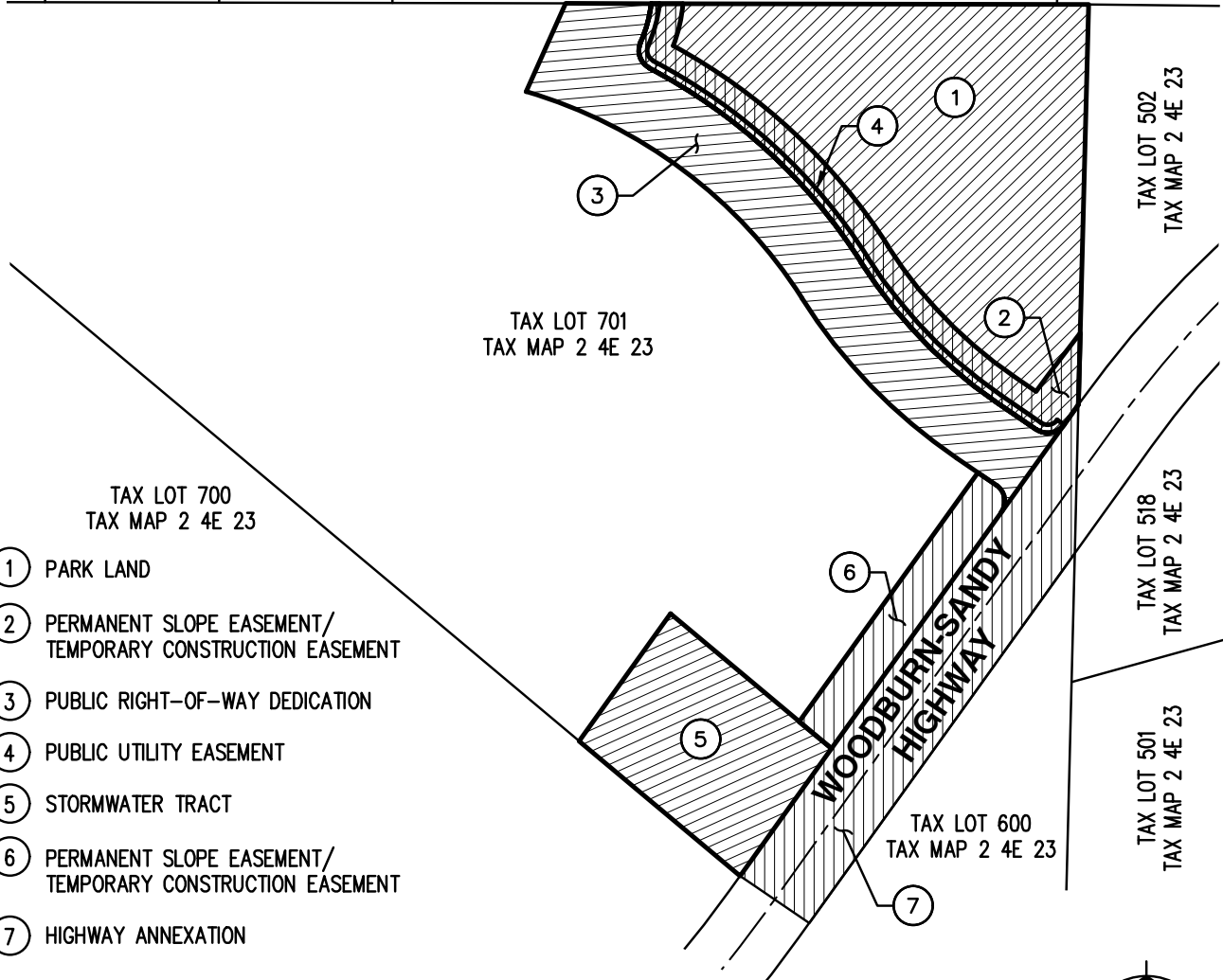
EXHIBIT KEY MAP

TAX LOT 807
TAX MAP 2 4E 23

TAX LOT 800
TAX MAP 2 4E 23

TAX LOT 803
TAX MAP 2 4E 23

PONDER LANE



- ① PARK LAND
- ② PERMANENT SLOPE EASEMENT/
TEMPORARY CONSTRUCTION EASEMENT
- ③ PUBLIC RIGHT-OF-WAY DEDICATION
- ④ PUBLIC UTILITY EASEMENT
- ⑤ STORMWATER TRACT
- ⑥ PERMANENT SLOPE EASEMENT/
TEMPORARY CONSTRUCTION EASEMENT
- ⑦ HIGHWAY ANNEXATION

TAX LOT 700
TAX MAP 2 4E 23

TAX LOT 701
TAX MAP 2 4E 23

TAX LOT 502
TAX MAP 2 4E 23

TAX LOT 518
TAX MAP 2 4E 23

TAX LOT 501
TAX MAP 2 4E 23

TAX LOT 600
TAX MAP 2 4E 23

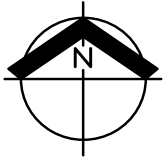
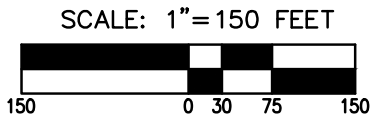
1/7/2020

**REGISTERED
PROFESSIONAL
LAND SURVEYOR**

Benjamin R Huff
OREGON
MARCH 14, 2017
BENJAMIN R HUFF
84738PLS
RENEWS: 6/30/21

PREPARED FOR

ALLIED HOMES & DEVELOPMENT
12042 SE SUNNYSIDE ROAD, SUITE 706
CLACKAMAS, OR 97015



| | | |
|--|--|--|
| SE PONDER LANE - SANDY | | EXHIBIT KEY |
| AKS ENGINEERING & FORESTRY, LLC 12965 SW HERMAN RD, STE 100 TUALATIN, OR 97062 503.563.6151 WWW.AKS-ENG.COM | | DRWN: WCB CHKD: BRH AKS JOB: 7107 |





**Exhibit D: Lancaster Mobley Engineering
Traffic Documentation**

Technical Memorandum

To: Cody Bjugan, Allied Homes & Development
From: Jessica Hijar
Date: January 6, 2020
Subject: UGB Amendment & Gunderson Road Connection
 Traffic Impact Analysis, Addendum #1



**LANCASTER
ENGINEERING**

321 SW 4th Ave., Suite 400
 Portland, OR 97204
 phone: 503.248.0313
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 lancasterengineering.com

This memorandum is written as an addendum to the Bailey Meadows Subdivision Traffic Impact Analysis prepared by Lancaster Engineering dated June 20, 2019. Specifically, analysis is provided regarding the potential new roadway connection to Highway 211. The current planning effort includes a connection of Gunderson Road to Highway 211 as considered in the City of Sandy's Transportation System Plan (TSP).

In addition, this memorandum addresses the Transportation Planning Rule and associated approval criteria relative to the proposed Urban Growth Boundary (UGB) amendment, comprehensive plan and zone map amendments, and annexation applications. All of these are necessary to accommodate a connection of Gunderson Road to Highway 211.

Future Roadway Connection

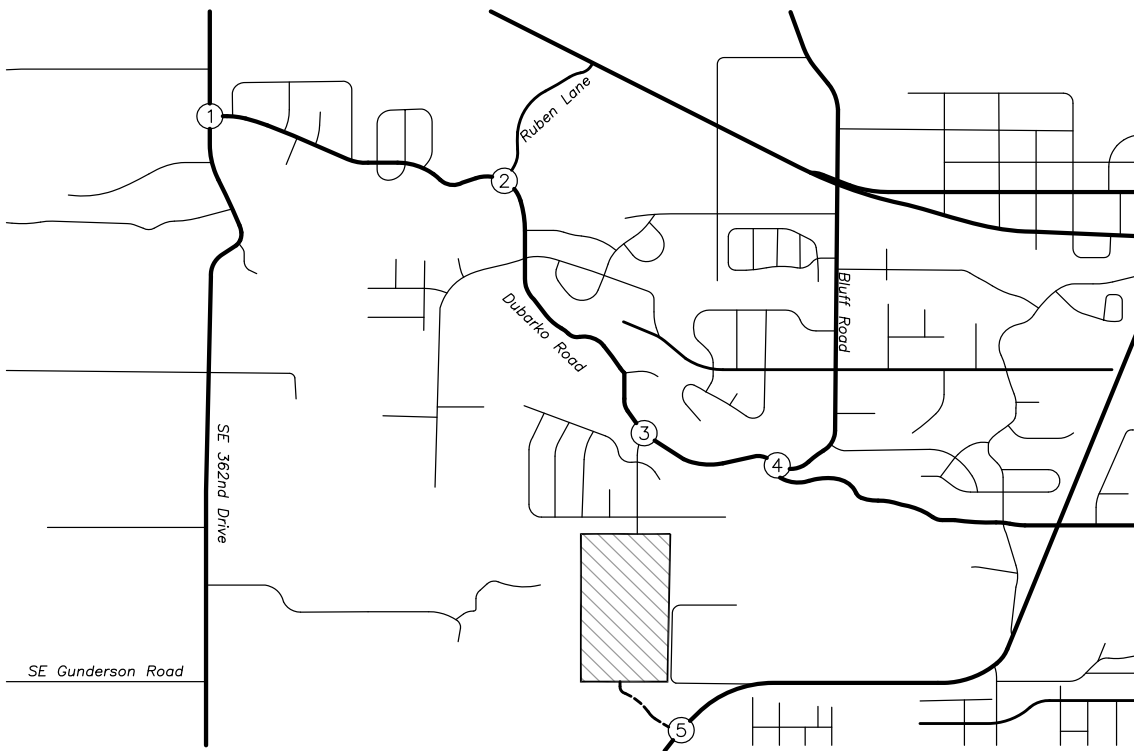
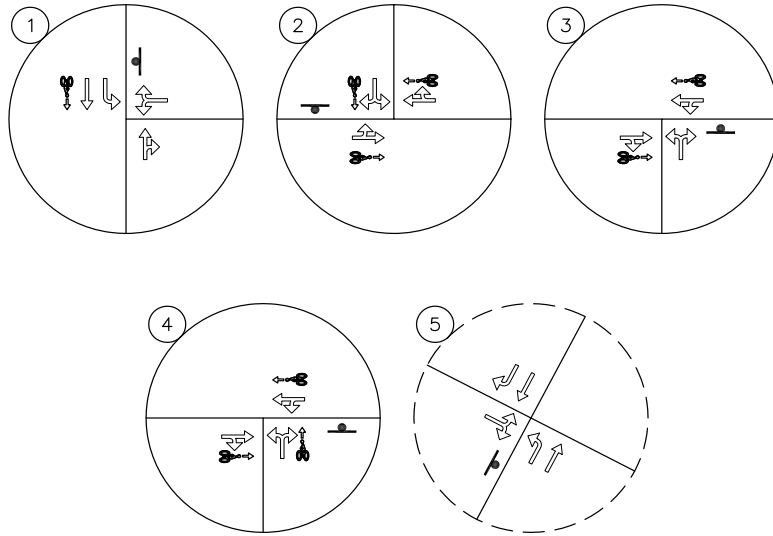
The planned connection of Gunderson Road to Highway 211 will provide an additional route into and out of the Bailey Meadows subdivision as well as the existing neighborhood to the north. This will reduce reliance on Melissa Avenue, which will provide access to the Bailey Meadows subdivision via Dubarko Road. The planned intersection of Gunderson Road at Highway 211 will be a three-legged intersection that is stop-controlled for the SE Gunderson Road approach. Future development on the south side of Highway 211 could extend the street to the east, to eventually connect with Cascadia Village Drive, as shown in the TSP. The existing characteristics of the subject roadways are shown in Table 1. The existing and future intersection configurations are shown in Figure 1 on page two.

Table 1: Vicinity Roadway Characteristics

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|--------------------------|---------------|-----------------------|------------------|---------|-----------|---------------|
| Highway 211 | ODOT | District Highway | 45-55 mph posted | No | No | Partial |
| Gunderson Road (planned) | City of Sandy | Future Minor Arterial | Not Posted | Partial | Partial | Yes |

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STUDY INTERSECTION (PROPOSED)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY
-  FUTURE MINOR ARTERIAL



VICINITY MAP



FIGURE 1

PAGE 2



Trip Distribution

The Gunderson connection to Highway 211 is expected to serve trips to and from the Bailey Meadows subdivision, as well as trips from the existing neighborhood north of Bailey Meadows, which currently uses only Melissa Avenue. Based on travel time studies, it is not expected that traffic from outside the immediate area (such as residents in Bornstedt Village or Cascadia Village) would use the new Gunderson Road connection as a bypass route. Those trips would have to use Gunderson Road, three different streets within Bailey Meadows, Melissa Avenue, and Dubarko Road. This would be a very circuitous route and would not be faster than existing travel routes serving these neighborhoods.

Bailey Meadows Trips

The overall directional distribution of site trips to and from Bailey Meadows was based on the original TIS, but trip routing was modified to reflect the new street connection.

To & From the East

It is expected that the 15 percent of site trips in the TIS previously assigned to Dubarko Road to the east will all use the new Gunderson Road connection. Turning left onto Highway 211 at the new intersection will have significantly lower delay than turning left or crossing Highway 211 at Dubarko Road.

Contribution: 15% via Gunderson

To & From the South

A total of 10 percent of the trips are expected to be to and from the south, and all these trips will use the Gunderson Road connection to Highway 211, since that will be a much more direct route.

Contribution: 10% via Gunderson

To & From the West

Trips to and from the west (30%) were assigned primarily to 362nd Avenue, as this is the quickest route to shopping destinations as well as Highway 26 west of Sandy. Travel time studies show that the route using Dubarko Road to 362nd Avenue is identical in time to the route using Highway 211 to 362nd Avenue. Therefore, the 30% was split evenly via Melissa Avenue to the north and Gunderson Road to the south.

Contribution: 15% via Gunderson

The total percentage of site trips using Gunderson Road is 40 percent, or 378 of the site's 944 trips per day.



Rerouted Existing Trips

Since 40 percent of the Bailey Meadows trips are expected to use the Gunderson Road connection to Highway 211, it is expected that a similar, although slightly lower percentage of the existing neighborhood traffic would also use Gunderson. Since the existing neighborhood is north of the project site, the use of Gunderson could decrease from 40 percent to approximately 30 percent. As shown in the TIS, the existing traffic volume on Melissa Avenue was measured to be 1160 vehicles per day.

In total, 30 percent of the existing 1160 average daily traffic (ADT) on Melissa Avenue would reroute via Gunderson Road, or 348 trips per day.

In summary, the table below shows the total daily traffic volumes to the north (via Melissa Avenue) and to the south (via Gunderson Road) with the future street connection in place.

Table 2: Trip Distribution Summary

| | Daily Traffic Volumes | |
|--|-----------------------|----------------|
| | Melissa Avenue | Gunderson Road |
| Existing neighborhood traffic | 1160 | 0 |
| Existing neighborhood traffic w/ Gunderson | 812 | 348 |
| Bailey Meadows site trips with Gunderson | 566 | 378 |
| <i>Total Daily Volume with Gunderson</i> | <i>1378</i> | <i>726</i> |

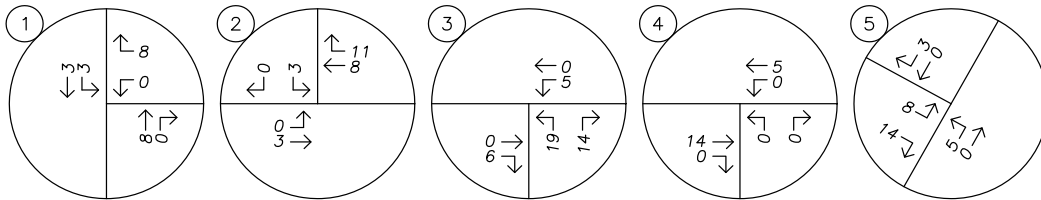
The updated trip distribution and assignment during the morning and evening peak hours are shown in Figure 2 on page five.

LEGEND

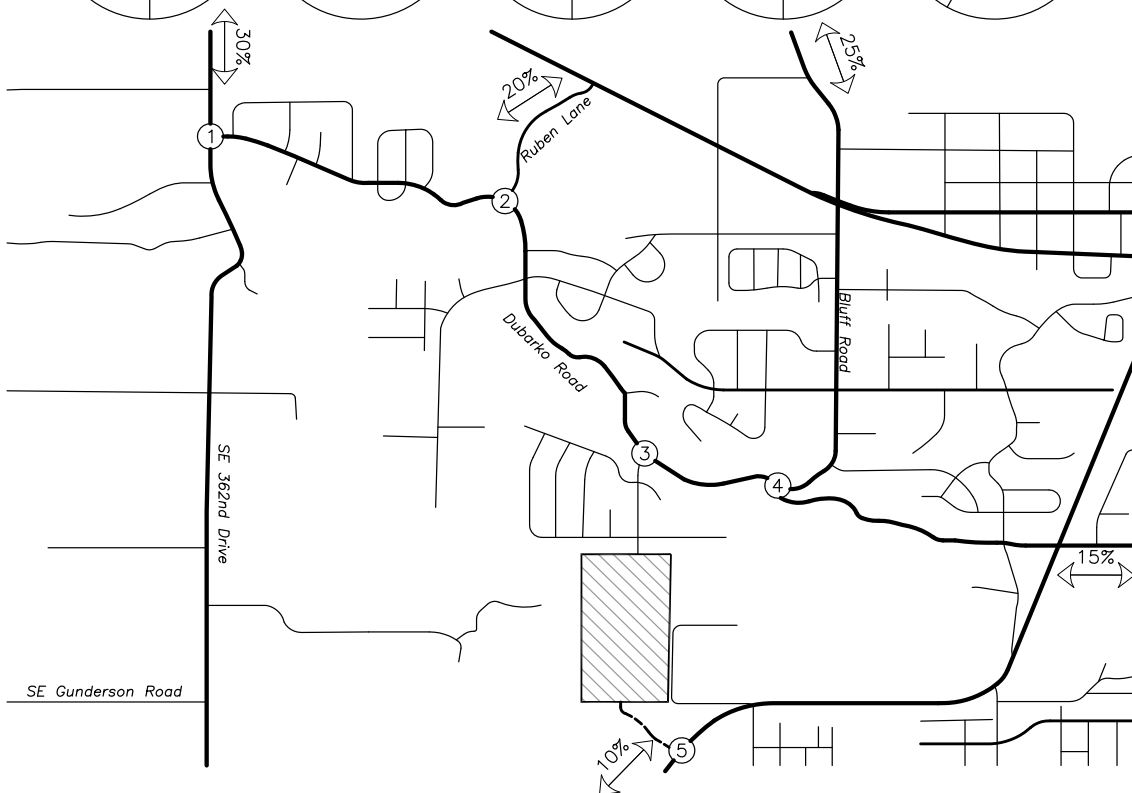
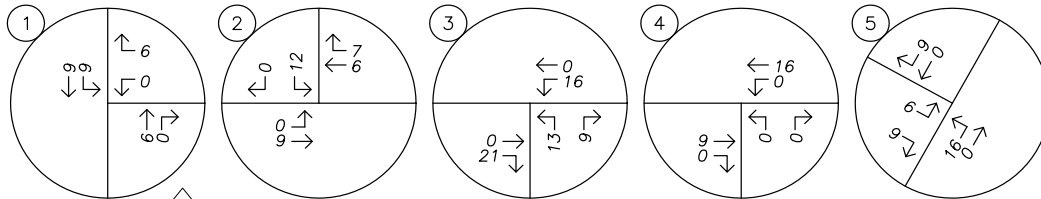
XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |

AM PEAK HOUR



PM PEAK HOUR



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Development Plan – Site Trips
 AM & PM Peak Hours



FIGURE
2
PAGE
5



Traffic Volumes

Existing Conditions

Twenty-four-hour speed data was collected on Highway 211 near the intersection with Ponder Lane on December 4th, 2018. The morning and evening peak hours of traffic occurred between 7:00 AM and 8:00 AM and between 4:00 PM and 5:00 PM, respectively.

Since Highway 211 is under the jurisdiction of ODOT, highway traffic volumes were seasonally adjusted to reflect the 30th highest hour per methodologies in ODOT's Analysis Procedures Manual (APM). Based on the commuter seasonal trend in ODOT's 2018 Seasonal Trend Table, a seasonal factor of 1.122 was calculated and applied to through volumes on Highway 211.

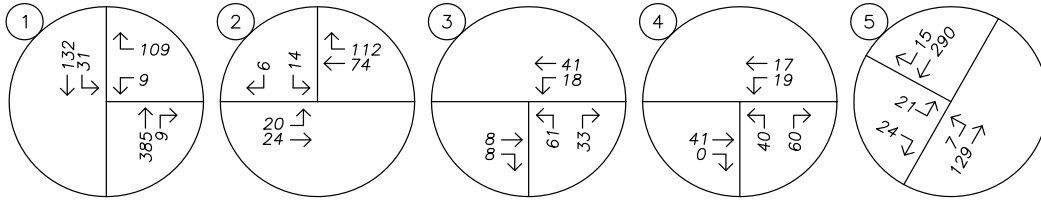
Buildout Conditions

A compounded growth rate of two percent per year was used to estimate growth on all streets under the City of Sandy jurisdiction as described within the TIS. Growth rates for traffic volumes on Highway 211 were derived using ODOT's 2037 Future Volume Tables in accordance with the APM. Using data corresponding to mileposts 3.75 and 5.07, a linear growth rate of 2.8 percent was calculated and applied to through volumes on the highway. Traffic volumes were projected over a period of four years in order to estimate the year 2022 buildout traffic volumes (traffic count data was collected in 2018).

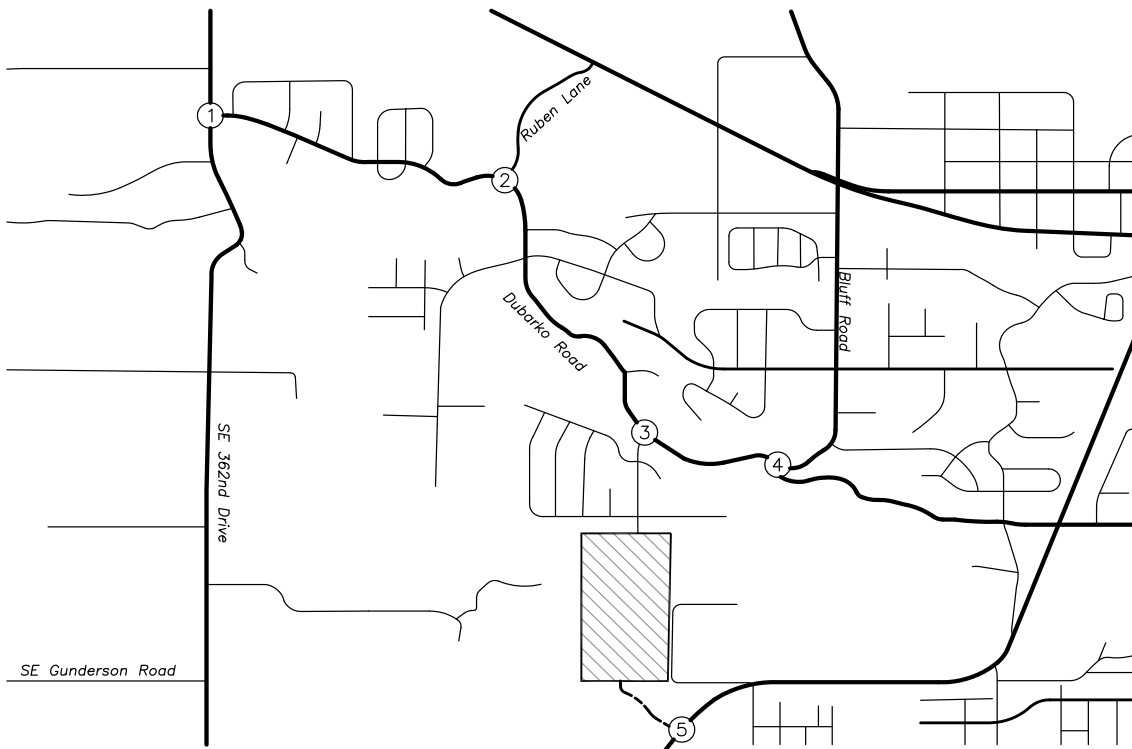
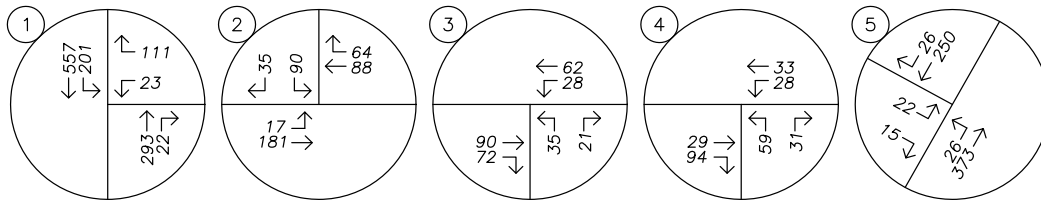
The year 2022 buildout scenario was updated to include a redistribution of existing trips that are likely to use the new Highway 211 roadway connection. Finally, site trips generated by the Bailey Meadows subdivision, discussed previously within the Trip Distribution section, were added to the projected year 2022 volumes in order to obtain the year 2022 buildout traffic volumes.

The year 2022 buildout traffic volumes are shown in Figure 3 on page seven.

AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
 Year 2022 Buildout Traffic Volumes
 AM & PM Peak Hours



FIGURE
3
PAGE
7



January 6, 2020
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Preliminary Traffic Signal Warrants

Preliminary traffic signal warrants were examined for all study intersections based on methodologies in the *Manual on Uniform Traffic Control Devices*¹ (MUTCD) and the Analysis Procedures Manual. Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT and that the eighth-highest hour is 5.6 percent of the daily traffic. Volumes were used for the evening peak hour under the year 2022 buildout scenario.

For the intersection under ODOT jurisdiction, the APM dictates that minor-street right turns are only used if the volume exceeds 85 percent of the lane capacity, and even then, only the increment of volume in excess of 85 percent can be used. In this case, none of the right turns can be used for the purpose of the signal warrant analysis.

Due to insufficient minor street volumes, traffic signal warrants are not met at the intersection of SE Gunderson Road at Highway 211 under year 2022 buildout scenario.

Left-Turn Lane Warrants

Left-turn lane warrants were examined at the planned intersection of Highway 211 at SE Gunderson Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream.

Warrants were examined based on the design curves developed by the Texas Transportation Institute, as adopted by the APM. This methodology evaluates the need for a left-turn lane based on the number of left-turning vehicles, the number of travel lanes, the number of advancing and opposing vehicles, and the roadway travel speed.

A left-turn lane is warranted at the intersection of SE Gunderson Road at Highway 211 under the year 2022 buildout scenario and it is recommended that a left-turn lane be constructed as part of the intersection improvements.

¹ Federal Highway Administration (FTA), American Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual of Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010



Operational Analysis

A capacity analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*² (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy's TSP states that both signalized and unsignalized intersections are required to operate at LOS D or better.

The applicable minimum operational standards for ODOT facilities are established under the Oregon Highway Plan and are based on the classification of the roadway and its v/c ratio. District highways located outside the Urban Growth Boundary and within an unincorporated community has a peak hour v/c ratio target of 0.80.

Table 3: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 13 | B | 0.24 | 19 | C | 0.36 |
| Ruben Lane at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Year 2022 Buildout Conditions | 9 | A | 0.13 | 10 | B | 0.09 |
| Dubarko Road at Bluff Road | | | | | | |
| Year 2022 Buildout Conditions | 8 | A | 0.16 | 8 | A | 0.15 |
| Highway 211 at SE Gunderson Road | | | | | | |
| Year 2022 Buildout Conditions | 11 | B | 0.08 | 13 | B | 0.08 |

All intersections are projected to operate within the City of Sandy and ODOT's operational standards under all analysis scenarios.

² Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Intersection Location

The City of Sandy TSP shows a planning-level depiction of the Gunderson Road extension that was outside of the UGB at the time the TSP was adopted but is within the current UGB. This is shown below in Figure 4.



Figure 4: Alignment from Sandy TSP

However, upon closer investigation and engineering analysis, it was determined that the alignment shown on the TSP was not feasible for construction of an intersection with Highway 211, primarily due to poor sight distance, the need for a perpendicular intersection, and a very steep superelevated roadway section.

Looking to the northeast from the TSP-identified location, sight distance is limited by both horizontal and vertical curves on Highway 211. In addition, sight distance from the future fourth leg of the intersection would be particularly poor. At

the TSP-identified location, the highway was designed for moving traffic, not for accommodation of an intersection. Due to the high design speed and the horizontal curve, superelevation (the banking of the roadway around the curve) is very steep. This facilitates through traffic on the highway, but makes an intersection at this location problematic, due to difficult turning and crossing movements across the steep curve.

Need for UGB Expansion

The nearest suitable intersection location was found to be farther to the southwest, at the location currently proposed for a UGB amendment. From this location, it is far enough from the horizontal and vertical curves to the northeast to have adequate sight distance and far enough southwest of the curve to not be in a

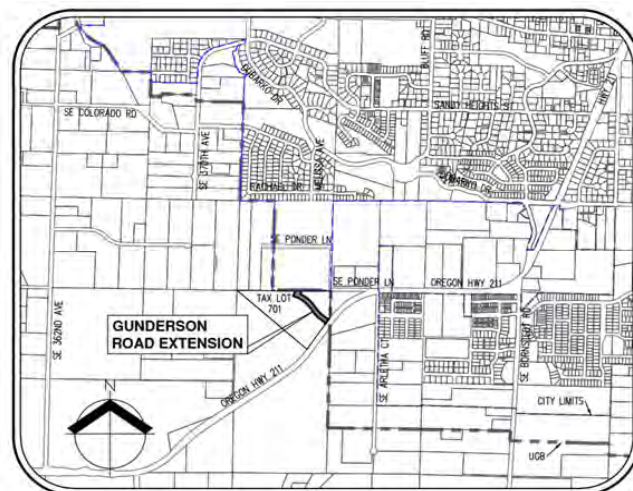


Figure 5: Planned Alignment



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superelevated roadway section. However, this alignment is outside of the current UGB of the City of Sandy, as shown in Figure 5. As such, a UGB amendment is proposed to accommodate the road extension.

With the proposed UGB amendment, there will be a triangle-shaped remnant piece of property that will also be brought into the UGB. This remnant is approximately 2.38 acres in size and is proposed to be dedicated as a public neighborhood park. This will be a small, passive-use neighborhood park that will be used primarily by the residents in the area. Trips to and from the park will be primarily pedestrian and bicycle trips and no separate parking lot is planned.

Oregon Administrative Rules

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation applications trigger the need to address the Transportation Planning Rule (TPR) and associated criteria from the Oregon Administrative Rules. These are addressed below.

OAR 660-012-0060 Transportation Planning Rule

The primary purpose of the TPR is to account for the potential transportation impacts associated with any amendments to adopted plans and land use regulations. The TPR is quoted in *italics* below, with a response immediately following each section.

1. *If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*

- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*

Response: The proposed UGB amendment, comprehensive plan and zone map amendment, and annexation will not change the functional classification of any transportation facilities. In fact, it will implement planned roadway connections in the TSP.

- (b) Change standards implementing a functional classification system; or*

Response: The standards that implement the functional classification system are contained in the TSP and will not change as part of this proposal.

- (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing*



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Page 12 of 14

requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

- (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;*
- (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or*
- (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.*

Response: The proposed UGB amendment and associated plan amendments will facilitate the Gunderson Road connection and will not result in developable property that will increase trip generation. In fact, by facilitating an important street connection it is implementing the City of Sandy TSP, will improve connectivity for the neighborhood, and will improve performance of the surrounding transportation system. The proposal will not result in a significant effect as defined by the TPR and no mitigations are necessary.

OAR 660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB

This section of the OAR is specific to UGB expansions and speaks to public facilities (such as transportation facilities) that require specific site characteristics. The OAR is quoted in *italics* below, with a response immediately following each section.

- 3. When the primary purpose for expansion of the UGB is to accommodate a particular industrial use that requires specific site characteristics, or to accommodate a public facility that requires specific site characteristics, and the site characteristics may be found in only a small number of locations, the preliminary study area may be limited to those locations within the distance described in section (1) or (2), whichever is appropriate, that have or could be improved to provide the required site characteristics. For purposes of this section:*

- (a) The definition of "site characteristics" in OAR 660-009-0005(11) applies for purposes of identifying a particular industrial use.*

Response: In OAR 660-009-0005(11), "Site Characteristics" are defined by visibility, proximity to a particular transportation facility, and major transportation routes. In this case, the "site" for the UGB amendment is very narrowly defined and the location between the subdivision and Highway 211 is dictated by engineering standards that must be satisfied for a safe and efficient intersection location.

- (b) A "public facility" may include a facility necessary for public sewer, water, storm water, transportation, parks, schools, or fire protection. Site characteristics may include but are not limited to size, topography and proximity.*



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Page 13 of 14

Response: Since the primary purpose of the proposed UGB amendment is to accommodate the extension of Gunderson Road to Highway 211, it is by definition a “public facility”. Site characteristics such as topography are what have dictated the need for the intersection in the location as proposed. Additionally, the applicant is providing area for a neighborhood park, a minor public facility.

Summary & Conclusions

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation will implement the City of Sandy TSP and result in improved operation at the study area roadways and intersections. The connection will improve conditions for the existing neighborhood to the north of the Bailey Meadows subdivision by providing another means of vehicular access to the area.



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Appendix

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 1/6/2020
 Scenario: Year 2022 Buildout Conditions - Evening Peak Hour

Major Street: Highway 211 Minor Street: SE Gunderson Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 675 PM Peak Hour Volumes: 22

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 6,750 | 8,850 | |
| Minor Street* | 220 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 6,750 | 13,300 | |
| Minor Street* | 220 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 6,750 | 10,640 | |
| Minor Street* | 220 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 85% of the turn lane capacity.



Project: Bailey Meadows Subdivision
 Intersection: Highway 211 at SE Gunderson Road
 Date: 1/6/2020
 Scenario: 2022 Buildout conditions

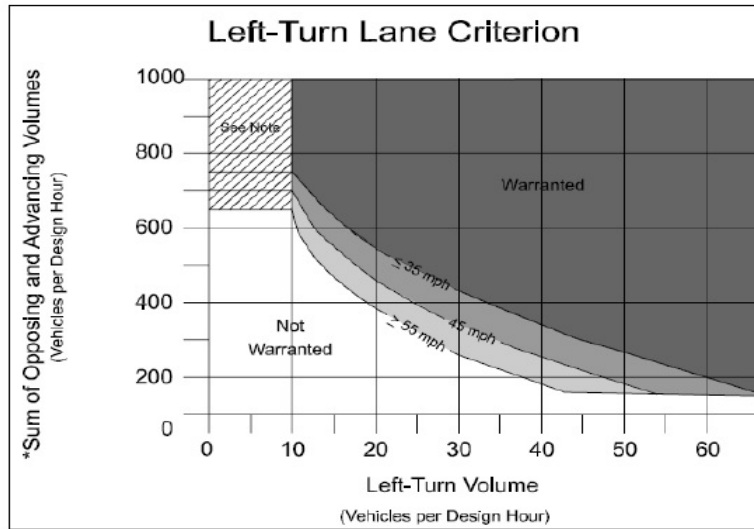
Speed? 45 mph

PM Peak Hour

| | |
|------------------------------|-----|
| Left-Turn Volume | 26 |
| Approaching DHV | 250 |
| # of Advancing Through Lanes | 1 |
| Opposing DHV | 399 |
| # of Opposing Through Lanes | 1 |

O+A DHV 649

Lane Needed? **Yes**



Source: Oregon DOT Analysis Procedures Manual 2008

*** (Advancing Vol/ # of Advancing Through Lanes) + (Opposing Vol/ # of Opposing Through Lanes)**

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

Lanes, Volumes, Timings
1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.876 | | 0.997 | | | |
| Flt Protected | 0.996 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Flt Permitted | 0.996 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 2% | 2% | 6% | 6% |
| Adj. Flow (vph) | 11 | 128 | 453 | 11 | 36 | 155 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 139 | 0 | 464 | 0 | 36 | 155 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | 12 |
| Link Offset(ft) | 0 | | 0 | | 0 | 0 |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | 16 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 39.7% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

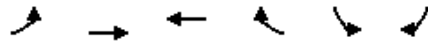
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 2.7 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 128 | 453 | 11 | 36 | 155 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 686 | 459 | 0 | 0 | 464 | |
| Stage 1 | 459 | - | - | - | - | |
| Stage 2 | 227 | - | - | - | - | |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | |
| Pot Cap-1 Maneuver | 415 | 604 | - | - | 1077 | |
| Stage 1 | 638 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 401 | 604 | - | - | 1077 | |
| Mov Cap-2 Maneuver | 401 | - | - | - | - | |
| Stage 1 | 617 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 13.1 | 0 | | 1.6 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 582 | 1077 | - | |
| HCM Lane V/C Ratio | - | - | 0.239 | 0.034 | - | |
| HCM Control Delay (s) | - | - | 13.1 | 8.5 | - | |
| HCM Lane LOS | - | - | B | A | - | |
| HCM 95th %tile Q(veh) | - | - | 0.9 | 0.1 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | 0.919 | | 0.959 | |
| Flt Protected | | 0.978 | | | 0.966 | |
| Satd. Flow (prot) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Flt Permitted | | 0.978 | | | 0.966 | |
| Satd. Flow (perm) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 6% | 6% | 2% | 2% | 13% | 13% |
| Adj. Flow (vph) | 22 | 27 | 83 | 126 | 16 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 49 | 209 | 0 | 23 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.4% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

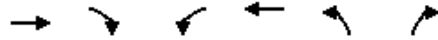
HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 1.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 27 | 83 | 126 | 16 | 7 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 209 | 0 | - | 0 | 217 | 146 |
| Stage 1 | - | - | - | - | 146 | - |
| Stage 2 | - | - | - | - | 71 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1338 | - | - | - | 747 | 873 |
| Stage 1 | - | - | - | - | 855 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1338 | - | - | - | 734 | 873 |
| Mov Cap-2 Maneuver | - | - | - | - | 734 | - |
| Stage 1 | - | - | - | - | 840 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 3.5 | 0 | 9.8 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1338 | - | - | - | 771 | |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.029 | |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.8 | |
| HCM Lane LOS | A | A | - | - | A | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr't | 0.932 | | | | 0.952 | |
| Flt Protected | | | 0.985 | | 0.969 | |
| Satd. Flow (prot) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Flt Permitted | | | 0.985 | | 0.969 | |
| Satd. Flow (perm) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 |
| Heavy Vehicles (%) | 22% | 22% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 10 | 10 | 23 | 52 | 77 | 42 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 20 | 0 | 0 | 75 | 119 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.9% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|-------|-------|
| Int Delay, s/veh | 6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 10 | 23 | 52 | 77 | 42 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 20 | 0 | 113 | 15 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 98 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1596 | - | 884 | 1065 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1596 | - | 871 | 1065 |
| Mov Cap-2 Maneuver | - | - | - | - | 871 | - |
| Stage 1 | - | - | - | - | 993 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.2 | 9.4 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 931 | - | - | 1596 | - | |
| HCM Lane V/C Ratio | 0.128 | - | - | 0.014 | - | |
| HCM Control Delay (s) | 9.4 | - | - | 7.3 | 0 | |
| HCM Lane LOS | A | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | | | 0.919 | |
| Flt Protected | | | | 0.974 | 0.980 | |
| Satd. Flow (prot) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Flt Permitted | | | | 0.974 | 0.980 | |
| Satd. Flow (perm) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles (%) | 12% | 12% | 9% | 9% | 4% | 4% |
| Adj. Flow (vph) | 59 | 0 | 27 | 24 | 57 | 86 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 59 | 0 | 0 | 51 | 143 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | | 9 | 15 | | 15 | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.2% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 0 | 27 | 24 | 57 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.8 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 40% | 0% | 53% |
| Vol Thru, % | 0% | 100% | 47% |
| Vol Right, % | 60% | 0% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 100 | 41 | 36 |
| LT Vol | 40 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 0 | 0 |
| Lane Flow Rate | 143 | 59 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.154 | 0.072 | 0.064 |
| Departure Headway (Hd) | 3.877 | 4.396 | 4.456 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 913 | 807 | 796 |
| Service Time | 1.95 | 2.466 | 2.528 |
| HCM Lane V/C Ratio | 0.157 | 0.073 | 0.064 |
| HCM Control Delay | 7.7 | 7.8 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.2 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | SEL | SER | NEL | NET | SWT | SWR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.928 | | | | | 0.850 |
| Flt Protected | 0.977 | | 0.950 | | | |
| Satd. Flow (prot) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.977 | | 0.950 | | | |
| Satd. Flow (perm) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 827 | | | 1043 | 1164 | |
| Travel Time (s) | 18.8 | | | 23.7 | 26.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 23 | 26 | 8 | 140 | 315 | 16 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 49 | 0 | 8 | 140 | 315 | 16 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 26.6% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh | 1.1 | | | | | |
| Movement | SEL | SER | NEL | NET | SWT | SWR |
| Lane Configurations | ↔ | | ↔ | ↑ | ↑ | ↔ |
| Traffic Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 26 | 8 | 140 | 315 | 16 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | 471 | 315 | 331 | 0 | - | 0 |
| Stage 1 | 315 | - | - | - | - | - |
| Stage 2 | 156 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 551 | 725 | 1228 | - | - | - |
| Stage 1 | 740 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 547 | 725 | 1228 | - | - | - |
| Mov Cap-2 Maneuver | 547 | - | - | - | - | - |
| Stage 1 | 735 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |
| Approach | SE | NE | | SW | | |
| HCM Control Delay, s | 11.2 | 0.4 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NEL | NET | SELn1 | SWT | SWR | |
| Capacity (veh/h) | 1228 | - | 629 | - | - | |
| HCM Lane V/C Ratio | 0.006 | - | 0.078 | - | - | |
| HCM Control Delay (s) | 8 | - | 11.2 | - | - | |
| HCM Lane LOS | A | - | B | - | - | |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - | |

Lanes, Volumes, Timings
 1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.888 | | 0.991 | | | |
| Flt Protected | 0.992 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Flt Permitted | 0.992 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 1% | 1% |
| Adj. Flow (vph) | 25 | 121 | 318 | 24 | 218 | 605 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 146 | 0 | 342 | 0 | 218 | 605 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 46.0% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

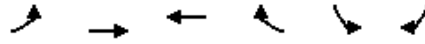
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 3.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 121 | 318 | 24 | 218 | 605 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 1371 | 330 | 0 | 0 | 342 | |
| Stage 1 | 330 | - | - | - | - | |
| Stage 2 | 1041 | - | - | - | - | |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | |
| Pot Cap-1 Maneuver | 161 | 712 | - | - | 1223 | |
| Stage 1 | 728 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 132 | 712 | - | - | 1223 | |
| Mov Cap-2 Maneuver | 132 | - | - | - | - | |
| Stage 1 | 598 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 18.7 | 0 | | 2.3 | | |
| HCM LOS | C | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 406 | 1223 | - | |
| HCM Lane V/C Ratio | - | - | 0.359 | 0.179 | - | |
| HCM Control Delay (s) | - | - | 18.7 | 8.6 | - | |
| HCM Lane LOS | - | - | C | A | - | |
| HCM 95th %tile Q(veh) | - | - | 1.6 | 0.6 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr't | | | 0.943 | | 0.962 | |
| Flt Protected | | 0.996 | | | 0.965 | |
| Satd. Flow (prot) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Flt Permitted | | 0.996 | | | 0.965 | |
| Satd. Flow (perm) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 19 | 203 | 99 | 72 | 101 | 39 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 222 | 171 | 0 | 140 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 36.1% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

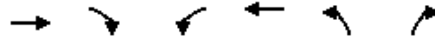
HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 203 | 99 | 72 | 101 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 171 | 0 | - | 0 | 376 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 241 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1412 | - | - | - | 627 | 917 |
| Stage 1 | - | - | - | - | 894 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1412 | - | - | - | 618 | 917 |
| Mov Cap-2 Maneuver | - | - | - | - | 618 | - |
| Stage 1 | - | - | - | - | 881 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.7 | 0 | 11.7 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1412 | - | - | - | 680 | |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.207 | |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.7 | |
| HCM Lane LOS | A | A | - | - | B | |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.940 | | | | 0.949 | |
| Flt Protected | | | 0.985 | | 0.970 | |
| Satd. Flow (prot) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Flt Permitted | | | 0.985 | | 0.970 | |
| Satd. Flow (perm) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 106 | 85 | 33 | 73 | 41 | 25 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 191 | 0 | 0 | 106 | 66 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh | 2.6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 85 | 33 | 73 | 41 | 25 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 191 | 0 | 288 | 149 |
| Stage 1 | - | - | - | - | 149 | - |
| Stage 2 | - | - | - | - | 139 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1395 | - | 707 | 903 |
| Stage 1 | - | - | - | - | 884 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1395 | - | 689 | 903 |
| Mov Cap-2 Maneuver | - | - | - | - | 689 | - |
| Stage 1 | - | - | - | - | 862 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.4 | 10.2 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 756 | - | - | 1395 | - | |
| HCM Lane V/C Ratio | 0.087 | - | - | 0.024 | - | |
| HCM Control Delay (s) | 10.2 | - | - | 7.6 | 0 | |
| HCM Lane LOS | B | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | 0.897 | | | 0.954 | | |
| Flt Protected | | | | 0.978 | 0.968 | |
| Satd. Flow (prot) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Flt Permitted | | | | 0.978 | 0.968 | |
| Satd. Flow (perm) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 34 | 111 | 33 | 39 | 69 | 36 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 145 | 0 | 0 | 72 | 105 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | 15 | | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 25.8% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 111 | 33 | 39 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.4 | 7.8 | 7.9 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 46% |
| Vol Thru, % | 0% | 24% | 54% |
| Vol Right, % | 34% | 76% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 123 | 61 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 145 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.124 | 0.148 | 0.086 |
| Departure Headway (Hd) | 4.213 | 3.682 | 4.29 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 841 | 959 | 825 |
| Service Time | 2.29 | 1.761 | 2.368 |
| HCM Lane V/C Ratio | 0.126 | 0.151 | 0.087 |
| HCM Control Delay | 7.9 | 7.4 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.3 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.946 | | | | | 0.850 |
| Flt Protected | 0.971 | | 0.950 | | | |
| Satd. Flow (prot) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.971 | | 0.950 | | | |
| Satd. Flow (perm) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 45 | 45 | |
| Link Distance (ft) | 1495 | | | 875 | 917 | |
| Travel Time (s) | 34.0 | | | 13.3 | 13.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 24 | 16 | 28 | 405 | 272 | 28 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 40 | 0 | 28 | 405 | 272 | 28 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 31.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 16 | 28 | 405 | 272 | 28 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | 733 | 272 | 300 | 0 | - | 0 |
| Stage 1 | 272 | - | - | - | - | - |
| Stage 2 | 461 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 388 | 767 | 1261 | - | - | - |
| Stage 1 | 774 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 379 | 767 | 1261 | - | - | - |
| Mov Cap-2 Maneuver | 379 | - | - | - | - | - |
| Stage 1 | 757 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 13.2 | 0.5 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 1261 | - | 477 | - | - | |
| HCM Lane V/C Ratio | 0.022 | - | 0.084 | - | - | |
| HCM Control Delay (s) | 7.9 | - | 13.2 | - | - | |
| HCM Lane LOS | A | - | B | - | - | |
| HCM 95th %tile Q(veh) | 0.1 | - | 0.3 | - | - | |

Bailey Meadows Subdivision

Traffic Impact Analysis
Sandy, Oregon

Date:

June 20, 2019

Prepared for:

Cody Bjugan, Allied Homes & Development

Prepared by:

Jessica Hijar
Todd Mobley, PE



RENEWS: 12/31/2020



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Executive Summary

1. A 100-lot single family detached swelling unit subdivision is proposed for the following tax lots in Sandy, Oregon: 24E23 800, 801, 802, 803, and 804.
2. Access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.
3. The proposed subdivision is calculated to generate 74 trips during the morning peak hour, 99 trips during the evening peak hour, and 944 trips each weekday.
4. Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.
5. Due to insufficient major and minor street volumes, preliminary traffic signal warrants were not met at the study intersections under all analysis scenarios.
6. Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not met under any analysis scenario.
7. All study intersections, including the intersection of Melissa Avenue at Dubarko Road, are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.



Project Description

Introduction

The proposed development will include the construction of a 100-lot subdivision to be located on tax lots 24E23 800, 801, 802, 803, and 804 in Sandy, Oregon. The site is currently within the City of Sandy Urban Growth Boundary, the city limits, and is zoned Single Family Residential (SFR), which allows the subdivision as proposed. The project will be built in three phases, with the expected completion year of 2022.

This report includes traffic counts and a full operational analysis at the intersections listed below. This scope was developed based on City of Sandy's Traffic Impact Analysis (TIA) requirements and was approved by Replinger and Associates, the City's consulting transportation engineer. Coordination of the scope of work with the Oregon Department of Transportation (ODOT) was not necessary since no intersections on the state highway are affected.

1. SE 362nd Drive at Dubarko Road,
2. Ruben Lane at Dubarko Road,
3. Dubarko Road at Melissa Avenue, and
4. Dubarko Road at Bluff Road.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of supporting the existing uses as well as the proposed subdivision and to determine if mitigation is necessary. Detailed information on traffic counts, trip generation calculations, safety analyses, and level-of-service calculations is included in the appendix to this report.

Location Description

The subject site is located south of Rachel Drive and west of Ponder Lane in Sandy, Oregon. Although roadway stubs will be provided within the site for future roadway connections, access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.

Access to the subdivision cannot be provided via SE Ponder Lane in the southeast corner of the site since the existing right-of-way along SE Ponder Lane does not allow for two directions of travel and the current configuration of SE Ponder Lane at Highway 211 cannot support additional vehicle trips. There is not sufficient right-of-way available to realign Ponder Lane at its intersection with Highway 211. It is expected that additional access will be available to the east of the site as other properties develop.

Vicinity Streets

Five roadways have been identified in the traffic study scope. Table 1 provides a description of each of the roadways.



Table 1: Vicinity Roadway Descriptions

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|----------------------------|---------------|----------------------|------------------|---------|-----------|---------------|
| SE 362 nd Drive | City of Sandy | Rural Minor Arterial | 35 mph posted | Partial | Partial | Partial |
| Ruben Lane | City of Sandy | Collector | 25 mph posted | Yes | Partial | Yes |
| Dubarko Road | City of Sandy | Minor Arterial | 25 mph posted | Yes | Yes | Partial |
| Melissa Avenue | City of Sandy | Local Road | 25 mph statutory | Yes | Yes | No |
| Bluff Road | City of Sandy | Minor Arterial | 25 mph posted | Partial | Partial | Partial |

Study Intersections

Four nearby intersections were identified in discussions with City staff that are expected to be impacted by the proposed project. Table 2 below provides a summary of each of the study intersections.

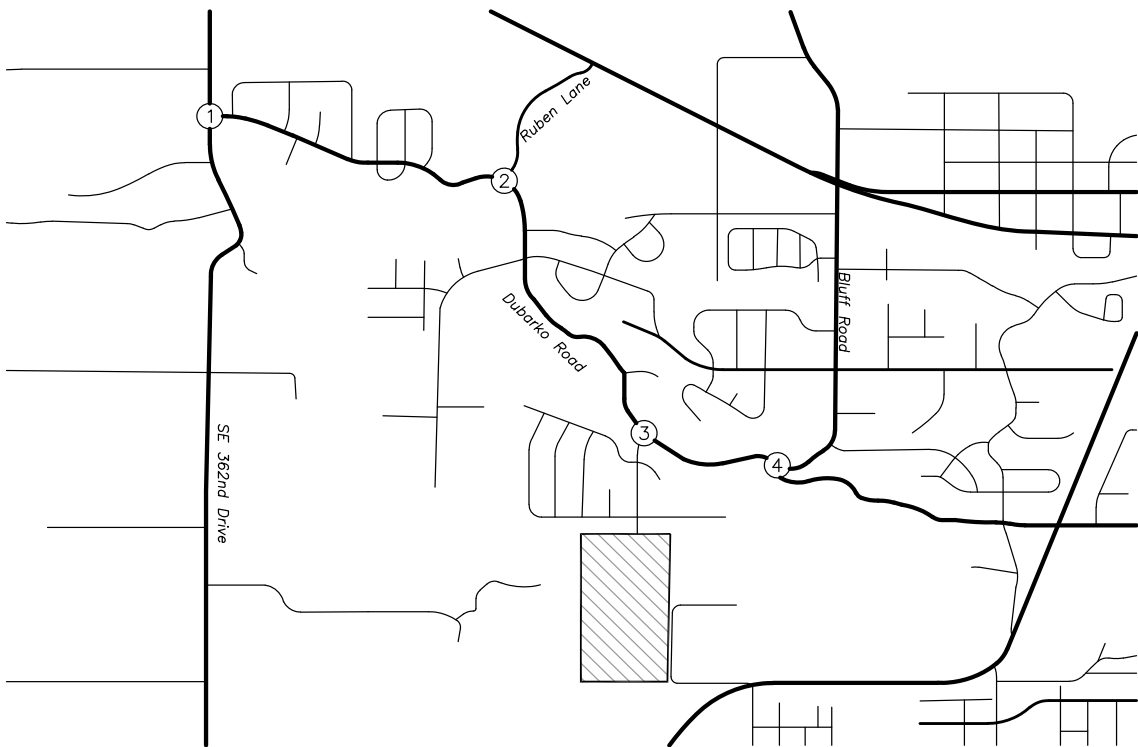
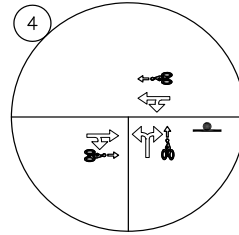
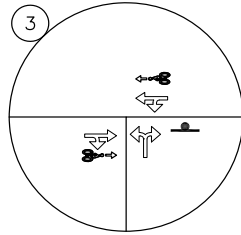
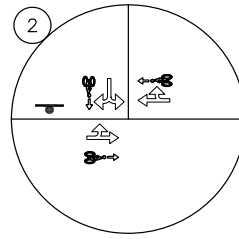
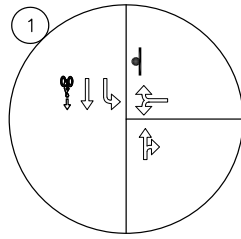
Table 2: Vicinity Intersection Descriptions

| Number | Intersection | Geometry | Traffic Control | Stopped Approaches |
|--------|--|--------------|-------------------------|--------------------|
| 1 | SE 362 nd Drive at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Westbound |
| 2 | Ruben Lane at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Southbound |
| 3 | Dubarko Road at Melissa Avenue | Three-Legged | Two-Way Stop Controlled | Northbound |
| 4 | Dubarko Road at Bluff Rod | Three-Legged | All-Way Stop Controlled | All |

The figure on the following page shows the site vicinity and the study intersection configurations.

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY



VICINITY MAP



FIGURE 1

PAGE 4



Site Trips

Trip Generation

To estimate the number of trips that will be generated by the proposed use, trip rates from the *Trip Generation Manual*¹ were used. Data from land use codes 210, *Single-Family Detached Housing*, was used to estimate the proposed development's trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed subdivision is projected to generate 74 morning peak hour trips, 99 evening peak hour trips, and 944 average weekday trips. The trip generation estimates are summarized in Table 3 below and detailed trip generation calculations are included as an attachment to this report.

Table 3: Trip Generation Summary

| Land Use Code | Size | Morning Peak Hour | | | Evening Peak Hour | | | Weekday Total |
|--------------------------------------|-----------|-------------------|-----|-------|-------------------|-----|-------|---------------|
| | | In | Out | Total | In | Out | Total | |
| 210 – Single-Family Detached Housing | 100 units | 19 | 55 | 74 | 62 | 37 | 99 | 944 |

Custom Trip Rates

Based on traffic counts collected at the existing intersection of Melissa Avenue at Dubarko Road and 24-hour counts collected along Melissa Avenue, a localized trip rate was derived for the existing subdivision that accesses Dubarko Road via Melissa Avenue. The custom trip rate was calculated to be 0.49 trips per unit during the morning peak hour, 0.63 trips per unit during the evening peak hour, and 6.90 trips per unit during each weekday. A comparison of the ITE trip rates and the trip rates based on localized data is provided in the following table.

Table 4: Trip Rate Comparison

| Data | Morning Trip Rate | Evening Trip Rate | Weekday Trip Rate |
|------------|-------------------|-------------------|-------------------|
| ITE | 0.74 trips/unit | 0.99 trips/unit | 9.44 trips/unit |
| Local Data | 0.49 trips/unit | 0.63 trips/unit | 6.90 trips/unit |

Since the localized data shows lower trip rates during all analysis periods, it can be expected that the proposed subdivision will yield site trips at a similar rate. Although this lower trip generation rate was not used for analysis, it should be noted that the trip generation based on ITE rates represents a conservative, worst-case analysis.

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Trip Distribution

The directional distribution of site trips to and from the proposed development was calculated based on travel patterns of trips to and from the existing neighborhood that is served by Melissa Avenue. In addition, the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution was estimated and used for analysis:

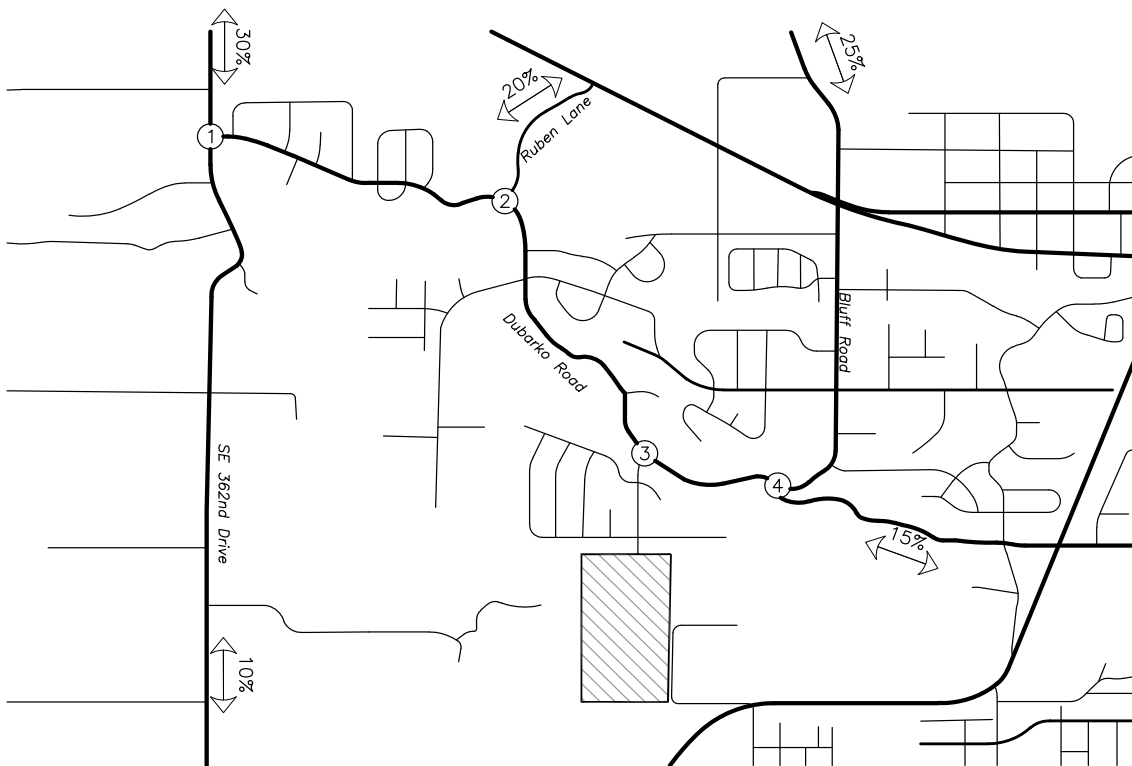
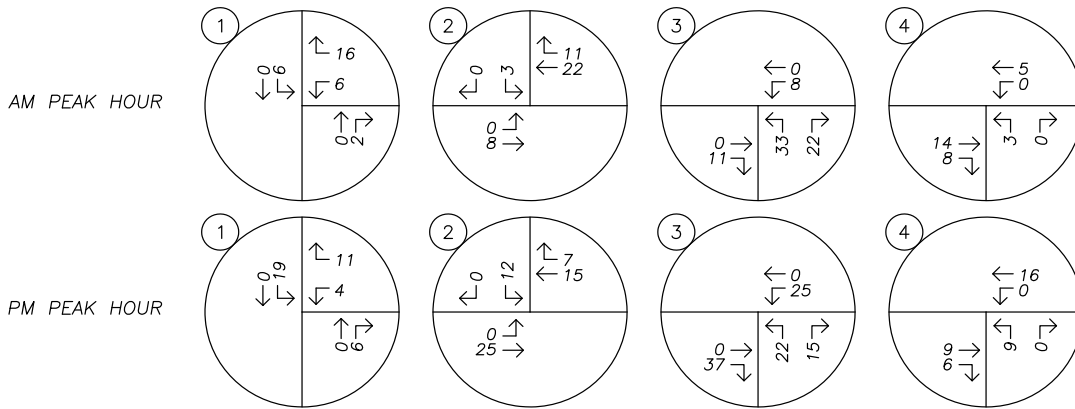
- Approximately 30 percent of site trips will travel to/from the north along SE 362nd Drive;
- Approximately 25 percent of site trips will travel to/from the north along Bluff Road;
- Approximately 20 percent of site trips will travel to/from the north on Ruben Lane;
- Approximately 15 percent of site trips will travel to/from the east along Dubarko Road; and
- Approximately 10 percent of site trips will travel to/from the south along SE 362nd Drive.

Figure 2 on page 7 shows the distribution and assignment of site trips for the proposed development.

LEGEND

XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |



SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Site Trips
AM & PM Peak Hours



no scale

FIGURE 2

PAGE 7



Traffic Volumes

Existing Conditions

Traffic counts were conducted at the intersection of Melissa Avenue at Dubarko Road on Thursday, April 25th, 2019 from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM. Traffic counts were conducted at all other study intersections on Wednesday, May 22nd, 2019 from 4:00 PM to 6:00 PM, and on Thursday, May 23rd, 2019 from 7:00 AM to 9:00 AM. Each intersection's respective morning and evening peak hours were used for analysis.

Background Conditions

In order to calculate the future traffic volumes on local streets, an exponential growth rate of two percent per year for an assumed period of three years was applied to the measured existing traffic volumes to approximate year 2022 background conditions.

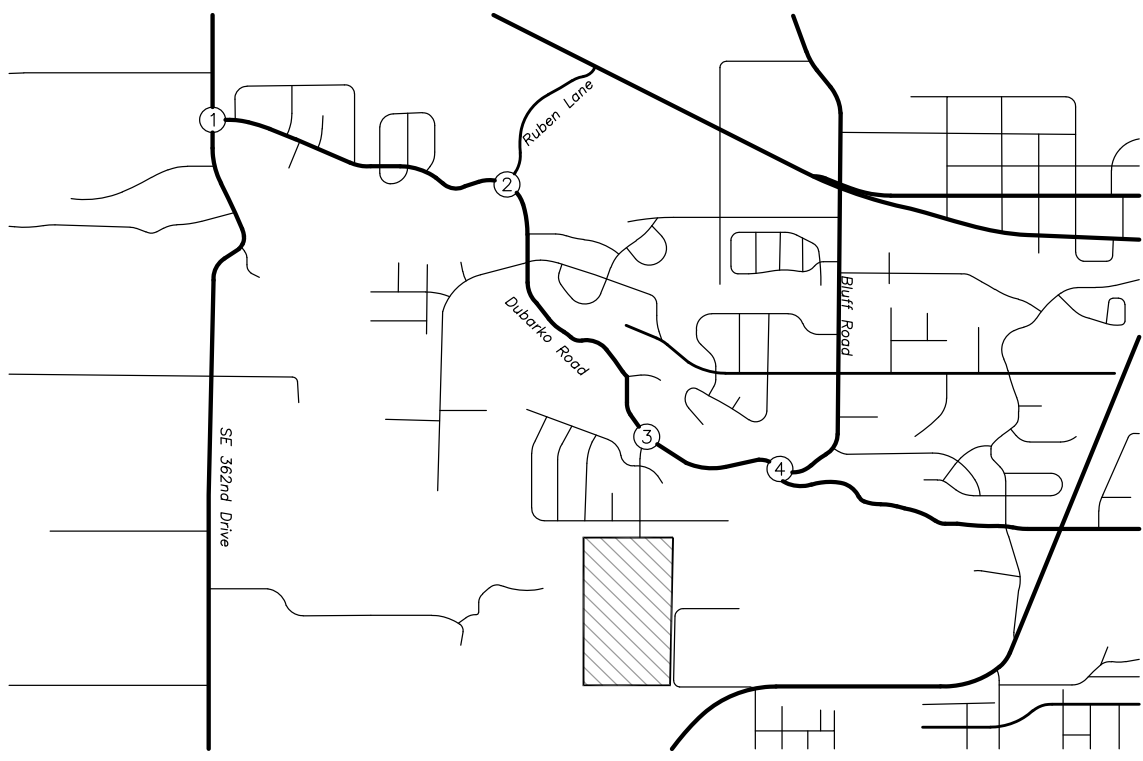
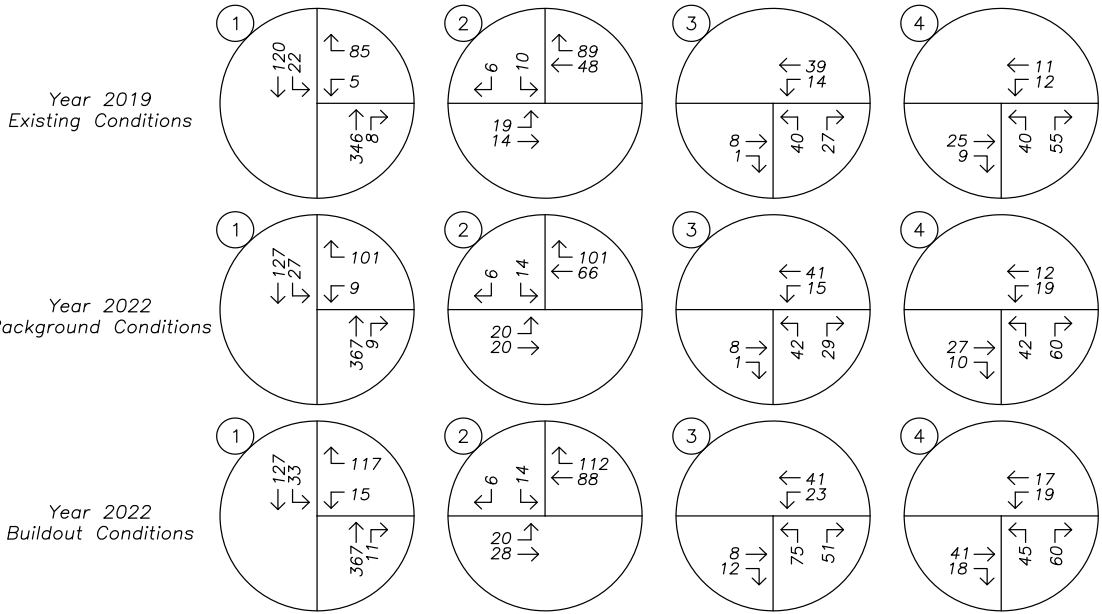
In-Process Trips

In-process trips associated with previously approved developments were added to the background volumes in order to represent future traffic volumes at the study intersections prior to the approval of the subject development. Trips associated with the approved 138-unit Sandy Heights Apartments were added to the study intersections.

Buildout Conditions

Trips to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2022 background traffic volumes to obtain the expected year 2022 buildout volumes.

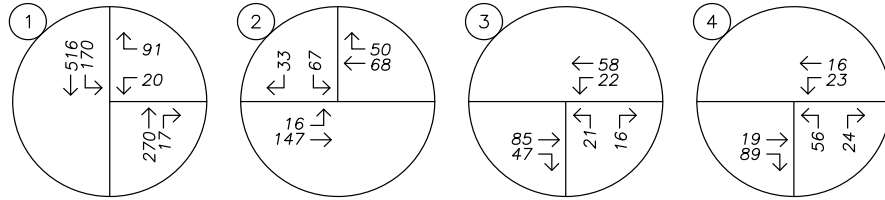
Figure 3 on page 9 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the morning peak hour. Figure 4 on page 10 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the evening peak hour.



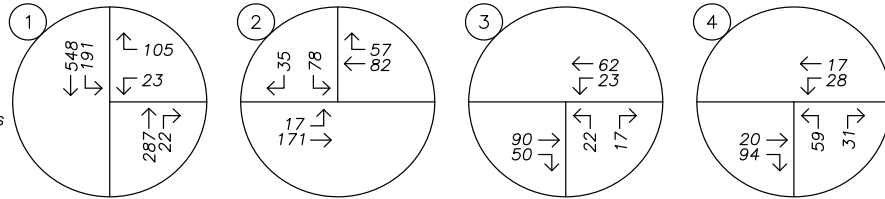
TRAFFIC VOLUMES
 All Analysis Scenarios
 AM Peak Hour



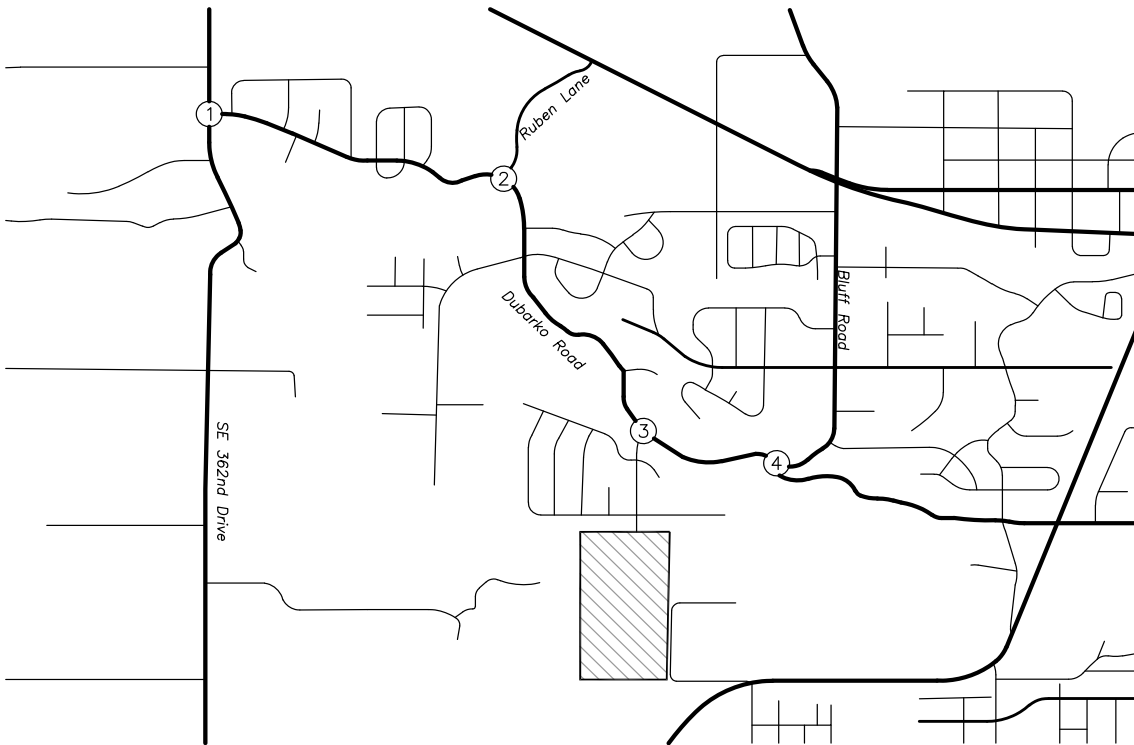
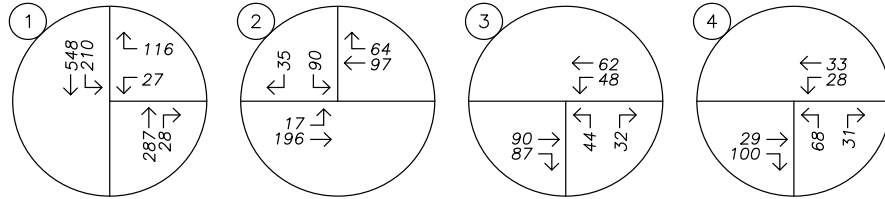
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



TRAFFIC VOLUMES
All Analysis Scenarios
PM Peak Hour



FIGURE
4

PAGE
10



Safety Analysis

Crash History Review

Using data obtained from the ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2012 to December 2016) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

Table 5: Crash Analysis Summary

| Intersection | Crash Type | | Crash Severity | Total | AADT | Crash Rate |
|--|------------|-----------|----------------|-------|--------|------------|
| | Turn | Sideswipe | PDO | | | |
| Dubarko Road at SE 362 nd Drive | 0 | 1 | 1 | 1 | 10,840 | 0.05 |
| Dubarko Road at Melissa Avenue | 2 | 0 | 2 | 2 | 2,490 | 0.44 |

The calculated crash rates at the intersections of Dubarko Road at SE 362nd Drive and at Melissa Avenue are not indicative of safety deficiencies or design flaws. No mitigation is recommended.

No reported crashes were found at the intersections of Dubarko Road at Ruben Lane and Dubarko Road at Bluff Road during the analysis period. Accordingly, no safety concerns were identified at these study intersections.

Warrant Analysis

Traffic Signal Warrants

Traffic signal warrants were examined for all study intersections based on the methodologies in the *Manual on Uniform Traffic Control Devices*² (MUTCD). Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT. Volumes were used for the year 2022 buildout conditions. Traffic signal warrants were not met at any of the study intersections due to low major and minor street

² Federal Highway Administration (FTA), America Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010.



traffic volumes. Detailed information on the traffic signal warrant analysis is included in the attached appendix.

Left-Turn Lane Warrants

Left-turn lane warrants were examined for the westbound left-turn lane at the intersection of Melissa Avenue at Dubarko Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream. Warrants were based on the methodology outlined in the National Cooperative Highway Research Program (NCHRP) Report Number 457³. These turn-lane warrants were evaluated based on the number of left-turning vehicles, the number of advancing and opposing vehicles, and the roadway travel speed.

Left-turn lanes were not warranted during any of the analysis scenarios. No new left-turn lanes are recommended.

³ Bonneson, James A. and Michael D. Fontaine, *NCHRP Report 457: An Engineering Study Guide for Evaluating Intersection Improvements*, Transportation Research Board, 2001.



Operational Analysis

Delay & Capacity Analysis

A capacity and delay analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*⁴ (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s Transportation System Plan states that both signalized and unsignalized intersections are required to operate at LOS D or better.

Based on the results of the operational analysis, shown in Table 6, the study intersections are currently operating acceptably and are projected to continue operating acceptably through the 2022 buildout year of the site. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 6: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Existing Conditions | 12 | B | 0.17 | 16 | C | 0.27 |
| Year 2022 Background Conditions | 13 | B | 0.22 | 18 | C | 0.34 |
| Year 2022 Buildout Conditions | 13 | B | 0.27 | 21 | C | 0.40 |
| Ruben Lane at Dubarko Road | | | | | | |
| Existing Conditions | 9 | A | 0.02 | 11 | B | 0.15 |
| Year 2022 Background Conditions | 10 | A | 0.03 | 11 | B | 0.18 |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Existing Conditions | 9 | A | 0.09 | 10 | A | 0.05 |
| Year 2022 Background Conditions | 9 | A | 0.09 | 10 | A | 0.06 |
| Year 2022 Buildout Conditions | 10 | A | 0.17 | 11 | B | 0.12 |
| Dubarko Road at Bluff Road | | | | | | |
| Existing Conditions | 8 | A | 0.15 | 8 | A | 0.13 |
| Year 2022 Background Conditions | 8 | A | 0.16 | 8 | A | 0.14 |
| Year 2022 Buildout Conditions | 8 | A | 0.17 | 8 | A | 0.16 |

⁴ Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Conclusions

Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.

Due to insufficient major and minor street volumes, traffic signal warrants were not met at the study intersections under all analysis scenarios.

Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not estimated to be met under any analysis scenario.

All study intersections, including the intersection of Melissa Avenue and Dubarko Road are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.

1e

Appendix



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location: General Urban/Suburban
Variable: Dwelling Units
Variable Value: 100

AM PEAK HOUR

Trip Rate: 0.74

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 25% | 75% | |
| Trip Ends | 19 | 55 | 74 |

PM PEAK HOUR

Trip Rate: 0.99

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 63% | 37% | |
| Trip Ends | 62 | 37 | 99 |

WEEKDAY

Trip Rate: 9.44

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 472 | 472 | 944 |

SATURDAY

Trip Rate: 9.54

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 477 | 477 | 954 |

Source: Trip Generation Manual, Tenth Edition

All Traffic Data Services, Inc.
alltrafficdata.net

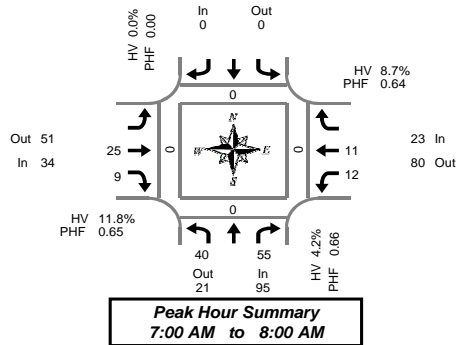
Melissa Ave S-O Dubarko Rd

| Start Time | 25-Apr-19 Thu | NB | SB | Total | | | | | |
|-------------|---------------|------------|-------------|------------|---|---|---|---|-------|
| 12:00 AM | | 2 | 5 | 7 | | | | | |
| 01:00 | | 1 | 1 | 2 | | | | | |
| 02:00 | | 1 | 0 | 1 | | | | | |
| 03:00 | | 7 | 2 | 9 | | | | | |
| 04:00 | | 20 | 1 | 21 | | | | | |
| 05:00 | | 30 | 5 | 35 | | | | | |
| 06:00 | | 57 | 11 | 68 | | | | | |
| 07:00 | | 67 | 15 | 82 | | | | | |
| 08:00 | | 37 | 17 | 54 | | | | | |
| 09:00 | | 30 | 17 | 47 | | | | | |
| 10:00 | | 25 | 18 | 43 | | | | | |
| 11:00 | | 23 | 22 | 45 | | | | | |
| 12:00 PM | | 35 | 25 | 60 | | | | | |
| 01:00 | | 16 | 24 | 40 | | | | | |
| 02:00 | | 29 | 46 | 75 | | | | | |
| 03:00 | | 35 | 58 | 93 | | | | | |
| 04:00 | | 44 | 64 | 108 | | | | | |
| 05:00 | | 30 | 54 | 84 | | | | | |
| 06:00 | | 32 | 74 | 106 | | | | | |
| 07:00 | | 28 | 40 | 68 | | | | | |
| 08:00 | | 16 | 36 | 52 | | | | | |
| 09:00 | | 9 | 30 | 39 | | | | | |
| 10:00 | | 5 | 12 | 17 | | | | | |
| 11:00 | | 0 | 4 | 4 | | | | | |
| Total | | 579 | 581 | 1160 | | | | | |
| Percent | | 49.9% | 50.1% | | | | | | |
| AM Peak | - | 07:00 | 11:00 | - | - | - | - | - | 07:00 |
| Vol. | - | 67 | 22 | - | - | - | - | - | 82 |
| PM Peak | - | 16:00 | 18:00 | - | - | - | - | - | 16:00 |
| Vol. | - | 44 | 74 | - | - | - | - | - | 108 |
| Grand Total | | 579 | 581 | | | | | | 1160 |
| Percent | | 49.9% | 50.1% | | | | | | |
| ADT | | ADT 11,874 | AADT 11,874 | | | | | | |

Total Vehicle Summary



Clay Carney
(603) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

**Peak Hour Summary
7:00 AM to 8:00 AM**

5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 3 | 4 | 0 | | | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:05 AM | 1 | 8 | 0 | | | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:10 AM | 3 | 7 | 0 | | | 0 | 5 | 1 | 0 | 2 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 6 | 0 | | | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:25 AM | 6 | 7 | 0 | | | 0 | 3 | 2 | 0 | 4 | 2 | 0 | 24 | 0 | 0 | 0 | 0 |
| 7:30 AM | 3 | 2 | 0 | | | 0 | 6 | 1 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:35 AM | 1 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:40 AM | 3 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 2 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| 7:50 AM | 5 | 6 | 0 | | | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 0 | 0 | 0 |
| 7:55 AM | 4 | 2 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:00 AM | 2 | 1 | 0 | | | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:05 AM | 2 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 5 | 0 | | | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:15 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:20 AM | 3 | 2 | 0 | | | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 5 | 0 | | | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 5 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:35 AM | 3 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 8:40 AM | 3 | 2 | 0 | | | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:45 AM | 1 | 1 | 0 | | | 0 | 1 | 1 | 0 | 3 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| 8:55 AM | 1 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 7 | 19 | 0 | | | 0 | 9 | 2 | 0 | 3 | 2 | 0 | 42 | 0 | 0 | 0 | 0 |
| 7:15 AM | 16 | 20 | 0 | | | 0 | 7 | 2 | 0 | 5 | 4 | 0 | 54 | 0 | 0 | 0 | 0 |
| 7:30 AM | 7 | 6 | 0 | | | 0 | 8 | 2 | 0 | 3 | 2 | 0 | 28 | 0 | 0 | 0 | 0 |
| 7:45 AM | 10 | 10 | 0 | | | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 28 | 0 | 0 | 0 | 0 |
| 8:00 AM | 5 | 7 | 0 | | | 0 | 3 | 3 | 0 | 3 | 2 | 0 | 23 | 0 | 0 | 0 | 0 |
| 8:15 AM | 8 | 14 | 0 | | | 0 | 4 | 3 | 0 | 4 | 1 | 0 | 34 | 0 | 0 | 0 | 0 |
| 8:30 AM | 6 | 7 | 0 | | | 0 | 0 | 6 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 2 | 0 | | | 0 | 1 | 4 | 0 | 4 | 1 | 0 | 14 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-------|-----------------------|-----|-------|-------|--------------------|-----|-------|-------|--------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 95 | 21 | 116 | 0 | 0 | 0 | 0 | 0 | 34 | 51 | 85 | 0 | 23 | 80 | 103 | 0 | 0 | 0 | 0 | 0 | |
| %HV | 4.2% | | | | 0.0% | | | | 11.8% | | | | 8.7% | | | | 6.6% | | | | |
| PHF | 0.66 | | | | 0.00 | | | | 0.65 | | | | 0.64 | | | | 0.70 | | | | |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total | | | | | | |
|-------------|-----------------------|------|-------|-----------------------|----|-------|--------------------|------|-------|--------------------|-------|-------|-------|----|------|------|--|--|--|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | | | | | | | |
| Volume | 40 | 55 | 95 | | | 0 | 25 | 9 | 34 | 12 | 11 | 23 | 152 | | | | | | |
| %HV | 2.5% | NA | 5.5% | 4.2% | NA | NA | 0.0% | NA | 12.0% | 11.1% | 11.8% | 8.3% | 9.1% | NA | 8.7% | 6.6% | | | |
| PHF | 0.63 | 0.65 | 0.66 | | | 0.00 | 0.57 | 0.75 | 0.65 | 0.50 | 0.69 | 0.64 | 0.70 | | | | | | |

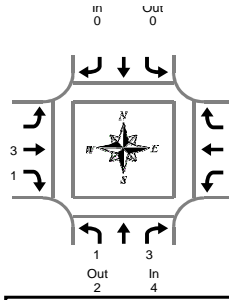
Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 55 | 0 | | | 0 | 25 | 9 | 0 | 12 | 11 | 0 | 152 | 0 | 0 | 0 | 0 |
| 7:15 AM | 38 | 43 | 0 | | | 0 | 19 | 10 | 0 | 12 | 11 | 0 | 133 | 0 | 0 | 0 | 0 |
| 7:30 AM | 30 | 37 | 0 | | | 0 | 16 | 11 | 0 | 11 | 8 | 0 | 113 | 0 | 0 | 0 | 0 |
| 7:45 AM | 29 | 38 | 0 | | | 0 | 8 | 15 | 0 | 9 | 7 | 0 | 106 | 0 | 0 | 0 | 0 |
| 8:00 AM | 21 | 30 | 0 | | | 0 | 8 | 16 | 0 | 12 | 5 | 0 | 92 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:05 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7:10 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:20 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 1 | 1 | | | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 1 | 1 | | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 1 | 2 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 4 | 2 | 6 | 0 | 0 | 0 | 4 | 2 | 6 | 2 | 6 | 8 | 10 |
| PHF | 0.50 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|--|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| PHF | 0.25 | 0.75 | 0.50 | | | 0.00 | 0.38 | 0.25 | 0.50 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| 7:15 AM | 1 | 3 | 4 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 7 |
| 7:30 AM | 1 | 4 | 5 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 8 |
| 7:45 AM | 1 | 4 | 5 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| 8:00 AM | 1 | 3 | 4 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

Dubarko Rd & Bluff Rd

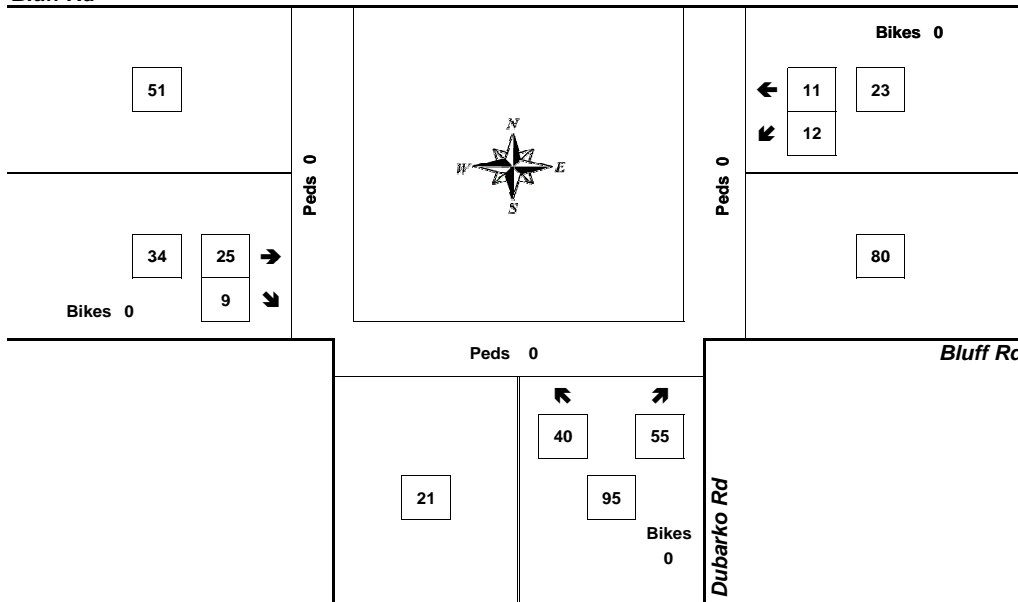
7:00 AM to 8:00 AM

Thursday, May 23, 2019

Bikes
0

Bluff Rd

Peds 0



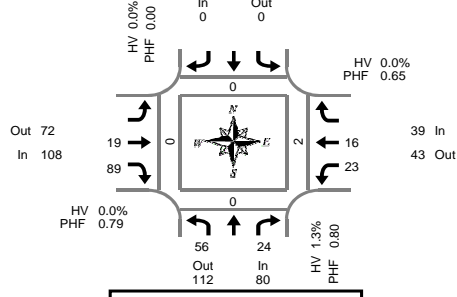
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.65 | 11.8% | 34 |
| WB | 0.64 | 8.7% | 23 |
| NB | 0.66 | 4.2% | 95 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.70 | 6.6% | 152 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 4 | 0 | 0 | | | 0 | | | 0 | 4 | 7 | 0 | 5 | 0 | 0 | 0 | 0 |
| 4:05 PM | 2 | 0 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 0 |
| 4:10 PM | 7 | 1 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 |
| 4:15 PM | 5 | 1 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 1 | 0 | 0 | 0 |
| 4:20 PM | 3 | 0 | 0 | | | 0 | | | 0 | 0 | 5 | 0 | 2 | 3 | 0 | 0 | 0 |
| 4:25 PM | 7 | 2 | 0 | | | 0 | | | 0 | 3 | 8 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:30 PM | 6 | 2 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:35 PM | 2 | 2 | 0 | | | 0 | | | 0 | 3 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:40 PM | 7 | 3 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:45 PM | 7 | 0 | 0 | | | 0 | | | 0 | 0 | 10 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:50 PM | 8 | 4 | 0 | | | 0 | | | 0 | 2 | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:55 PM | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:00 PM | 4 | 3 | 0 | | | 0 | | | 0 | 1 | 5 | 0 | 3 | 2 | 0 | 0 | 0 |
| 5:05 PM | 6 | 1 | 1 | | | 0 | | | 0 | 3 | 8 | 0 | 1 | 2 | 0 | 1 | 0 |
| 5:10 PM | 1 | 0 | 0 | | | 0 | | | 0 | 4 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:15 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 9 | 0 | 1 | 2 | 0 | 0 | 0 |
| 5:20 PM | 7 | 4 | 0 | | | 0 | | | 0 | 3 | 6 | 0 | 1 | 3 | 0 | 0 | 0 |
| 5:25 PM | 1 | 2 | 0 | | | 0 | | | 0 | 0 | 8 | 0 | 3 | 1 | 0 | 0 | 0 |
| 5:30 PM | 5 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 5 | 1 | 0 | 0 | 0 |
| 5:35 PM | 3 | 0 | 0 | | | 0 | | | 0 | 2 | 9 | 0 | 2 | 3 | 0 | 0 | 0 |
| 5:40 PM | 8 | 7 | 0 | | | 0 | | | 0 | 2 | 8 | 0 | 2 | 1 | 0 | 1 | 0 |
| 5:45 PM | 7 | 1 | 0 | | | 0 | | | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:50 PM | 6 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:55 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 13 | 1 | 0 | | | 0 | | | 0 | 6 | 15 | 0 | 10 | 3 | 0 | 0 | 0 |
| 4:15 PM | 15 | 3 | 0 | | | 0 | | | 0 | 5 | 20 | 0 | 6 | 4 | 0 | 0 | 0 |
| 4:30 PM | 15 | 7 | 0 | | | 0 | | | 0 | 5 | 22 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:45 PM | 18 | 5 | 0 | | | 0 | | | 0 | 2 | 21 | 0 | 4 | 1 | 0 | 0 | 0 |
| 5:00 PM | 11 | 4 | 1 | | | 0 | | | 0 | 8 | 22 | 0 | 5 | 4 | 0 | 1 | 0 |
| 5:15 PM | 11 | 6 | 0 | | | 0 | | | 0 | 4 | 23 | 0 | 5 | 6 | 0 | 0 | 0 |
| 5:30 PM | 16 | 9 | 0 | | | 0 | | | 0 | 5 | 23 | 0 | 9 | 5 | 0 | 1 | 0 |
| 5:45 PM | 16 | 3 | 0 | | | 0 | | | 0 | 2 | 11 | 0 | 2 | 3 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

Peak Hour Summary
4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | | North | South | East | West |
| Volume | 80 | 112 | 192 | 1 | 0 | 0 | 0 | 108 | 72 | 180 | 0 | 39 | 43 | 82 | 0 | 227 | |
| %HV | 1.3% | | | 0.0% | | | 0.0% | | | 0.0% | | | 0.4% | | | | |
| PHF | 0.80 | | | 0.00 | | | 0.79 | | | 0.65 | | | 0.85 | | | | |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|----|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 56 | 24 | 80 | | | 0 | 19 | 89 | 108 | 23 | 16 | 39 | 227 |
| %HV | 1.8% | NA | 0.0% | 1.3% | NA | NA | 0.0% | NA | 0.0% | 0.0% | 0.0% | 0.4% | 0.4% |
| PHF | 0.78 | 0.67 | 0.80 | | | 0.00 | 0.59 | 0.86 | 0.79 | 0.58 | 0.67 | 0.65 | 0.85 |

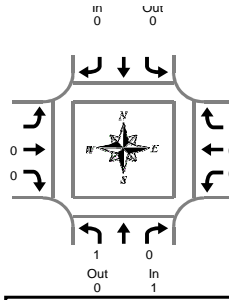
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 61 | 16 | 0 | | | 0 | | | 0 | 18 | 78 | 0 | 23 | 8 | 0 | 0 | 0 |
| 4:15 PM | 59 | 19 | 1 | | | 0 | | | 0 | 20 | 85 | 0 | 18 | 9 | 0 | 1 | 0 |
| 4:30 PM | 55 | 22 | 1 | | | 0 | | | 0 | 19 | 88 | 0 | 17 | 11 | 0 | 1 | 0 |
| 4:45 PM | 56 | 24 | 1 | | | 0 | | | 0 | 19 | 89 | 0 | 23 | 16 | 0 | 2 | 0 |
| 5:00 PM | 54 | 22 | 1 | | | 0 | | | 0 | 19 | 79 | 0 | 21 | 18 | 0 | 2 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle Peak Hour Summary 4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | | 0.00 | | | 0.00 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|---|-------|-----------------------|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Peak Hour Summary

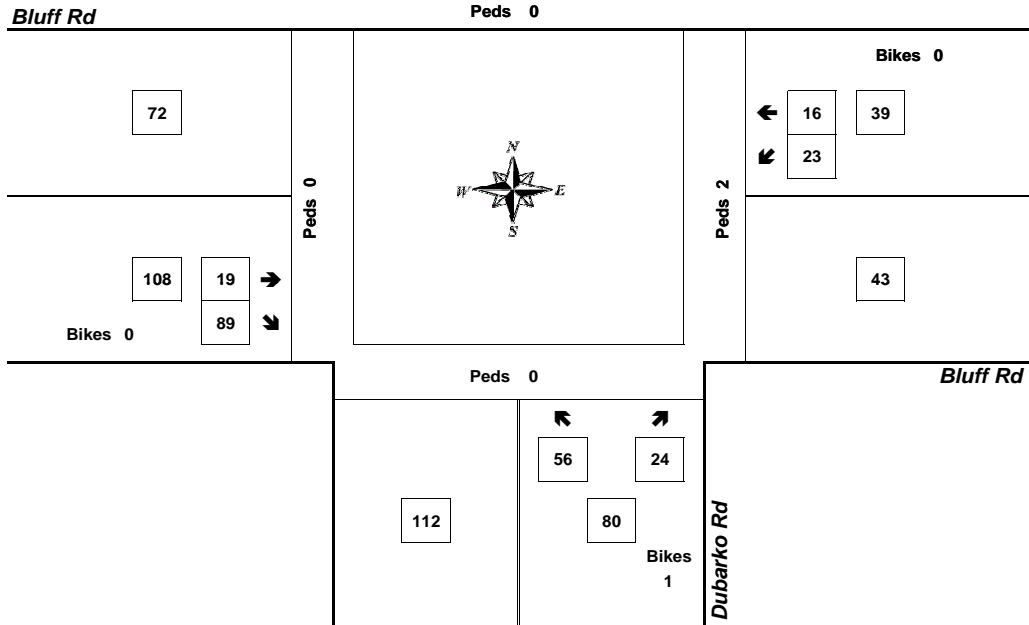


Clay Carney
(503) 833-2740

Dubarko Rd & Bluff Rd

4:45 PM to 5:45 PM
Wednesday, May 22, 2019

Bikes
0



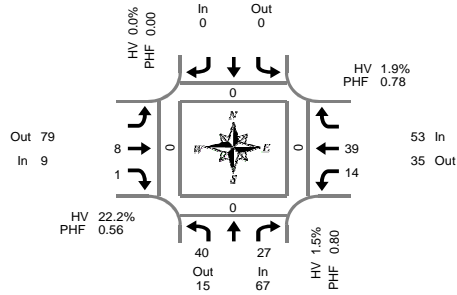
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.79 | 0.0% | 108 |
| WB | 0.65 | 0.0% | 39 |
| NB | 0.80 | 1.3% | 80 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 227 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 5 | 2 | 0 | | | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:05 AM | 4 | 6 | 0 | | | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 16 | 0 | 0 | 0 | 0 |
| 7:10 AM | 2 | 2 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:15 AM | 4 | 1 | 0 | | | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 3 | 0 | | | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:25 AM | 2 | 3 | 0 | | | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:30 AM | 6 | 4 | 0 | | | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 17 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 5 | 0 | 0 | 0 | 0 |
| 7:40 AM | 2 | 1 | 0 | | | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 4 | 1 | 0 | | | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:50 AM | 6 | 1 | 0 | | | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:55 AM | 3 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 10 | 0 | 0 | 0 | 0 |
| 8:00 AM | 3 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:05 AM | 4 | 0 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:10 AM | 3 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 0 | | | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:20 AM | 1 | 3 | 0 | | | 0 | 3 | 1 | 0 | 1 | 4 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 2 | 0 | | | 0 | 2 | 0 | 0 | 1 | 4 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:30 AM | 3 | 3 | 0 | | | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:35 AM | 2 | 1 | 0 | | | 0 | 4 | 1 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 2 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 2 | 0 | | | 0 | 5 | 1 | 0 | 0 | 5 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:55 AM | 2 | 0 | 0 | | | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 8 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | 42 | 0 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 11 | 10 | 0 | | | 0 | 1 | 0 | 0 | 5 | 9 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 7 | 0 | | | 0 | 2 | 1 | 0 | 2 | 13 | 0 | 33 | 0 | 0 | 0 | 0 |
| 7:30 AM | 8 | 5 | 0 | | | 0 | 3 | 0 | 0 | 4 | 10 | 0 | 30 | 0 | 0 | 0 | 0 |
| 7:45 AM | 13 | 5 | 0 | | | 0 | 2 | 0 | 0 | 3 | 7 | 0 | 30 | 0 | 0 | 0 | 0 |
| 8:00 AM | 10 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 8:15 AM | 5 | 5 | 0 | | | 0 | 6 | 2 | 0 | 3 | 11 | 0 | 32 | 0 | 0 | 0 | 0 |
| 8:30 AM | 5 | 6 | 0 | | | 0 | 13 | 2 | 0 | 1 | 6 | 0 | 33 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 3 | 0 | | | 0 | 7 | 3 | 0 | 4 | 10 | 0 | 29 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | 42 | 0 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|------------------------|----|-----|----------------------|-------|----|----------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 67 | 15 | 82 | 0 | 0 | 0 | 0 | 0 | 9 | 79 | 88 | 0 | 53 | 35 | 88 | 0 | 129 |
| %HV | 1.5% | | | 0.0% | | | 22.2% | | | 1.9% | | | 3.1% | | | | |
| PHF | 0.80 | | | 0.00 | | | 0.56 | | | 0.78 | | | 0.79 | | | | |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | | | | |
|-------------|------------------------|------|-------|------------------------|----|-------|----------------------|------|-------|----------------------|-------|-------|-------|------|----|------|------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | | | | | |
| Volume | 40 | 27 | 67 | | | 0 | 8 | 1 | 9 | 14 | 39 | 53 | 129 | | | | |
| %HV | 2.5% | NA | 0.0% | 1.5% | NA | NA | NA | 0.0% | NA | 12.5% | ##### | 22.2% | 7.1% | 0.0% | NA | 1.9% | 3.1% |
| PHF | 0.77 | 0.68 | 0.80 | | | 0.00 | 0.67 | 0.25 | 0.56 | 0.70 | 0.75 | 0.78 | 0.79 | | | | |

Rolling Hour Summary

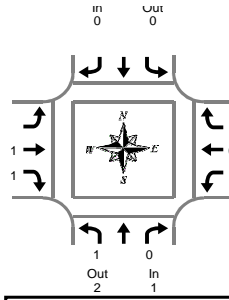
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 27 | 0 | | | 0 | 8 | 1 | 0 | 14 | 39 | 0 | 129 | 0 | 0 | 0 | 0 |
| 7:15 AM | 39 | 18 | 0 | | | 0 | 8 | 2 | 0 | 10 | 35 | 0 | 112 | 0 | 0 | 0 | 0 |
| 7:30 AM | 36 | 16 | 0 | | | 0 | 12 | 3 | 0 | 11 | 33 | 0 | 111 | 0 | 0 | 0 | 0 |
| 7:45 AM | 33 | 17 | 0 | | | 0 | 22 | 5 | 0 | 8 | 29 | 0 | 114 | 0 | 0 | 0 | 0 |
| 8:00 AM | 22 | 15 | 0 | | | 0 | 27 | 8 | 0 | 9 | 32 | 0 | 113 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 2

Peak Hour Summary
7:00 AM to 8:00 AM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:10 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 8:20 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:25 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 1 | 2 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 2 | 3 | 0 | 0 | 0 | 2 | 1 | 3 | 1 | 1 | 2 | 4 |
| PHF | 0.25 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|---|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.25 | 0.25 | 0.50 | 0.25 | 0.00 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| 7:15 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 7:30 AM | 2 | 1 | 3 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 5 |
| 7:45 AM | 2 | 2 | 4 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 6 |
| 8:00 AM | 2 | 2 | 4 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

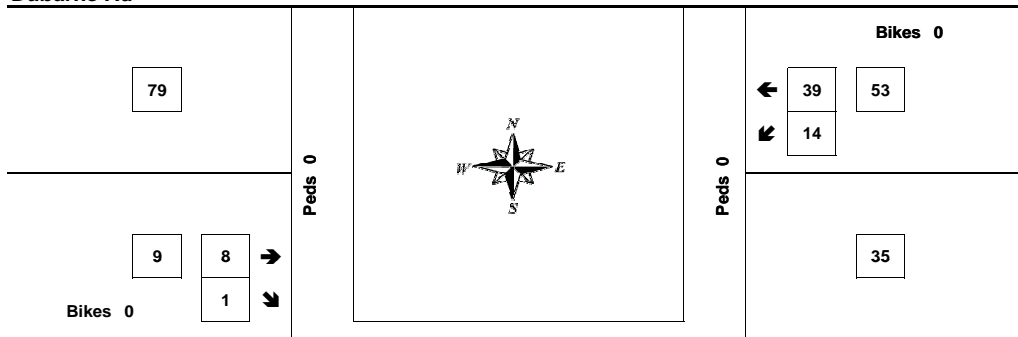
Melissa Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

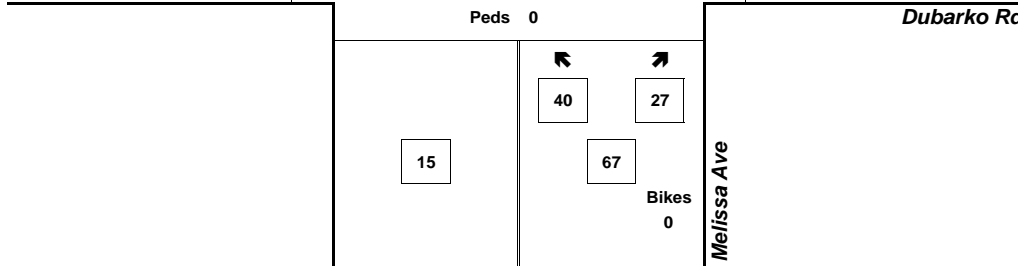
Peds 0



Bikes 0

Bikes 0

Peds 0



Dubarko Rd

Bikes
0

Melissa Ave

| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.56 | 22.2% | 9 |
| WB | 0.78 | 1.9% | 53 |
| NB | 0.80 | 1.5% | 67 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.79 | 3.1% | 129 |

Count Period: 7:00 AM to 9:00 AM

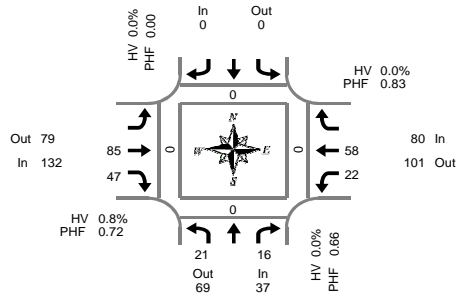
Total Vehicle Summary



Clay Carney
(603) 833-2740

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM



Peak Hour Summary
4:40 PM to 5:40 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 1 | 3 | 0 | | | 0 | 12 | 4 | 0 | 3 | 6 | 0 | 29 | 0 | 0 | 0 | 0 |
| 4:05 PM | 0 | 2 | 0 | | | 0 | 4 | 2 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 4:10 PM | 4 | 2 | 0 | | | 0 | 3 | 2 | 0 | 0 | 7 | 0 | 18 | 0 | 0 | 0 | 1 |
| 4:15 PM | 2 | 2 | 0 | | | 0 | 5 | 4 | 0 | 2 | 2 | 0 | 17 | 0 | 1 | 0 | 0 |
| 4:20 PM | 2 | 2 | 0 | | | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 4:25 PM | 3 | 2 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 17 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 1 | 0 | | | 0 | 7 | 4 | 0 | 2 | 4 | 0 | 18 | 0 | 0 | 0 | 0 |
| 4:35 PM | 1 | 0 | 0 | | | 0 | 8 | 2 | 0 | 3 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 4:40 PM | 1 | 2 | 0 | | | 0 | 5 | 7 | 0 | 5 | 6 | 0 | 26 | 0 | 0 | 0 | 0 |
| 4:45 PM | 5 | 2 | 0 | | | 0 | 4 | 5 | 0 | 0 | 4 | 0 | 20 | 0 | 0 | 0 | 0 |
| 4:50 PM | 2 | 1 | 0 | | | 0 | 7 | 8 | 0 | 3 | 6 | 0 | 27 | 0 | 0 | 0 | 0 |
| 4:55 PM | 2 | 2 | 0 | | | 0 | 7 | 5 | 0 | 0 | 5 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | | 0 | 14 | 5 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | | 0 | 9 | 1 | 0 | 0 | 5 | 0 | 16 | 0 | 0 | 0 | 0 |
| 5:10 PM | 2 | 1 | 0 | | | 0 | 5 | 3 | 0 | 3 | 7 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 1 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 10 | 0 | 0 | 0 | 0 |
| 5:20 PM | 3 | 3 | 0 | | | 0 | 10 | 4 | 0 | 3 | 4 | 0 | 27 | 0 | 0 | 0 | 0 |
| 5:25 PM | 1 | 1 | 0 | | | 0 | 4 | 2 | 0 | 1 | 5 | 0 | 14 | 0 | 0 | 0 | 0 |
| 5:30 PM | 2 | 1 | 0 | | | 0 | 7 | 3 | 0 | 3 | 7 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:35 PM | 2 | 2 | 0 | | | 0 | 9 | 3 | 0 | 2 | 5 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:40 PM | 3 | 0 | 0 | | | 0 | 3 | 6 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 5:45 PM | 1 | 1 | 0 | | | 0 | 8 | 2 | 0 | 4 | 5 | 0 | 21 | 0 | 0 | 0 | 1 |
| 5:50 PM | 3 | 0 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 15 | 0 | 0 | 0 | 0 |
| 5:55 PM | 2 | 0 | 0 | | | 0 | 9 | 4 | 0 | 0 | 2 | 0 | 17 | 0 | 0 | 0 | 1 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 5 | 7 | 0 | | | 0 | 19 | 8 | 0 | 3 | 16 | 0 | 58 | 0 | 0 | 0 | 0 |
| 4:15 PM | 7 | 6 | 0 | | | 0 | 17 | 7 | 0 | 2 | 8 | 0 | 47 | 0 | 1 | 0 | 0 |
| 4:30 PM | 2 | 3 | 0 | | | 0 | 20 | 13 | 0 | 10 | 15 | 0 | 63 | 0 | 0 | 0 | 0 |
| 4:45 PM | 9 | 5 | 0 | | | 0 | 18 | 18 | 0 | 3 | 15 | 0 | 68 | 0 | 0 | 0 | 0 |
| 5:00 PM | 3 | 1 | 0 | | | 0 | 28 | 9 | 0 | 4 | 13 | 0 | 58 | 0 | 0 | 0 | 0 |
| 5:15 PM | 4 | 5 | 0 | | | 0 | 18 | 7 | 0 | 5 | 12 | 0 | 51 | 0 | 0 | 0 | 0 |
| 5:30 PM | 7 | 3 | 0 | | | 0 | 19 | 12 | 0 | 5 | 13 | 0 | 59 | 0 | 0 | 0 | 0 |
| 5:45 PM | 6 | 1 | 0 | | | 0 | 22 | 8 | 0 | 4 | 12 | 0 | 53 | 0 | 0 | 0 | 2 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

Peak Hour Summary
4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|------------------------|----|-----|----------------------|-------|----|----------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 37 | 69 | 106 | 0 | 0 | 0 | 0 | 132 | 79 | 211 | 0 | 80 | 101 | 181 | 0 | 249 | |
| %HV | 0.0% | | | 0.0% | | | 0.8% | | | 0.0% | | | 0.4% | | | | |
| PHF | 0.66 | | | 0.00 | | | 0.72 | | | 0.83 | | | 0.85 | | | | |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|------|-------|------------------------|----|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 21 | 16 | 37 | | | 0 | 85 | 47 | 132 | 22 | 58 | 80 | 249 |
| %HV | 0.0% | NA | 0.0% | 0.0% | NA | NA | NA | 1.2% | 0.0% | 0.8% | 0.0% | 0.0% | 0.4% |
| PHF | 0.58 | 0.80 | 0.66 | | | 0.00 | 0.71 | 0.59 | 0.72 | 0.69 | 0.85 | 0.83 | 0.85 |

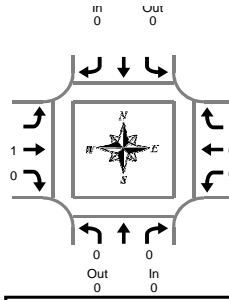
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 23 | 21 | 0 | | | 0 | 74 | 46 | 0 | 18 | 54 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:15 PM | 21 | 15 | 0 | | | 0 | 83 | 47 | 0 | 19 | 51 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:30 PM | 18 | 14 | 0 | | | 0 | 84 | 47 | 0 | 22 | 55 | 0 | 240 | 0 | 0 | 0 | 0 |
| 4:45 PM | 23 | 14 | 0 | | | 0 | 83 | 46 | 0 | 17 | 53 | 0 | 236 | 0 | 0 | 0 | 0 |
| 5:00 PM | 20 | 10 | 0 | | | 0 | 87 | 36 | 0 | 18 | 50 | 0 | 221 | 0 | 0 | 0 | 2 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 4:10 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle Peak Hour Summary

4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| PHF | 0.00 | | | 0.00 | | | 0.25 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|------|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.00 | 0.00 | 0.00 | | 0.00 | 0.25 | 0.00 | 0.25 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |

Peak Hour Summary



Clay Carney
(503) 833-2740

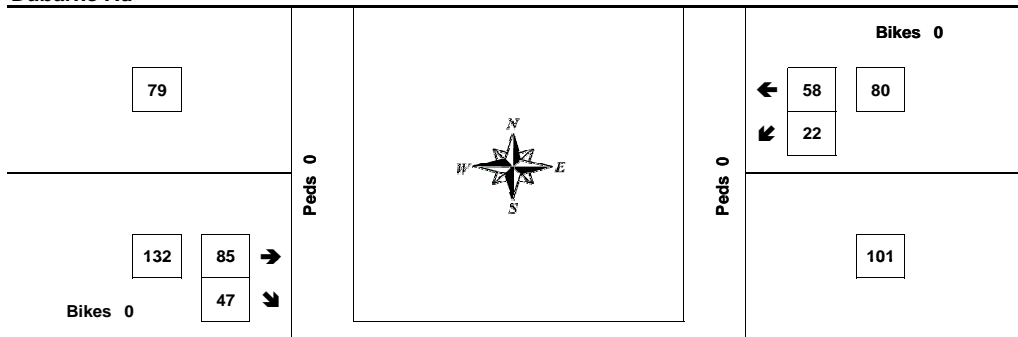
Melissa Ave & Dubarko Rd

4:40 PM to 5:40 PM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

Peds 0



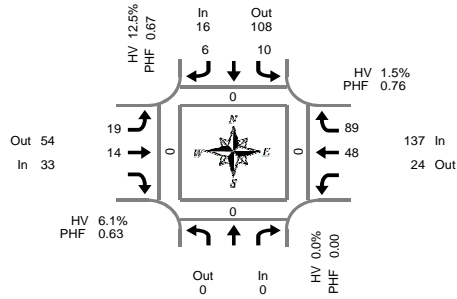
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.72 | 0.8% | 132 |
| WB | 0.83 | 0.0% | 80 |
| NB | 0.66 | 0.0% | 37 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 249 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:55 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:55 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

Peak Hour Summary

7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 16 | 108 | 124 | 0 | 33 | 54 | 87 | 0 | 137 | 24 | 161 | 0 | 186 | 0 | 0 | 0 | 0 |
| %HV | | | | | | | 12.5% | | | | | 6.1% | | | | 1.5% | | | | | 3.2% |
| PHF | | | | | | | 0.67 | | | | | 0.63 | | | | 0.76 | | | | | 0.89 |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | | | |
|-------------|---------------------|----|----|------|---------------------|------|------|-------|----------------------|-------|----|------|----------------------|------|------|------|-------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | |
| Volume | | | | 0 | 10 | 6 | 16 | 19 | 14 | 33 | | | | 48 | 89 | 137 | 186 | | | |
| %HV | NA | NA | NA | 0.0% | 20.0% | NA | 0.0% | 12.5% | 0.0% | 14.3% | NA | 6.1% | NA | 2.1% | 1.1% | 1.5% | 3.2% | | | |
| PHF | | | | 0.00 | 0.50 | 0.30 | 0.67 | 0.59 | 0.70 | 0.63 | | | | 0.75 | 0.77 | 0.76 | 0.89 | | | |

Rolling Hour Summary

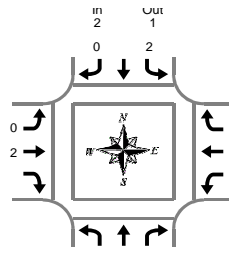
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 2

Peak Hour Summary
7:05 AM to 8:05 AM

Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:10 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 7:20 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 8:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Total Survey | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 3 |
| 7:15 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Total Survey | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 4 | 6 | 6 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | 6 |
| PHF | 0.00 | 0.25 | | 0.00 | 0.25 | | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 2 | 2 | 1 | 2 | 3 | 7 |
| 7:15 AM | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 2 | 1 | 0 | 1 | 4 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 |

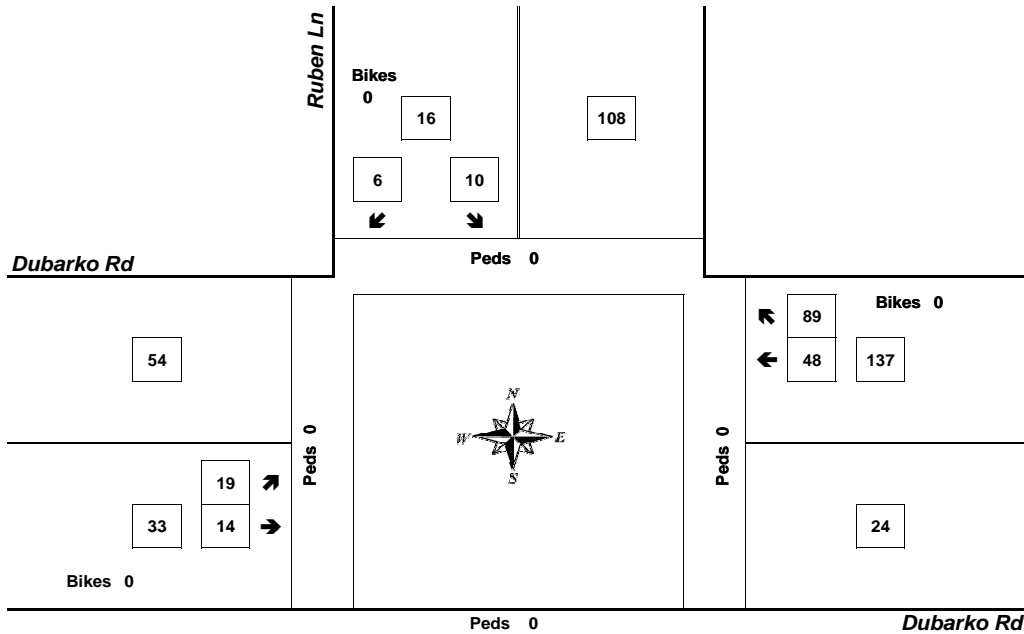
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

7:05 AM to 8:05 AM
Thursday, May 23, 2019



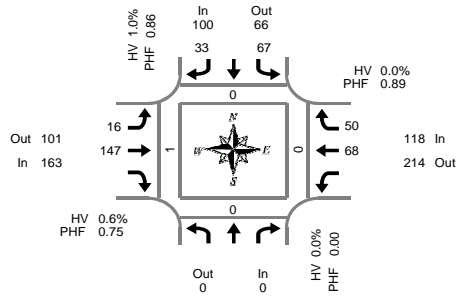
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.63 | 6.1% | 33 |
| WB | 0.76 | 1.5% | 137 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.67 | 12.5% | 16 |
| Intersection | 0.89 | 3.2% | 186 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



**Peak Hour Summary
4:25 PM to 5:25 PM**

Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

**5-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:05 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:10 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:20 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:25 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:35 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:40 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:50 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:55 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:05 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:10 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:20 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:25 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:35 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:40 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:50 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:55 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

**15-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

**Peak Hour Summary
4:25 PM to 5:25 PM**

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 100 | 66 | 166 | 0 | 163 | 101 | 264 | 0 | 118 | 214 | 332 | 0 | 381 | 0 | 0 | 0 | 1 |
| %HV | 0.0% | | | | 1.0% | | | | 0.6% | | | | 0.0% | | | | 0.5% | | | | |
| PHF | 0.00 | | | | 0.86 | | | | 0.75 | | | | 0.89 | | | | 0.89 | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|---------------------|------|------|-------|---------------------|------|-------|-------|----------------------|------|------|-------|----------------------|------|------|------|-------|
| | Total | L | R | Total | L | T | Total | Bikes | Total | T | R | Total | Bikes | | | | |
| Volume | 0 | 67 | 33 | 100 | 16 | 147 | 163 | 0 | 68 | 50 | 118 | 0 | 381 | | | | |
| %HV | NA | NA | NA | 0.0% | 0.0% | NA | 3.0% | 1.0% | 6.3% | 0.0% | NA | 0.6% | NA | 0.0% | 0.0% | 0.0% | 0.5% |
| PHF | | 0.00 | 0.80 | 0.75 | 0.86 | 0.57 | 0.75 | 0.75 | 0.75 | 0.89 | 0.83 | 0.89 | 0.89 | | | | |

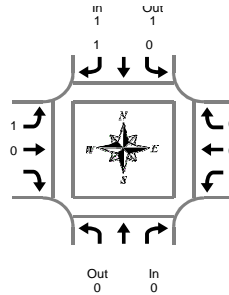
**Rolling Hour Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:25 PM to 5:25 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 4:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| 5:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle Peak Hour Summary 4:25 PM to 5:25 PM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.00 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|---|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | 0.00 | | 0.25 | 0.25 | 0.25 | 0.00 | | 0.25 | 0.00 | 0.00 | 0.00 | 0.50 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 1 | 0 | 0 | 4 |
| 4:15 PM | 0 | 1 | 0 | 1 | 2 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 3 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 3 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 1 | 1 | 4 |

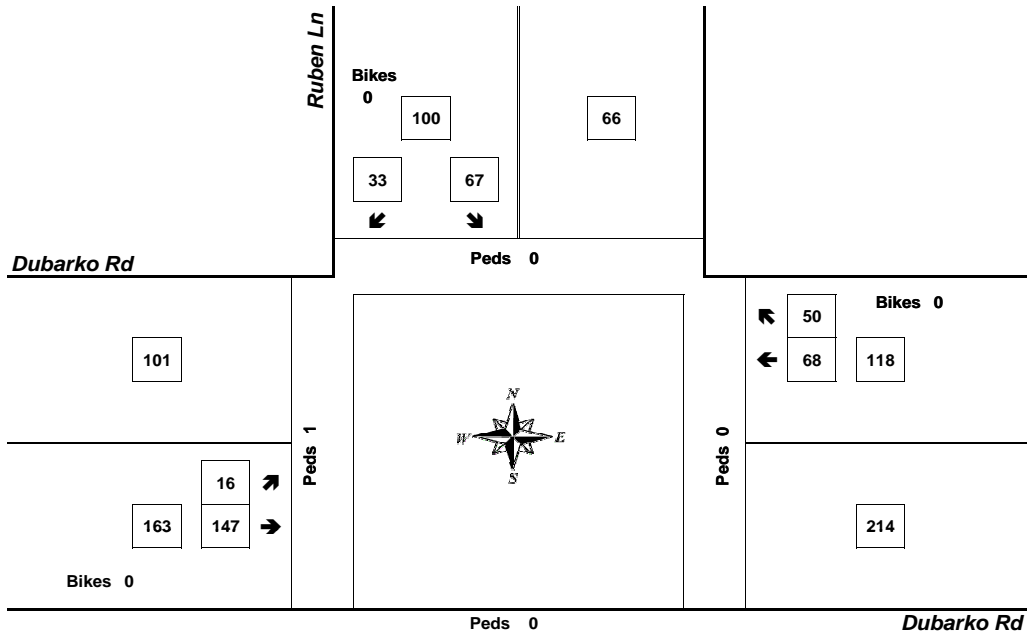
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

4:25 PM to 5:25 PM
Wednesday, May 22, 2019



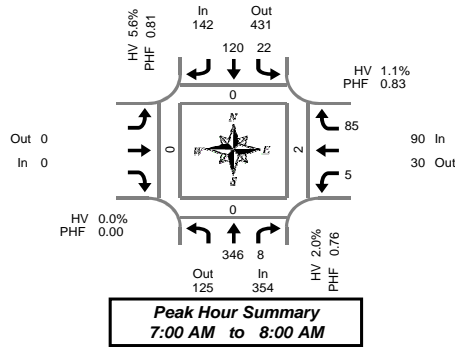
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.75 | 0.6% | 163 |
| WB | 0.89 | 0.0% | 118 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.86 | 1.0% | 100 |
| Intersection | 0.89 | 0.5% | 381 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 33 | 0 | 0 | 0 | 10 | 0 | | 0 | 1 | 11 | 0 | 55 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 50 | 1 | 0 | 1 | 7 | 0 | | 0 | 0 | 8 | 0 | 67 | 0 | 0 | 0 | 0 | |
| 7:10 AM | 32 | 0 | 0 | 3 | 9 | 0 | | 0 | 1 | 6 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 34 | 0 | 0 | 3 | 6 | 0 | | 0 | 0 | 9 | 0 | 52 | 0 | 0 | 1 | 0 | |
| 7:20 AM | 32 | 1 | 0 | 4 | 13 | 0 | | 0 | 0 | 6 | 0 | 56 | 0 | 0 | 0 | 0 | |
| 7:25 AM | 25 | 1 | 0 | 1 | 12 | 0 | | 0 | 0 | 9 | 0 | 48 | 0 | 0 | 1 | 0 | |
| 7:30 AM | 21 | 0 | 0 | 2 | 12 | 0 | | 0 | 1 | 7 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 7:35 AM | 24 | 1 | 0 | 4 | 8 | 0 | | 0 | 0 | 7 | 0 | 44 | 0 | 0 | 0 | 0 | |
| 7:40 AM | 34 | 0 | 0 | 1 | 8 | 0 | | 0 | 2 | 4 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 26 | 2 | 0 | 1 | 17 | 0 | | 0 | 0 | 5 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:50 AM | 17 | 2 | 0 | 2 | 11 | 0 | | 0 | 0 | 10 | 0 | 42 | 0 | 0 | 0 | 0 | |
| 7:55 AM | 18 | 0 | 0 | 0 | 7 | 0 | | 0 | 0 | 3 | 0 | 28 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 26 | 0 | 0 | 4 | 7 | 0 | | 0 | 1 | 8 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:05 AM | 27 | 2 | 0 | 2 | 15 | 0 | | 0 | 1 | 4 | 0 | 51 | 0 | 0 | 1 | 0 | |
| 8:10 AM | 33 | 0 | 0 | 1 | 6 | 0 | | 0 | 1 | 0 | 0 | 41 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 24 | 2 | 0 | 4 | 16 | 0 | | 0 | 0 | 3 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:20 AM | 29 | 0 | 0 | 4 | 6 | 0 | | 0 | 1 | 6 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 33 | 1 | 0 | 3 | 7 | 0 | | 0 | 0 | 4 | 0 | 48 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 21 | 2 | 0 | 3 | 11 | 0 | | 0 | 0 | 6 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 24 | 2 | 0 | 2 | 15 | 0 | | 0 | 0 | 6 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:40 AM | 21 | 2 | 0 | 1 | 12 | 0 | | 0 | 1 | 2 | 0 | 39 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 21 | 2 | 0 | 5 | 16 | 0 | | 0 | 1 | 7 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:50 AM | 26 | 2 | 0 | 5 | 16 | 0 | | 0 | 0 | 3 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:55 AM | 16 | 1 | 0 | 1 | 18 | 0 | | 0 | 1 | 5 | 0 | 42 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 115 | 1 | 0 | 4 | 26 | 0 | | 0 | 2 | 25 | 0 | 173 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 91 | 2 | 0 | 8 | 31 | 0 | | 0 | 0 | 24 | 0 | 156 | 0 | 0 | 2 | 0 | |
| 7:30 AM | 79 | 1 | 0 | 7 | 28 | 0 | | 0 | 3 | 18 | 0 | 136 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 61 | 4 | 0 | 3 | 35 | 0 | | 0 | 0 | 18 | 0 | 121 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 86 | 2 | 0 | 7 | 28 | 0 | | 0 | 3 | 12 | 0 | 138 | 0 | 0 | 1 | 0 | |
| 8:15 AM | 86 | 3 | 0 | 11 | 29 | 0 | | 0 | 1 | 13 | 0 | 143 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 66 | 6 | 0 | 6 | 38 | 0 | | 0 | 1 | 14 | 0 | 131 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 63 | 5 | 0 | 11 | 50 | 0 | | 0 | 2 | 15 | 0 | 146 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | | | | |
|-------------|-------------------------|-----|-------|-------------------------|------|-----|----------------------|-------|------|----------------------|-------|-------|-------|-----------------------|-------|------|------|---|---|--|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West | | | |
| Volume | 354 | 125 | 479 | 0 | 142 | 431 | 573 | 0 | 0 | 0 | 90 | 30 | 120 | 0 | 586 | 0 | 0 | 2 | 0 | |
| %HV | 2.0% | | | | 5.6% | | | | 0.0% | | | | 1.1% | | | 2.7% | | | | |
| PHF | 0.76 | | | | 0.81 | | | | 0.00 | | | | 0.83 | | | 0.85 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|-------|-------|----------------------|-------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | | Total | L | R | Total | | |
| Volume | 346 | 8 | 354 | 22 | 120 | 142 | | 0 | 5 | 85 | 90 | 586 | |
| %HV | NA | 2.0% | 0.0% | 2.0% | 13.6% | 4.2% | NA | 5.6% | NA | NA | NA | 2.7% | |
| PHF | 0.75 | 0.50 | 0.76 | 0.55 | 0.81 | 0.81 | | 0.00 | 0.42 | 0.85 | 0.83 | 0.85 | |

Rolling Hour Summary

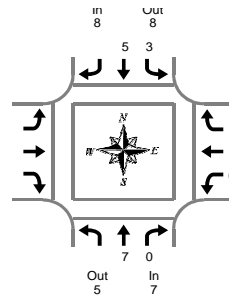
7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|---|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 346 | 8 | 0 | 22 | 120 | 0 | | 0 | 5 | 85 | 0 | 586 | 0 | 0 | 2 | 0 | |
| 7:15 AM | 317 | 9 | 0 | 25 | 122 | 0 | | 0 | 6 | 72 | 0 | 551 | 0 | 0 | 3 | 0 | |
| 7:30 AM | 312 | 10 | 0 | 28 | 120 | 0 | | 0 | 7 | 61 | 0 | 538 | 0 | 0 | 1 | 0 | |
| 7:45 AM | 299 | 15 | 0 | 27 | 130 | 0 | | 0 | 5 | 57 | 0 | 533 | 0 | 0 | 1 | 0 | |
| 8:00 AM | 301 | 16 | 0 | 35 | 145 | 0 | | 0 | 7 | 54 | 0 | 558 | 0 | 0 | 1 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

Peak Hour Summary
7:00 AM to 8:00 AM

SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 7:10 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:15 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:20 AM | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 3 | |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:35 AM | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:50 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:05 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 3 | |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 8:40 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:45 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:50 AM | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 8:55 AM | 6 | 0 | 6 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 8 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 0 | 0 | 3 | 3 | 40 | | |

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|-------|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 7:00 AM | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:15 AM | 2 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 4 | |
| 7:30 AM | 1 | 0 | 1 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 4 | |
| 8:00 AM | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 1 | 1 | 1 | 8 | |
| 8:30 AM | 1 | 0 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 8:45 AM | 8 | 0 | 8 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 11 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 0 | 0 | 3 | 3 | 40 | | |

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 7 | 5 | 12 | 8 | 8 | 16 | 0 | 0 | 0 | 1 | 3 | 4 | 16 |
| PHF | 0.44 | | | 0.50 | | | 0.00 | | | 0.25 | | | 0.67 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|------|----------------------|-------|----|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| Volume | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 1 | 1 | 1 | 16 | |
| PHF | 0.44 | 0.00 | 0.44 | 0.38 | 0.42 | 0.50 | 0.00 | 0.00 | 0.25 | 0.25 | 0.67 | | |

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|---|----------------------|-------|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 7:00 AM | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 1 | 1 | 1 | 16 | |
| 7:15 AM | 5 | 0 | 5 | 3 | 6 | 9 | 0 | 0 | 1 | 1 | 1 | 15 | |
| 7:30 AM | 6 | 1 | 7 | 2 | 9 | 11 | 0 | 0 | 1 | 1 | 1 | 19 | |
| 7:45 AM | 6 | 1 | 7 | 0 | 9 | 9 | 0 | 0 | 1 | 1 | 1 | 17 | |
| 8:00 AM | 13 | 1 | 14 | 0 | 8 | 8 | 0 | 0 | 2 | 2 | 2 | 24 | |

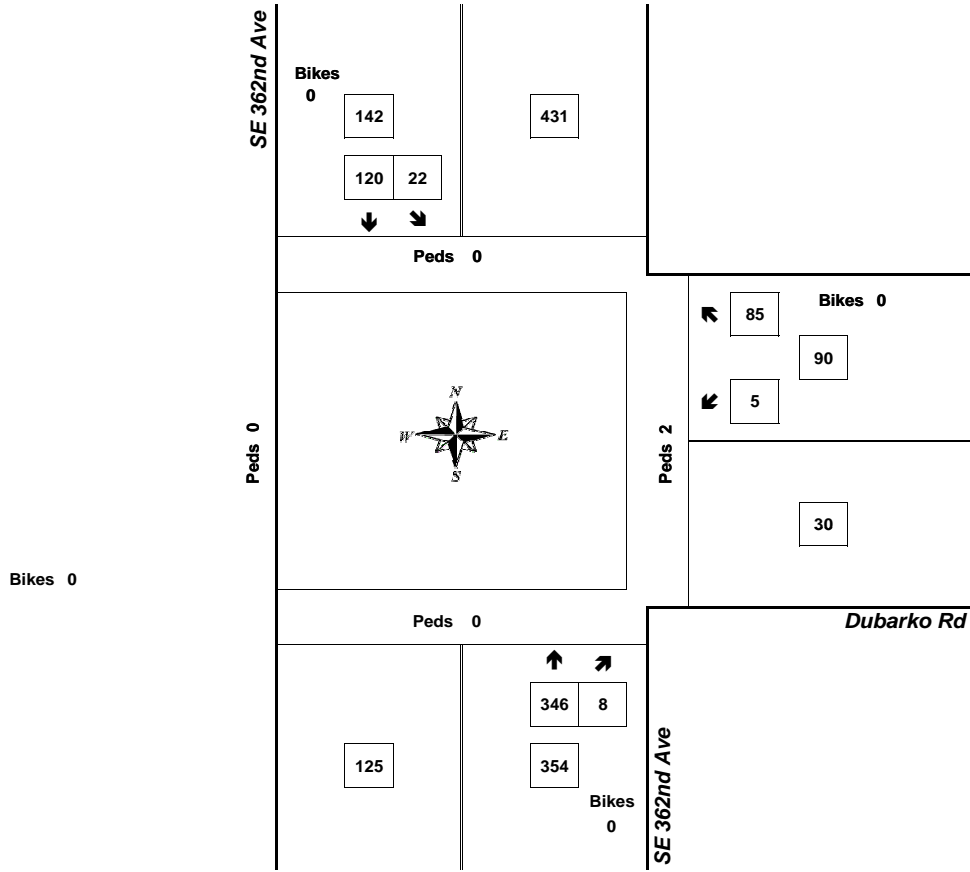
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019



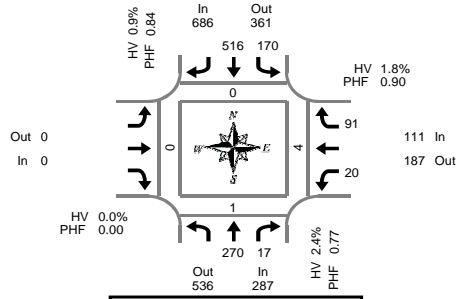
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.83 | 1.1% | 90 |
| NB | 0.76 | 2.0% | 354 |
| SB | 0.81 | 5.6% | 142 |
| Intersection | 0.85 | 2.7% | 586 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



**Peak Hour Summary
4:30 PM to 5:30 PM**

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

**5-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 25 | 0 | 0 | 11 | 35 | 0 | | 0 | 1 | 6 | 0 | 78 | 1 | 0 | 3 | 0 | |
| 4:05 PM | 21 | 2 | 0 | 7 | 36 | 0 | | 0 | 1 | 5 | 0 | 72 | 0 | 0 | 0 | 0 | |
| 4:10 PM | 19 | 2 | 0 | 8 | 36 | 0 | | 0 | 1 | 6 | 0 | 72 | 0 | 0 | 0 | 0 | |
| 4:15 PM | 26 | 3 | 0 | 8 | 32 | 0 | | 0 | 0 | 4 | 0 | 73 | 0 | 0 | 1 | 0 | |
| 4:20 PM | 22 | 1 | 0 | 14 | 45 | 0 | | 0 | 3 | 4 | 0 | 89 | 0 | 0 | 0 | 0 | |
| 4:25 PM | 21 | 2 | 0 | 15 | 34 | 0 | | 0 | 0 | 5 | 0 | 77 | 0 | 0 | 0 | 0 | |
| 4:30 PM | 19 | 2 | 0 | 18 | 30 | 0 | | 0 | 1 | 8 | 0 | 78 | 0 | 0 | 2 | 0 | |
| 4:35 PM | 27 | 0 | 0 | 9 | 42 | 0 | | 0 | 0 | 9 | 0 | 87 | 0 | 0 | 0 | 0 | |
| 4:40 PM | 17 | 3 | 0 | 12 | 33 | 0 | | 0 | 2 | 9 | 0 | 76 | 0 | 0 | 0 | 0 | |
| 4:45 PM | 28 | 0 | 0 | 7 | 46 | 0 | | 0 | 1 | 6 | 0 | 88 | 0 | 0 | 0 | 0 | |
| 4:50 PM | 28 | 2 | 0 | 14 | 33 | 0 | | 0 | 3 | 7 | 0 | 87 | 0 | 0 | 0 | 0 | |
| 4:55 PM | 30 | 2 | 0 | 10 | 51 | 0 | | 0 | 4 | 3 | 0 | 100 | 0 | 0 | 0 | 0 | |
| 5:00 PM | 30 | 1 | 0 | 15 | 42 | 0 | | 0 | 3 | 11 | 0 | 102 | 0 | 0 | 0 | 0 | |
| 5:05 PM | 21 | 4 | 0 | 16 | 45 | 0 | | 0 | 0 | 7 | 0 | 93 | 0 | 0 | 0 | 0 | |
| 5:10 PM | 21 | 1 | 0 | 20 | 49 | 0 | | 0 | 2 | 6 | 0 | 99 | 0 | 0 | 0 | 0 | |
| 5:15 PM | 16 | 1 | 0 | 14 | 60 | 0 | | 0 | 1 | 7 | 0 | 99 | 0 | 0 | 0 | 0 | |
| 5:20 PM | 17 | 1 | 0 | 19 | 42 | 0 | | 0 | 2 | 12 | 0 | 93 | 0 | 1 | 0 | 0 | |
| 5:25 PM | 16 | 0 | 0 | 16 | 43 | 0 | | 0 | 1 | 6 | 0 | 82 | 0 | 0 | 2 | 0 | |
| 5:30 PM | 19 | 0 | 0 | 16 | 24 | 0 | | 0 | 2 | 4 | 0 | 65 | 0 | 0 | 0 | 0 | |
| 5:35 PM | 16 | 1 | 0 | 12 | 33 | 0 | | 0 | 2 | 7 | 0 | 71 | 0 | 0 | 0 | 0 | |
| 5:40 PM | 26 | 0 | 0 | 9 | 39 | 0 | | 0 | 1 | 6 | 0 | 81 | 0 | 0 | 0 | 0 | |
| 5:45 PM | 18 | 2 | 0 | 13 | 36 | 0 | | 0 | 2 | 5 | 0 | 76 | 0 | 0 | 0 | 0 | |
| 5:50 PM | 19 | 2 | 0 | 17 | 43 | 0 | | 0 | 1 | 7 | 0 | 89 | 0 | 0 | 0 | 0 | |
| 5:55 PM | 17 | 3 | 0 | 17 | 29 | 0 | | 0 | 1 | 7 | 0 | 74 | 0 | 0 | 0 | 0 | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | |

**15-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 65 | 4 | 0 | 26 | 107 | 0 | | 0 | 3 | 17 | 0 | 222 | 1 | 0 | 3 | 0 | |
| 4:15 PM | 69 | 6 | 0 | 37 | 111 | 0 | | 0 | 3 | 13 | 0 | 239 | 0 | 0 | 1 | 0 | |
| 4:30 PM | 63 | 5 | 0 | 39 | 105 | 0 | | 0 | 3 | 26 | 0 | 241 | 0 | 0 | 2 | 0 | |
| 4:45 PM | 86 | 4 | 0 | 31 | 130 | 0 | | 0 | 8 | 16 | 0 | 275 | 0 | 0 | 0 | 0 | |
| 5:00 PM | 72 | 6 | 0 | 51 | 136 | 0 | | 0 | 5 | 24 | 0 | 294 | 0 | 0 | 0 | 0 | |
| 5:15 PM | 49 | 2 | 0 | 49 | 145 | 0 | | 0 | 4 | 25 | 0 | 274 | 0 | 1 | 2 | 0 | |
| 5:30 PM | 61 | 1 | 0 | 37 | 96 | 0 | | 0 | 5 | 17 | 0 | 217 | 0 | 0 | 0 | 0 | |
| 5:45 PM | 54 | 7 | 0 | 47 | 108 | 0 | | 0 | 4 | 19 | 0 | 239 | 0 | 0 | 0 | 0 | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | |

**Peak Hour Summary
4:30 PM to 5:30 PM**

| By Approach | Northbound SE 362nd Ave | | | | Southbound SE 362nd Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------|-------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 287 | 536 | 823 | 0 | 686 | 361 | 1,047 | 0 | 0 | 0 | 0 | 0 | 111 | 187 | 298 | 0 | 1,084 | 0 | 1 | 4 | 0 |
| %HV | 2.4% | | | | 0.9% | | | | 0.0% | | | | 1.8% | | | | 1.4% | | | | |
| PHF | 0.77 | | | | 0.84 | | | | 0.00 | | | | 0.90 | | | | 0.92 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|-------|----------------------|------|-------|-------|------|
| | T | R | Total | L | T | Total | | | Total | L | R | Total | | |
| Volume | 270 | 17 | 287 | 170 | 516 | 686 | | | 0 | 20 | 91 | 111 | 1,084 | |
| %HV | NA | 2.6% | 0.0% | 2.4% | 1.2% | 0.8% | NA | 0.9% | NA | NA | NA | 1.1% | 1.8% | 1.4% |
| PHF | 0.77 | 0.61 | 0.77 | 0.80 | 0.84 | 0.84 | | | 0.00 | 0.50 | 0.88 | 0.90 | 0.92 | |

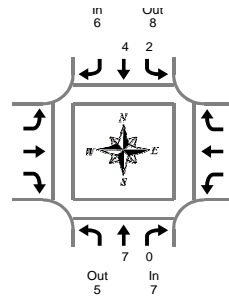
**Rolling Hour Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 283 | 19 | 0 | 133 | 453 | 0 | | 0 | 17 | 72 | 0 | 977 | 1 | 0 | 6 | 0 | |
| 4:15 PM | 290 | 21 | 0 | 158 | 482 | 0 | | 0 | 19 | 79 | 0 | 1,049 | 1 | 0 | 3 | 0 | |
| 4:30 PM | 270 | 17 | 0 | 170 | 516 | 0 | | 0 | 20 | 91 | 0 | 1,084 | 0 | 1 | 4 | 0 | |
| 4:45 PM | 268 | 13 | 0 | 168 | 507 | 0 | | 0 | 22 | 82 | 0 | 1,060 | 0 | 1 | 2 | 0 | |
| 5:00 PM | 236 | 16 | 0 | 184 | 485 | 0 | | 0 | 18 | 85 | 0 | 1,024 | 0 | 1 | 2 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total | |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|----------------------|-------|---|----------------|----|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 4:00 PM | 2 | 0 | 2 | 0 | 1 | 1 | | | 0 | 0 | 0 | 3 | |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 1 | 1 | |
| 4:10 PM | 2 | 0 | 2 | 0 | 1 | 1 | | | 0 | 0 | 0 | 3 | |
| 4:15 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 2 | |
| 4:20 PM | 0 | 0 | 0 | 0 | 1 | 1 | | | 0 | 0 | 0 | 1 | |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 4:30 PM | 0 | 0 | 0 | 0 | 3 | 3 | | | 0 | 0 | 0 | 3 | |
| 4:35 PM | 1 | 0 | 1 | 0 | 0 | 0 | | | 0 | 0 | 0 | 1 | |
| 4:40 PM | 0 | 0 | 0 | 1 | 0 | 1 | | | 0 | 1 | 0 | 2 | |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 4:55 PM | 0 | 0 | 0 | 0 | 1 | 1 | | | 0 | 0 | 0 | 1 | |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:05 PM | 2 | 0 | 2 | 0 | 0 | 0 | | | 0 | 0 | 0 | 2 | |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:15 PM | 1 | 0 | 1 | 0 | 0 | 0 | | | 0 | 0 | 0 | 1 | |
| 5:20 PM | 1 | 0 | 1 | 0 | 0 | 0 | | | 0 | 0 | 1 | 2 | |
| 5:25 PM | 2 | 0 | 2 | 1 | 0 | 1 | | | 0 | 0 | 0 | 3 | |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 2 | |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:50 PM | 0 | 0 | 0 | 1 | 0 | 1 | | | 0 | 0 | 0 | 1 | |
| 5:55 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 2 | |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total | |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|----------------------|-------|---|----------------|----|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 4:00 PM | 4 | 0 | 4 | 0 | 2 | 2 | | | 0 | 0 | 1 | 1 | 7 |
| 4:15 PM | 1 | 0 | 1 | 0 | 2 | 2 | | | 0 | 0 | 0 | 0 | 3 |
| 4:30 PM | 1 | 0 | 1 | 1 | 3 | 4 | | | 0 | 1 | 0 | 1 | 6 |
| 4:45 PM | 0 | 0 | 0 | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 2 | 0 | 2 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 2 |
| 5:15 PM | 4 | 0 | 4 | 1 | 0 | 1 | | | 0 | 0 | 1 | 1 | 6 |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 2 |
| 5:45 PM | 1 | 0 | 1 | 1 | 1 | 2 | | | 0 | 0 | 0 | 0 | 3 |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle Peak Hour Summary

4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Total | |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|----------------------|-------|---|-------|----|
| | In | Out | Total | In | Out | Total | In | Out | Total | Total | | | |
| Volume | 7 | 5 | 12 | 6 | 8 | 14 | 0 | 0 | 0 | 2 | 2 | 4 | 15 |
| PHF | 0.44 | | | 0.38 | | | 0.00 | | 0.50 | | | 0.63 | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Total | |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|---|----------------------|-------|------|-------|------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| Volume | 7 | 0 | 7 | 2 | 4 | 6 | | | 0 | 1 | 1 | 2 | 15 |
| PHF | 0.44 | 0.00 | 0.44 | 0.50 | 0.33 | 0.38 | | | 0.00 | 0.25 | 0.25 | 0.50 | 0.63 |

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | Westbound Dubarko Rd | | | Interval Total | |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|----------------------|-------|---|----------------|----|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 4:00 PM | 6 | 0 | 6 | 1 | 8 | 9 | | | 0 | 1 | 1 | 2 | 17 |
| 4:15 PM | 4 | 0 | 4 | 1 | 6 | 7 | | | 0 | 1 | 0 | 1 | 12 |
| 4:30 PM | 7 | 0 | 7 | 2 | 4 | 6 | | | 0 | 1 | 1 | 2 | 15 |
| 4:45 PM | 7 | 0 | 7 | 1 | 2 | 3 | | | 0 | 0 | 1 | 1 | 11 |
| 5:00 PM | 8 | 0 | 8 | 2 | 2 | 4 | | | 0 | 0 | 1 | 1 | 13 |

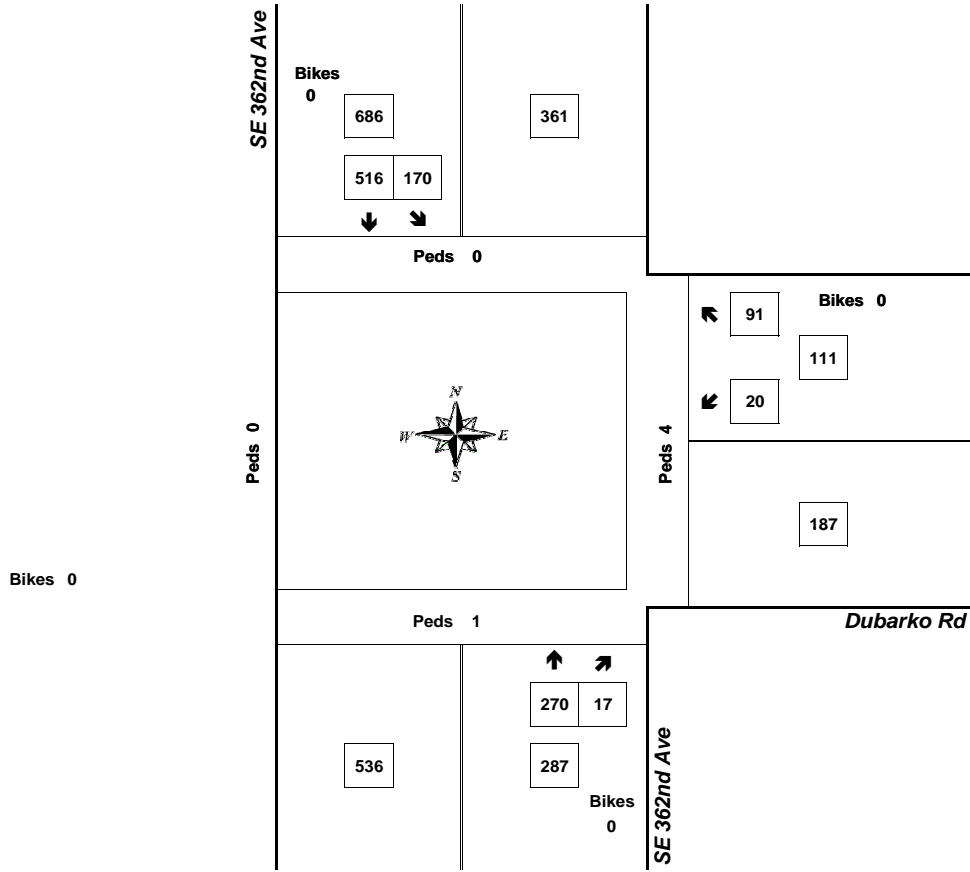
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

4:30 PM to 5:30 PM
Wednesday, May 22, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|--------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.90 | 1.8% | 111 |
| NB | 0.77 | 2.4% | 287 |
| SB | 0.84 | 0.9% | 686 |
| Intersection | 0.92 | 1.4% | 1,084 |

Count Period: 4:00 PM to 6:00 PM

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | PRTC | INJ | A | S | LOC | ERROR | ACT | EVENT | CAUSE | | | | | | |
|--------|---|---|---|---|---|-------------|-----------------|---------------|---------|----------|-----------|-------|-------|----------|-------|-----------|------|--------|------|-------|-------|-----|-------|-------|-------|-----|-------|-------|----|--|
| INVEST | E | A | U | I | C | O | DAY | FIRST STREET | DIRECT | (MEDIAN) | INT-REL | RNDBT | SURF | COLL | OWNER | FROM | | | G | E | LICNS | PED | | | | | | | | |
| RD DPT | E | L | G | N | H | R | TIME | SECOND STREET | LOCTN | LEGS | TRAF- | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE | | |
| UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE | | |
| 00737 | N | N | N | | | 02/27/2015 | 17 | DUBARKO RD | INTER | 3-LEG | N | N | UNK | S-1STOP | 01 | NONE | 0 | STRGHT | | | | | | | | | | | 29 | |
| NONE | | | | | | FR | 0 | 362ND DR | E | | STOP SIGN | N | WET | SS-O | | PRVTE | E -W | | | | | | | | | 000 | | 00 | | |
| N | | | | | | 12P | | | 06 | 0 | | N | DAY | PDO | | PSNGR CAR | | 01 | DRVR | NONE | 00 | M | UNK | | 026 | 000 | | 29 | | |
| N | | | | | | 45 23 57.42 | -122 17 27.9 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | 02 | NONE | 0 | STOP | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | PRVTE | E -W | | | | | | | | | | 011 | | 00 | |
| | | | | | | | | | | | | | | | | PSNGR CAR | | 01 | DRVR | NONE | 22 | M | OR-Y | | 000 | 000 | | 00 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/17/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
362ND DR at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 1

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | INT-REL | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |
|------|---|---|---|---|---|------|-------|-------------|---------|----------|---------|-------|------|-------|----------|------|---|---|--------|---|---|---|---|---|---|------|------|---------------|--------|------|-------|-------|------|------|-------|------|------|-----|---|---|-------|-----|--------|---|---|---|---|---|---|-----|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---|---|-----|-----|-------|-----|-------|-------|
|------|---|---|---|---|---|------|-------|-------------|---------|----------|---------|-------|------|-------|----------|------|---|---|--------|---|---|---|---|---|---|------|------|---------------|--------|------|-------|-------|------|------|-------|------|------|-----|---|---|-------|-----|--------|---|---|---|---|---|---|-----|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---|---|-----|-----|-------|-----|-------|-------|

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

Page: 1

CITY OF SANDY, CLACKAMAS COUNTY

DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

1 - 2 of 2 Crash records shown.

| SER# | S | D | M | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | INJ | G | E | LICNS | PED | ACT | EVENT | CAUSE | |
|--------|---|---|---|-------------|---|---|------------|------|---------------|---------|-------------|-----------|----------|-------|----------|----------|-----------|-------|--------|------|-------|-------|-----|-------|-------|-------|-------|-------|-------|
| INVEST | E | A | U | I | C | O | DAY | DIST | FIRST STREET | RD CHAR | (MEDIAN) | INT-REL | OFFRD | WTHR | CRASH | TRLR QTY | MOVE | PRTC | INJ | G | E | LICNS | PED | ACT | EVENT | CAUSE | | | |
| RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | ACT | EVENT | CAUSE | | | |
| UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |
| 00557 | N | N | N | | | | 02/07/2014 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | SNOW | ANGL-S | 01 | NONE | 0 | TURN-L | | | | | | | 124 | 08 | | |
| NONE | | | | FR | | | | 0 | MELISSA AVE | S | | STOP SIGN | N | ICE | TURN | | PRVTE | SE-S | | | | | | | | 000 | 124 | 00 | |
| N | | | | 3P | | | | | | 06 | 0 | | N | DAY | PDO | | PSNGR CAR | | 01 | DRVR | NONE | 59 | M | OR-Y | 002 | 017 | 08 | | |
| N | | | | 45 23 | | | -122 16 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 30.2562959 | | | 36.081048 | | | | | | | | | | | | | | | | | | | | | | |
| 01045 | N | N | N | | | | 03/26/2015 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | CLR | ANGL-OTH | 01 | NONE | 0 | STRGHT | | | | | | | | 02 | | |
| NONE | | | | TH | | | | 0 | MELISSA AVE | CN | | STOP SIGN | N | DRY | TURN | | PRVTE | NW-SE | | | | | | | | 000 | 00 | | |
| N | | | | 8A | | | | | | 04 | 0 | | N | DAWN | PDO | | PSNGR CAR | | 01 | DRVR | NONE | 23 | F | OR-Y | 000 | 000 | 00 | | |
| N | | | | 45 23 30.26 | | | -122 16 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 36.08 | | | | | | | | | | | | | | | | | | | | | | | | | |
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Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | S | D | M | CLASS | CITY STREET | INT-TYPE | SPCL USE | ACT | EVENT | CAUSE | | | | | | | | | | | | | | | | | | | |
|--------|---|---|---|-------|-------------|----------|----------|------|---------------|---------|----------|---------|-------|-------|-------|-------|------|------|-----|------|-------|-------|-----|-----|-----|-------|-----|-------|-------|
| INVEST | E | A | U | I | C | O | DAY | DIST | FIRST STREET | RD CHAR | (MEDIAN) | INT-REL | OFFRD | WTHR | CRASH | TRLR | QTY | MOVE | A | S | | | | | | | | | |
| RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | | | | | | |
| UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
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DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 538 PM Peak Hour Volumes: 103

Warrant Used:

100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 5,380 | 8,850 | |
| Minor Street* | 1,030 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 5,380 | 13,300 | |
| Minor Street* | 1,030 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 5,380 | 10,640 | |
| Minor Street* | 1,030 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 248 PM Peak Hour Volumes: 19

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,480 | 8,850 | |
| Minor Street* | 190 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,480 | 13,300 | |
| Minor Street* | 190 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,480 | 10,640 | |
| Minor Street* | 190 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 84 PM Peak Hour Volumes: 113

Warrant Used:

 X 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 840 | 8,850 | |
| Minor Street* | 1,130 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 840 | 13,300 | |
| Minor Street* | 1,130 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 840 | 10,640 | |
| Minor Street* | 1,130 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 164 PM Peak Hour Volumes: 36

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 1,640 | 8,850 | |
| Minor Street* | 360 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 1,640 | 13,300 | |
| Minor Street* | 360 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 1,640 | 10,640 | |
| Minor Street* | 360 | 2,120 | No |

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 1073 PM Peak Hour Volumes: 114

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 10,730 | 8,850 | |
| Minor Street* | 1,140 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 10,730 | 13,300 | |
| Minor Street* | 1,140 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 10,730 | 10,640 | |
| Minor Street* | 1,140 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 374 PM Peak Hour Volumes: 116

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 3,740 | 8,850 | |
| Minor Street* | 1,160 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 3,740 | 13,300 | |
| Minor Street* | 1,160 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 3,740 | 10,640 | |
| Minor Street* | 1,160 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 287 PM Peak Hour Volumes: 68

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,870 | 8,850 | |
| Minor Street* | 680 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,870 | 13,300 | |
| Minor Street* | 680 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,870 | 10,640 | |
| Minor Street* | 680 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 220 PM Peak Hour Volumes: 61

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,200 | 8,850 | |
| Minor Street* | 610 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,200 | 13,300 | |
| Minor Street* | 610 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,200 | 10,640 | |
| Minor Street* | 610 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout AM

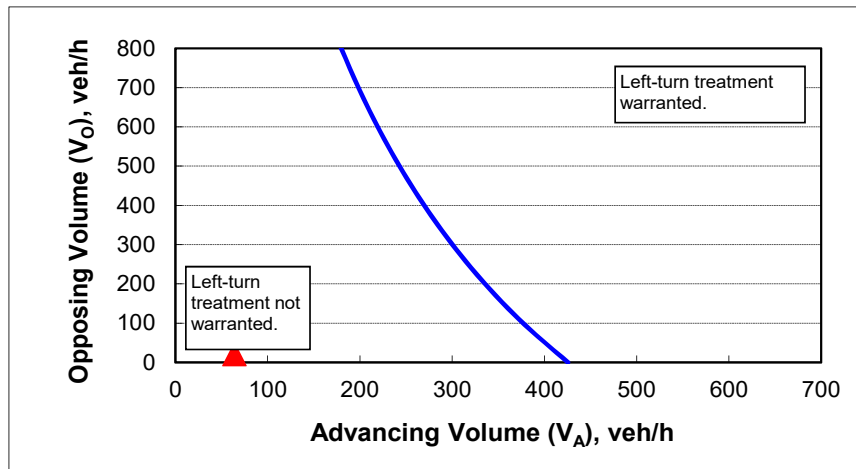
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 23 |
| Advancing volume (V_A), veh/h: | 64 |
| Opposing volume (V_O), veh/h: | 20 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 415 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout PM

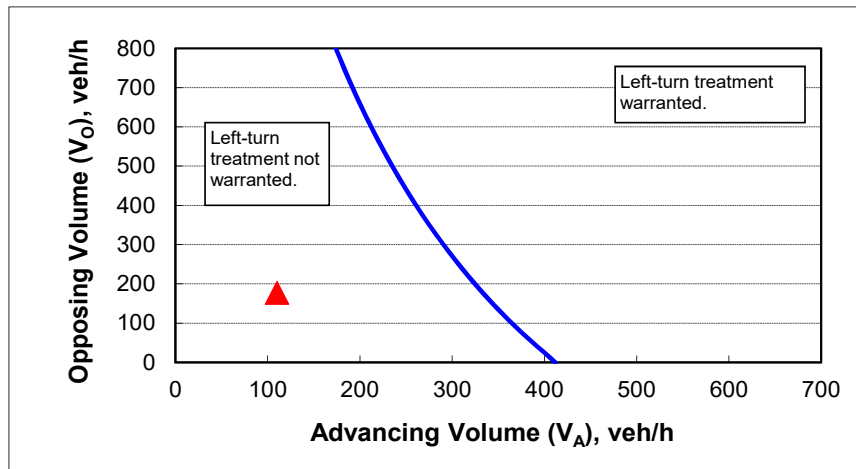
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 48 |
| Advancing volume (V_A), veh/h: | 110 |
| Opposing volume (V_O), veh/h: | 177 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 333 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.1 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Future Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 6 | 100 | 407 | 9 | 26 | 141 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---|---------------|-------|
| | Minor1 | Major1 | | Major2 | |
| Conflicting Flow All | 605 | 412 | 0 | 0 | 416 |
| Stage 1 | 412 | - | - | - | - |
| Stage 2 | 193 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 462 | 642 | - | - | 1122 |
| Stage 1 | 671 | - | - | - | - |
| Stage 2 | 842 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 451 | 642 | - | - | 1122 |
| Mov Cap-2 Maneuver | 451 | - | - | - | - |
| Stage 1 | 671 | - | - | - | - |
| Stage 2 | 822 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 11.9 | 0 | 1.3 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 627 | 1122 |
| HCM Lane V/C Ratio | - | - | 0.169 | 0.023 |
| HCM Control Delay (s) | - | - | 11.9 | 8.3 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.6 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

Intersection

Int Delay, s/veh 1.6

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Future Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 21 | 16 | 54 | 100 | 11 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 154 | 0 | - | 0 | 162 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 58 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1402 | - | - | - | 804 | 922 |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 937 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1402 | - | - | - | 792 | 922 |
| Mov Cap-2 Maneuver | - | - | - | - | 792 | - |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 4.4 | 0 | 9.4 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1402 | - | - | - | 836 |
| HCM Lane V/C Ratio | 0.015 | - | - | - | 0.022 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 9.4 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

HCM 2010 TWSC
3: Melissa Avenue & Dubarko Road

05/28/2019

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 5.5 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Future Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 18 | 49 | 51 | 34 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 96 |
| Stage 1 | - | - | - | - | 11 |
| Stage 2 | - | - | - | - | 85 |
| Critical Hdwy | - | - | 4.12 | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 903 |
| Stage 1 | - | - | - | - | 1012 |
| Stage 2 | - | - | - | - | 938 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 892 |
| Mov Cap-2 Maneuver | - | - | - | - | 892 |
| Stage 1 | - | - | - | - | 1012 |
| Stage 2 | - | - | - | - | 927 |

| Approach | EB | WB | NB |
|----------------------|----|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.1 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 956 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.089 | - | - | 0.011 | - |
| HCM Control Delay (s) | 9.1 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↵ | | | ↶ | ↷ | |
| Traffic Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Future Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 36 | 13 | 17 | 16 | 57 | 79 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.7 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 42% | 0% | 52% |
| Vol Thru, % | 0% | 74% | 48% |
| Vol Right, % | 58% | 26% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 95 | 34 | 23 |
| LT Vol | 40 | 0 | 12 |
| Through Vol | 0 | 25 | 11 |
| RT Vol | 55 | 9 | 0 |
| Lane Flow Rate | 136 | 49 | 33 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.145 | 0.057 | 0.04 |
| Departure Headway (Hd) | 3.844 | 4.21 | 4.435 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 927 | 844 | 801 |
| Service Time | 1.892 | 2.267 | 2.495 |
| HCM Lane V/C Ratio | 0.147 | 0.058 | 0.041 |
| HCM Control Delay | 7.6 | 7.5 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.1 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Future Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 22 | 99 | 293 | 18 | 185 | 561 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1233 | 303 | 0 | 0 | 312 | 0 |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 930 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 195 | 737 | - | - | 1254 | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 384 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 166 | 737 | - | - | 1254 | - |
| Mov Cap-2 Maneuver | 166 | - | - | - | - | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 327 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 15.7 | 0 | 2.1 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 455 | 1254 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.147 | - |
| HCM Control Delay (s) | - | - | 15.7 | 8.4 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.5 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

Intersection

Int Delay, s/veh 3.1

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Future Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 18 | 165 | 76 | 56 | 75 | 37 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 133 | 0 | - | 0 | 305 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 201 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1458 | - | - | - | 689 | 953 |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 835 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1458 | - | - | - | 679 | 953 |
| Mov Cap-2 Maneuver | - | - | - | - | 679 | - |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 823 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.7 | 0 | 10.6 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1458 | - | - | - | 750 |
| HCM Lane V/C Ratio | 0.012 | - | - | - | 0.15 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 10.6 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.5 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Future Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 100 | 55 | 26 | 68 | 25 | 19 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 155 | 0 | 248 | 128 |
| Stage 1 | - | - | - | - | 128 | - |
| Stage 2 | - | - | - | - | 120 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1438 | - | 745 | 927 |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 910 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1438 | - | 731 | 927 |
| Mov Cap-2 Maneuver | - | - | - | - | 731 | - |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 893 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.1 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 805 | - | - | 1438 | - |
| HCM Lane V/C Ratio | 0.054 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.4 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Future Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 22 | 105 | 27 | 19 | 66 | 28 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.2 | 7.6 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 70% | 0% | 59% |
| Vol Thru, % | 0% | 18% | 41% |
| Vol Right, % | 30% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 80 | 108 | 39 |
| LT Vol | 56 | 0 | 23 |
| Through Vol | 0 | 19 | 16 |
| RT Vol | 24 | 89 | 0 |
| Lane Flow Rate | 94 | 127 | 46 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.109 | 0.127 | 0.055 |
| Departure Headway (Hd) | 4.175 | 3.606 | 4.282 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 853 | 983 | 829 |
| Service Time | 2.228 | 1.668 | 2.345 |
| HCM Lane V/C Ratio | 0.11 | 0.129 | 0.055 |
| HCM Control Delay | 7.7 | 7.2 | 7.6 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.4 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | T | | T | T |
| Traffic Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Future Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 119 | 432 | 11 | 32 | 149 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 650 | 437 | 0 | 0 | 442 |
| Stage 1 | 437 | - | - | - | - |
| Stage 2 | 213 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 435 | 622 | - | - | 1097 |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 825 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 422 | 622 | - | - | 1097 |
| Mov Cap-2 Maneuver | 422 | - | - | - | - |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 801 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 12.7 | 0 | 1.5 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 599 | 1097 |
| HCM Lane V/C Ratio | - | - | 0.216 | 0.029 |
| HCM Control Delay (s) | - | - | 12.7 | 8.4 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.8 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.5

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Future Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 22 | 74 | 113 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 188 | 0 | - | 0 | 198 | 131 |
| Stage 1 | - | - | - | - | 131 | - |
| Stage 2 | - | - | - | - | 67 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1362 | - | - | - | 766 | 890 |
| Stage 1 | - | - | - | - | 869 | - |
| Stage 2 | - | - | - | - | 929 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1362 | - | - | - | 754 | 890 |
| Mov Cap-2 Maneuver | - | - | - | - | 754 | - |
| Stage 1 | - | - | - | - | 869 | - |
| Stage 2 | - | - | - | - | 914 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 3.8 | 0 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1362 | - | - | - | 790 |
| HCM Lane V/C Ratio | 0.016 | - | - | - | 0.028 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 5.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Future Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 19 | 52 | 53 | 37 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 101 | 11 |
| Stage 1 | - | - | - | - | 11 | - |
| Stage 2 | - | - | - | - | 90 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 898 | 1070 |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 934 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 887 | 1070 |
| Mov Cap-2 Maneuver | - | - | - | - | 887 | - |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.2 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 954 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.094 | - | - | 0.012 | - |
| HCM Control Delay (s) | 9.2 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Future Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 39 | 14 | 27 | 17 | 60 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.6 | 7.8 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 41% | 0% | 61% |
| Vol Thru, % | 0% | 73% | 39% |
| Vol Right, % | 59% | 27% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 102 | 37 | 31 |
| LT Vol | 42 | 0 | 19 |
| Through Vol | 0 | 27 | 12 |
| RT Vol | 60 | 10 | 0 |
| Lane Flow Rate | 146 | 53 | 44 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.156 | 0.062 | 0.055 |
| Departure Headway (Hd) | 3.864 | 4.233 | 4.475 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 919 | 838 | 794 |
| Service Time | 1.923 | 2.299 | 2.54 |
| HCM Lane V/C Ratio | 0.159 | 0.063 | 0.055 |
| HCM Control Delay | 7.6 | 7.6 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.2 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Future Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 114 | 312 | 24 | 208 | 596 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 1335 | 324 | 0 | 0 | 336 |
| Stage 1 | 324 | - | - | - | - |
| Stage 2 | 1011 | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 |
| Pot Cap-1 Maneuver | 169 | 717 | - | - | 1229 |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 352 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 140 | 717 | - | - | 1229 |
| Mov Cap-2 Maneuver | 140 | - | - | - | - |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 292 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 18.1 | 0 | 2.2 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 412 | 1229 |
| HCM Lane V/C Ratio | - | - | 0.338 | 0.169 |
| HCM Control Delay (s) | - | - | 18.1 | 8.5 |
| HCM Lane LOS | - | - | C | A |
| HCM 95th %tile Q(veh) | - | - | 1.5 | 0.6 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 3.2

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Future Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 192 | 92 | 64 | 88 | 39 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 156 | 0 | - | 0 | 354 | 124 |
| Stage 1 | - | - | - | - | 124 | - |
| Stage 2 | - | - | - | - | 230 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1430 | - | - | - | 646 | 929 |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 811 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1430 | - | - | - | 636 | 929 |
| Mov Cap-2 Maneuver | - | - | - | - | 636 | - |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 799 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.7 | 0 | 11.2 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1430 | - | - | - | 705 |
| HCM Lane V/C Ratio | 0.013 | - | - | - | 0.18 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.2 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.7 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Future Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 59 | 27 | 73 | 26 | 20 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 165 | 0 | 262 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 127 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1426 | - | 731 | 919 |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 904 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1426 | - | 716 | 919 |
| Mov Cap-2 Maneuver | - | - | - | - | 716 | - |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 886 | - |

Approach EB WB NB

| | | | |
|----------------------|---|---|-----|
| HCM Control Delay, s | 0 | 2 | 9.8 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 792 | - | - | 1426 | - |
| HCM Lane V/C Ratio | 0.058 | - | - | 0.019 | - |
| HCM Control Delay (s) | 9.8 | - | - | 7.6 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Future Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 24 | 111 | 33 | 20 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.3 | 7.7 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 62% |
| Vol Thru, % | 0% | 18% | 38% |
| Vol Right, % | 34% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 114 | 45 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 20 | 17 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 134 | 53 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.122 | 0.135 | 0.063 |
| Departure Headway (Hd) | 4.162 | 3.631 | 4.314 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 854 | 975 | 822 |
| Service Time | 2.222 | 1.7 | 2.385 |
| HCM Lane V/C Ratio | 0.124 | 0.137 | 0.064 |
| HCM Control Delay | 7.8 | 7.3 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Future Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 18 | 138 | 432 | 13 | 39 | 149 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 665 | 438 | 0 | 0 | 445 | 0 |
| Stage 1 | 438 | - | - | - | - | - |
| Stage 2 | 227 | - | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | - |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | - |
| Pot Cap-1 Maneuver | 427 | 621 | - | - | 1094 | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 813 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 412 | 621 | - | - | 1094 | - |
| Mov Cap-2 Maneuver | 412 | - | - | - | - | - |
| Stage 1 | 653 | - | - | - | - | - |
| Stage 2 | 784 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 13.3 | 0 | 1.7 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 587 | 1094 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.035 | - |
| HCM Control Delay (s) | - | - | 13.3 | 8.4 | - |
| HCM Lane LOS | - | - | B | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.1 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.3

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 31 | 99 | 126 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 225 | 0 | - | 0 | 238 | 162 |
| Stage 1 | - | - | - | - | 162 | - |
| Stage 2 | - | - | - | - | 76 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1320 | - | - | - | 727 | 855 |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 920 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1320 | - | - | - | 715 | 855 |
| Mov Cap-2 Maneuver | - | - | - | - | 715 | - |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 904 | - |

Approach EB WB SB

HCM Control Delay, s 3.2 0 9.9
HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1320 | - | - | - | 752 |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.03 |
| HCM Control Delay (s) | 7.8 | 0 | - | - | 9.9 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 6.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Future Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 15 | 29 | 52 | 95 | 65 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 25 | 0 | 128 | 18 |
| Stage 1 | - | - | - | - | 18 | - |
| Stage 2 | - | - | - | - | 110 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1589 | - | 866 | 1061 |
| Stage 1 | - | - | - | - | 1005 | - |
| Stage 2 | - | - | - | - | 915 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1589 | - | 850 | 1061 |
| Mov Cap-2 Maneuver | - | - | - | - | 850 | - |
| Stage 1 | - | - | - | - | 1005 | - |
| Stage 2 | - | - | - | - | 898 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.6 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 924 | - | - | 1589 | - |
| HCM Lane V/C Ratio | 0.173 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.6 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.8 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Future Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 26 | 27 | 24 | 64 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.9 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 43% | 0% | 53% |
| Vol Thru, % | 0% | 69% | 47% |
| Vol Right, % | 57% | 31% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 105 | 59 | 36 |
| LT Vol | 45 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 18 | 0 |
| Lane Flow Rate | 150 | 84 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.164 | 0.099 | 0.064 |
| Departure Headway (Hd) | 3.944 | 4.224 | 4.488 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 897 | 838 | 788 |
| Service Time | 2.024 | 2.302 | 2.572 |
| HCM Lane V/C Ratio | 0.167 | 0.1 | 0.065 |
| HCM Control Delay | 7.8 | 7.8 | 7.9 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.3 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Future Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 29 | 126 | 312 | 30 | 228 | 596 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1379 | 327 | 0 | 0 | 342 | 0 |
| Stage 1 | 327 | - | - | - | - | - |
| Stage 2 | 1052 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 159 | 714 | - | - | 1223 | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 336 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 129 | 714 | - | - | 1223 | - |
| Mov Cap-2 Maneuver | 129 | - | - | - | - | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 273 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 20.5 | 0 | 2.4 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 385 | 1223 | - |
| HCM Lane V/C Ratio | - | - | 0.404 | 0.187 | - |
| HCM Control Delay (s) | - | - | 20.5 | 8.6 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.9 | 0.7 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 3.2

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 220 | 109 | 72 | 101 | 39 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 181 | 0 | - | 0 | 403 | 145 |
| Stage 1 | - | - | - | - | 145 | - |
| Stage 2 | - | - | - | - | 258 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1400 | - | - | - | 605 | 905 |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 787 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1400 | - | - | - | 596 | 905 |
| Mov Cap-2 Maneuver | - | - | - | - | 596 | - |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 775 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.6 | 0 | 11.9 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1400 | - | - | - | 659 |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.213 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.9 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.3

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Future Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 102 | 56 | 73 | 52 | 38 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 208 | 0 | 343 | 157 |
| Stage 1 | - | - | - | - | 157 | - |
| Stage 2 | - | - | - | - | 186 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1375 | - | 657 | 894 |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 851 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1375 | - | 629 | 894 |
| Mov Cap-2 Maneuver | - | - | - | - | 629 | - |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 815 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|------|
| HCM Control Delay, s | 0 | 3.4 | 10.7 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 719 | - | - | 1375 | - |
| HCM Lane V/C Ratio | 0.124 | - | - | 0.041 | - |
| HCM Control Delay (s) | 10.7 | - | - | 7.7 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Future Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 118 | 33 | 39 | 80 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.8 | 8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 69% | 0% | 46% |
| Vol Thru, % | 0% | 22% | 54% |
| Vol Right, % | 31% | 78% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 99 | 129 | 61 |
| LT Vol | 68 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 100 | 0 |
| Lane Flow Rate | 116 | 152 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.137 | 0.156 | 0.086 |
| Departure Headway (Hd) | 4.249 | 3.695 | 4.316 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 833 | 955 | 819 |
| Service Time | 2.33 | 1.78 | 2.401 |
| HCM Lane V/C Ratio | 0.139 | 0.159 | 0.088 |
| HCM Control Delay | 8 | 7.5 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.6 | 0.3 |

Exhibit E: Property Ownership Information

JB

WARRANTY DEED - STATUTORY FORM
(Individual or Corporation)

JOE B. PHILLIPS

Grantor, conveys and warrants to:

LAWRENCE L. PULLEN and RICHARD L. PULLEN and MARK D. TEN EYCK

Grantee, the following described real property free of encumbrances except as specifically set forth herein:

PLEASE SEE ATTACHED DESCRIPTION SHEET

This instrument will not allow use of the property described in this instrument in violation of applicable land use laws and regulations. Before signing or accepting this instrument, the person acquiring fee title to the property should check with the appropriate city or county planning department to verify approved uses.

ENCUMBRANCES:
NONE

The true consideration for this conveyance is \$40,000.00.

Dated this 21st day of April, 1993; if a corporate grantor, it has caused its name to be signed by order of its board of directors.

CHICAGO TITLE INSURANCE COMPANY
C-108/08

Joe B. Phillips
JOE B. PHILLIPS

STATE OF OREGON,)
County of Clackamas)ss.
April 21, 1993.)

Personally appeared the above named JOE B. PHILLIPS and acknowledged the foregoing instrument to be his/her/their voluntary act and deed.

Before me:

Luella J. Taylor
Notary Public for Oregon
My commission expires: 3-2-94



After recording return and send tax statements to:
LAWRENCE L. PULLEN
36940 SE Deming
Sandy, OR 97055

Escrow No. 2300-00570-LF - Order No. 108108

93 28438

A portion of the Southwest one-quarter of the Northeast one-quarter of Section 23, Township 2 South, Range 4 East of the Willamette Meridian, in the County of Clackamas and State of Oregon, being more particularly described as follows:

Beginning at a stone marking the Northwest corner of said legal subdivision; thence N.88°26'40"E., along the North line thereof, a distance of 1321.91 feet to the Northeast corner of said legal subdivision; thence S.0°18'10"E., along the East line thereof, a distance of 388.20 feet to a point in the Northwesterly right-of-way line of Oregon State Highway No. 211; thence S.33°18'01"W., along said right-of-way line, a distance of 558.61 feet to an iron rod; thence N.51°08'54"W., leaving said right-of-way line, a distance of 1305.73 feet to the point of beginning.

2

STATE OF OREGON }
County of Clackamas } ss.
I, John Kaufman, County Clerk, for the County of Clackamas, do hereby certify that the instrument of writing was received for recording in the records of said county at

93 APR 29 PM 2:00



Witness my hand and seal this 29th day of April 1993.
John Kaufman
JOHN KAUFMAN
County Clerk
Recording Certificate
CCPR-1 (Rev. 8/91)

93 28438



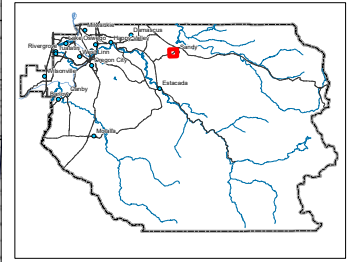
Exhibit F: Clackamas County Assessor's Map

SECTION 23 T.2S. R.4E. W.M.
CLACKAMUS COUNTY
1" = 400'

Cancelled Taxlots

- 2801
- 1000
- 2319
- 2300A1
- 1301
- 2701
- 503E1
- 503
- 1902
- 1802
- 517

- Parcel Boundary
- - - Private Road ROW
- - - Historical Boundary
- Railroad Centerline
- TaxCodeLines
- Map Index
- WaterLines
- Land Use Zoning
- ▨ Plats
- Water
- ⊙ Corner
- Section Corner
- 1/16th Line
- Govt Lot Line
- DLC Line
- Meander Line
- PLSS Section Line
- ⊕ Historic Corridor 40'
- ⊕ Historic Corridor 20'



THIS MAP IS FOR ASSESSMENT PURPOSES ONLY

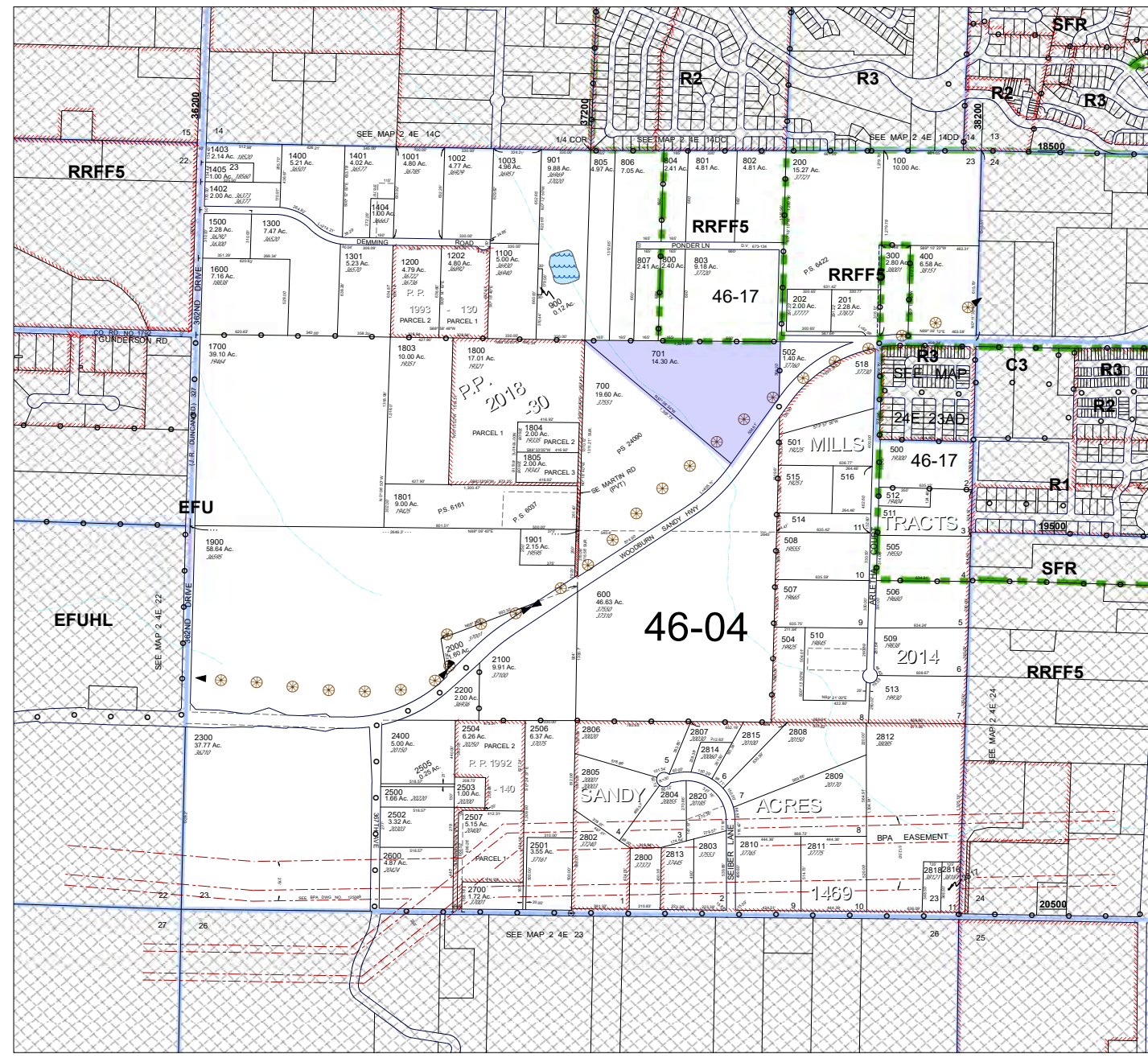
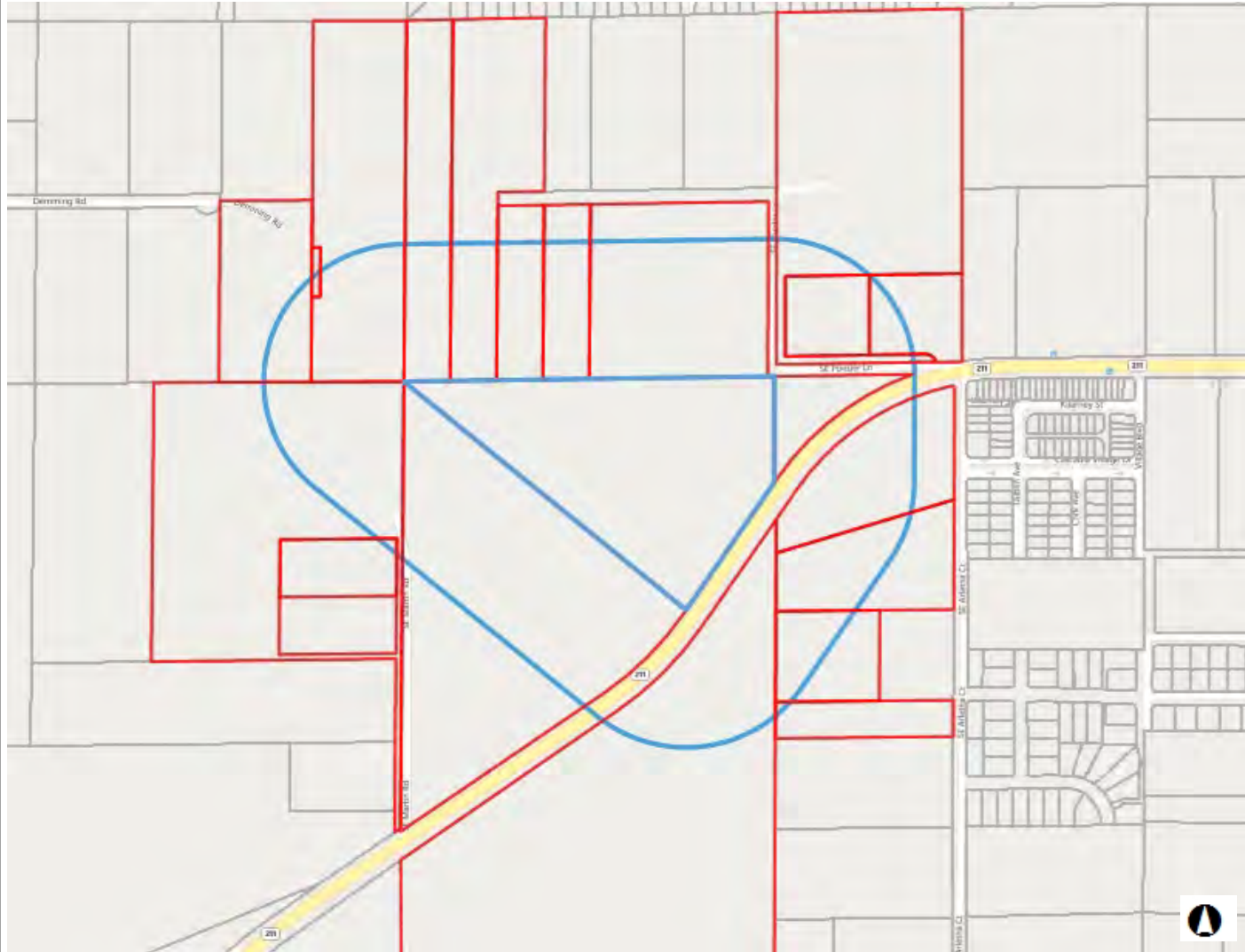





Exhibit G: Noticing Materials

24E23 00701 - 500' Radius

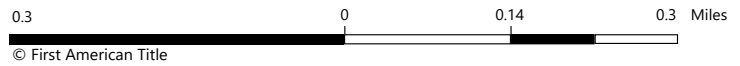


-  Subject
-  Radius
-  Radius Properties

1/2/2020



Notes



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24E23 00200
Leslie Geren
37721 SE Ponder Ln
Sandy, OR 97055

24E23 00201
Paul Klahn
Po Box 671
Sandy, OR 97055

24E23 00202
Lucille Tiscus
37777 SE Ponder Ln
Sandy, OR 97055

24E23 00501
Nancy Bennett
19225 SE Arletha Ct
Sandy, OR 97055

24E23 00502
Broek Boaz & Brian Galovin
244 Plant Ln SE
Salem, OR 97317

24E23 00514
Robert & Barbara Johnson
19555 SE Arletha Ct
Sandy, OR 97055

24E23 00515
William Fisher
19251 SE Arletha Ct
Sandy, OR 97055

24E23 00518
Garrett & Meri Lang
37730 SE Highway 211
Sandy, OR 97055

24E23 00600
Robert & Shana Foster
21442 S Parkview Ln
Estacada, OR 97023

24E23 00700
Calvin & Teresa Mckinnis
37551 SE Highway 211
Sandy, OR 97055

24E23 00701
Lawrence Pullen
36940 Deming Rd
Sandy, OR 97055

24E23 00800
Grant Sturm
647 E Historic Columbia River Hwy
Troutdale, OR 97060

24E23 00803
Grant Sturm
647 E Historic Columbia River Hwy
Troutdale, OR 97060

24E23 00805
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 00806
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 00807
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 00900
Eyck Ten & Richard Pullen
37020 Deming Rd
Sandy, OR 97055

24E23 00901
Sherrene Teneyck
37020 Deming Rd
Sandy, OR 97055

24E23 01100
Richard Pullen
36940 Deming Rd
Sandy, OR 97055

24E23 01800
University Developments Llc
17150 University Ave STE 200
Sandy, OR 97055

24E23 01804
Sixth Generation Properties Llc
Po Box 1750
Oregon City, OR 97045

Exhibit GGGG



January 13, 2020

Emily Meharg
Senior Planner
City of Sandy Development Services
39250 Pioneer Boulevard
Sandy, OR 97055

**RE: CITY OF SANDY BAILEY MEADOWS SUBDIVISION (FILE NO. 19-023 SUB/VAR/TREE)
PRELIMINARY REVIEW**

Dear Emily:

This letter is in response to the September 27, 2019 memo from Hassan Ibrahim with Curran-McLeod, Inc. Consulting Engineers to the City of Sandy.

Comments

1. *We have briefly reviewed the “Geotechnical Engineering Report” prepared by Geopacific Engineering, Inc., dated June 18, 2019 and recommend that the developer retains appropriate professional geotechnical services for observation of construction of earthwork and grading activities. The grading setbacks, drainage and terracing should comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report. When the grading is completed, a final report should be submitted to the City by the Geotechnical Engineer stating that adequate inspections and testing have been performed on the lots and all of the work is in compliance with the above noted report and the OSSC.*

Response: Professional geotechnical engineering services will be provided for observation of construction earthwork and grading activities. Grading setbacks, drainage, and terracing will meet the OSSC and the geotechnical engineer’s report recommendations. A final geotechnical engineering observation report will be submitted as required.

2. *We have reviewed the preliminary stormwater calculations that was provided with this submittal. The calculations are found to meet the water quality/quantity criteria as stated in the City of Sandy Development Code (SDC) 13.18 Standards and the City of Portland Stormwater Management Manual (SWMM) Standards, that were adopted by reference into the Sandy Development Code. However, a detailed final report stamped by a licensed professional shall be submitted for review with the final construction plans.*

Response: A final stormwater report, including updated calculations, will be submitted with the final construction plans.

3. *We have reviewed the “Traffic Impact Analysis” prepared by Lancaster Engineering dated June 20, 2019. The study doesn’t identify any concerns as a result of this development.*

Response: This is understood.

4. *3/4 Improvements should be required on Ponder Street north-south between Gunderson Road and the most northerly east-west street to include 28-foot wide paved surface, curbs on both sides, 5-foot*

BEND, OR | KEIZER, OR | TUALATIN, OR | VANCOUVER, WA
www.aks-eng.com

planter strip with street trees, street lighting and 5-foot wide sidewalks on the west side of the roadway.

Response: A three-quarter street improvement cannot be constructed in this portion of Ponder Lane because there is not adequate right-of-way. The existing right-of-way width is only 30 feet for this section. Also, the existing right-of-way is currently being used as driveway access for the neighboring property to the east (Tax Lot 200; Clackamas County Assessor's Map 2 4E 23) and blocking this access (with this project) is not desirable. Emergency vehicle access gates will be provided at the ends of the east-west oriented street stubs, so only emergency vehicles are permitted to ingress/egress. This provides for desirable emergency vehicle access between Bailey Meadows, Ponder Lane, and neighborhoods to the north. Introducing the opportunity for additional traffic (beyond what exists currently) to access the intersection of Highway 211 and Ponder Lane, as a 3/4 street improvement would do, is also considered not desirable.

5. *All interior streets to include the east-west Ponder lane should be constructed to local street standards (28-foot wide paved surface, curbs on both sides, 5-foot planter strips and 5-foot wide sidewalks) in compliance with the City of Sandy Transportation System Plan (TSP), figure 12. The proposed 50-foot right of way is adequate.*

Response: All interior streets will be designed and constructed as required.

6. *Gunderson Road is classified in the City of Sandy Transportation System Plan (TSP), figure 5 as a minor arterial street. A minimum of 34 feet of right of way dedication will be required along the entire site frontage as per City of Sandy Development Code, chapter 17.84. This roadway will be extended in the future as the surrounding properties develop around this site.*

A half Improvements would be required on Gunderson Road to include 22-foot wide paved surface, curbs on one side, 5-foot planter strips and 6-foot wide sidewalks along the south plat boundary line as per the TSP. At the request of the City, we have developed a layout of this site and came up with 98 lots including a 34-foot of right of way dedication along Gunderson Road.

Response: This comment is outdated. The alignment of Gunderson Road has been modified to better fit actual on-site conditions based on other applicable information that has become available. The reference to a different layout is also not applicable at this time.

7. *Melissa Avenue is classified in the City of Sandy Transportation System Plan (TSP), figure 5 as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No. 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations.*

We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case an evacuation is needed. A review by the Fire Department is needed to confirm whether an additional emergency access is needed or not. However, we recommend as a minimum a temporary/emergency access to Hwy 211.

Response: The City has performed maintenance on Melissa Avenue since the date this comment was made. The project's traffic engineer (Todd Mobley with Lancaster-Mobley Engineering) performed a site visit analysis on Melissa Avenue after the maintenance was completed



and stated that the avenue appears to be in good condition. Please see photographs included below. We also do not see any basis for the statement that additional trips will “cause a complete failure.” The TSP is not an approval criterion for this land use action.

A secondary emergency access to the site has been discussed with and reviewed by the fire marshal. A secondary emergency access to Ponder Lane has been provided, as shown on the preliminary plans and described in the response to #5, above.

Inclusions: Photos taken on Melissa Avenue on Thursday, December 26, 2019.



8. *The developer’s engineer should provide a profile design for a minimum of 200 feet for all future street extensions stubbed streets past the project boundary to ensure future grades can be met.*

Response: The profile design will be provided as required.

9. *All ADA ramps shall be designed, inspected by the design engineer and constructed by the contractor to meet the most current PROWAG requirements.*

Response: ADA ramps will be designed and constructed as required.

10. *All public sanitary sewer, waterline mains to be a minimum of 8-inches in diameter and a minimum of 12—inches in diameter for storm drains and be extended to the plat boundaries where practical to provide future connections to adjoining properties. All utilities are extended to the plat boundary for future connections.*

Response: Sanitary sewer, storm drain, and water mains will be provided as required and will be extended to boundaries where practical.



11. The new site layout eliminated the detention pond and a detention tank can be used in lieu of a pond meeting the requirements of the 2016 City of Portland StormWater Management Manual (SWWM).

Response: Stormwater facilities meeting the City's requirements will be provided.

Sincerely,

AKS ENGINEERING & FORESTRY, LLC



Montgomery B. Hurley, PE, PLS - Principal
503-563-6151 | monty@aks-eng.com
12965 SW Herman Road, Suite 100
Tualatin, OR 97062



**PLANNING COMMISSION
STAFF REPORT
TYPE III LAND DIVISION**

DATE OF REPORT: December 10, 2019

HEARING DATE: December 17, 2019

FILE NO.: 19-023 SUB/VAR/TREE

PROJECT NAME: Bailey Meadows Subdivision

OWNER/APPLICANT: Allied Homes & Development

LEGAL DESCRIPTION: T2S R4E Section 23 Tax Lots 800, 801, 802, 803, 804

EXHIBITS:

Applicant's Submittals

A. Land Use Application Form

B. Narrative

C. Project Plan Set

- Sheet P1-01: Cover Sheet with Site & Vicinity Maps & Legend
- Sheet P1-02: Preliminary Existing Conditions Plan
- Sheet P1-03: Preliminary Existing Conditions Plan
- Sheet P1-04: Preliminary Subdivision Plat with Future Building Setbacks
- Sheet P1-05: Preliminary Grading & Erosion & Sediment Control Plan
- Sheet P1-06: Preliminary Grading & Erosion & Sediment Control Plan
- Sheet P1-07: Preliminary Composite Utility Plan
- Sheet P1-08: Preliminary Composite Utility Plan
- Sheet P1-09: Preliminary Street Plan
- Sheet P1-10: Preliminary Street Plan
- Sheet P1-11: Preliminary Street Cross Sections & Profiles
- Sheet P1-12: Preliminary Street Profiles
- Sheet P1-13: Preliminary Street Profiles
- Sheet P1-14: Preliminary Street Profiles
- Sheet P1-15: Conceptual Future Street Plan
- Sheet P1-16: Preliminary Tree Preservation & Removal Plan & Arborist Report
- Sheet P1-17: Preliminary Tree Preservation & Removal Plan & Arborist Report
- Sheet P1-18: Preliminary Tree Preservation & Removal Table & Arborist Report
- Sheet P1-19: Preliminary Tree Preservation & Removal Table & Arborist Report
- Sheet P1-20: Preliminary Demolition Plan
- Sheet P1-21: Preliminary Demolition Plan
- Sheet P1-22: Preliminary Street Tree and Stormwater Screening Planting Plan
- Sheet P1-23: Preliminary Landscape Notes and Details
- Sheet P1-24: Preliminary Parking Plan

- Sheet P1-25: Preliminary Emergency Vehicle Access Plan
- Sheet P1-26: Preliminary Emergency Vehicle Access Plan
- D. Conceptual Connectivity Plan
- E. Preliminary Numbered Parking Plan
- F. Traffic Impact Analysis
- G. Preliminary Stormwater Report
- H. Flood & Slope Hazard (FSH) Analysis
- I. Geotechnical Engineering Report
- J. Letter from Michael Robinson (July 2, 2019)
- K. Mailing Labels
- L. Applicant Submittal Checklist
- M. Warranty Deed
- N. Clackamas County Assessor's Map
- O. Documentation of Plat Name Reservation
- P. Letter from Michael Robinson with Exhibits (August 20, 2019)
- Q. 120 Day Extension Letter (October 15, 2019)
- R. Letter from Michael Robinson (November 21, 2019)
- S. Updated Sheet P1-04 (Plan Dated November 15, 2019)
- T. Updated Sheet P1-15 (Plan Dated November 21, 2019)
- U. Updated Narrative (November 21, 2019)
- V. Gunderson Extension Exhibit from Todd Mobley (November 22, 2019)
- W. Letter from Michael Robinson with Exhibits (November 25, 2019)
- X. Trip Distribution with Gunderson Road Email from Todd Mobley (December 5, 2019)

Agency Comments Received Prior to November 2019 Updated Submittal

- Y. City Engineer (September 27, 2019)
- Z. PGE (September 18, 2019)
- AA. ODOT (October 4, 2019)
- BB. Parks and Trails Advisory Board (October 9, 2019)
- CC. ODOT Design Speed Email (November 19, 2019)

Public Comments

- DD. Paul and Jolette Owen, 37189 Rachael Drive (September 14, 2019)
- EE. Paul Savage, 37506 Rachael Drive (September 26, 2019)
- FF. Sarah Bettey, 18195 Melissa Avenue (September 26, 2019)
- GG. Tiffany Harris, Rachael Drive (September 27, 2019)
- HH. Todd Cooper, 18190 Melissa Avenue (September 27, 2019)
- II. Tom Newell, 18007 Rachael Drive (September 27, 2019)
- JJ. Cary Mallon, corner of Melissa Avenue and Rachael Drive (September 28, 2019)
- KK. Lonnie McVey, No address provided (September 28, 2019)
- LL. John and Carol Dick, 18255 Grey Avenue (September 29, 2019)
- MM. Marilyn and Treena Siewell, No address provided (October 1, 2019)
- NN. Marguerite Wadkins, 18291 Myra Court (October 1, 2019)
- OO. Doris E. Rooney, 37214 Rachael Drive (October 1, 2019)
- PP. Susan Hebb, Reich Court and Dubarko Road (October 1, 2019)
- QQ. Dawn and Jordan Allen, Melissa Avenue (October 1, 2019)

RR. Dave Meeker, 18198 Grey Avenue (October 1, 2019)
 SS. Carol Hassebroek, 39400 SE Trubel Road (October 1, 2019)
 TT. Karen Higgins, 37487 Rachael Drive (October 2, 2019)
 UU. The Molcany Family, Wewer Avenue (October 2, 2019)
 VV. Esther Naomi Quick, 18214 Grey Avenue (October 2, 2019)
 WW. Edith Newton, 18246 Grey Avenue (October 2, 2019)
 XX. Lori Graham, 37322 Rachael Drive (October 3, 2019)
 YY. Jeff Conder, 36345 Dubarko Road (October 3, 2019)
 ZZ. Belus and Juanita Schonek, 18102 Wewer Avenue (October 3, 2019)
 AAA. Danielle and Oliver Mullon, Myra Court (October 3, 2019)
 BBB. Corri Baldwin, 37524 Rachael Drive (October 3, 2019)
 CCC. Mike Schell, 37524 Rachael Drive (October 3, 2019)
 DDD. Ashley Parrish, 37356 Rachael Drive (October 3, 2019)
 EEE. Guimar and James DeVaere, 18176 Rachael Drive (October 3, 2019)
 FFF. Erin Findlay, 37616 Rachael Drive (October 3, 2019)
 GGG. Krista and Gabriel Stone, 18111 Rachael Drive (October 4, 2019)
 HHH. Faith Egli, 37708 Rachael Drive (October 4, 2019)
 III. Tim Sellin, 18256 Melissa Avenue (October 4, 2019)
 JJJ. Nicole Sellin, 18256 Melissa Avenue (October 4, 2019)
 KKK. Barbara Coutts, 37265 Solso Drive (October 4, 2019)
 LLL. Roberta (Shelly) Evett, 18192 Rachael Drive (October 4, 2019)
 MMM. Laura Kvamme, 37438 Rachael Drive (October 11, 2019)
 NNN. Kelli Acord, 36366 Industrial Way Ste B (October 18, 2019)
 OOO. Elizabeth A. (Libby) Burke, 37412 Rachael Drive (October 20, 2019)
 PPP. Brad Robison, 37412 Rachael Drive (October 20, 2019)
 QQQ. Laurie Gilbert, 18392 SE 370th Avenue (November 4, 2019)

BACKGROUND AND SIGNIFICANT ISSUES

1. Allied Homes & Development submitted an application to subdivide 23.42 acres into a 100-lot residential subdivision. The subject property is located on Ponder Lane south of the Nicholas Glen subdivision and north of Highway 211. The 100 proposed lots vary in size from 7,500 to 9,706 square feet. The proposal also includes a 22,521 square foot stormwater detention tract. The proposed development includes removal of trees to accommodate the extension and/or construction of rights-of-way. There are no existing structures on the subject property. The application as submitted proposed to rely solely on using Melissa Avenue in the Nicolas Glen subdivision to access the 100 lots in this subdivision.
2. The city received the application on July 5, 2019, and notified the applicant that it was incomplete. The applicant responded with a letter and additional submittal items that the city received on August 22, 2019. Under state law, the application was deemed complete on August 22, 2019 because the applicant provided some information in response to the incompleteness notice and stated that it would provide no additional information.
3. The subject site consists of five lots with a total area of approximately 23.42 acres. The site is located north of Highway 211, south of Rachael Drive, and west of Ponder Lane. The parcel has

a Plan Map designation of Low Density Residential and Zoning Map designation of SFR, Single Family Residential.

4. According to the applicant, the 100 proposed lots will add approximately 944 vehicle trips each weekday to Melissa Avenue. In discussions with the applicant, both during the preapplication stage and after the application was submitted, staff expressed concerns about having one access into Bailey Meadows via Melissa Avenue.
5. One challenge in providing a second access into the proposed subdivision is the location of the subject property relative to the city's urban growth boundary ("UGB"). The city has a road identified in its transportation system plan ("TSP") that would serve as a second way to access Bailey Meadows. That road ("Gunderson Road") could connect the southern portion of the subdivision with Highway 211, as the TSP generally envisions. However, the connection from the subject property to 211 would occur outside of the city's UGB. State law would only allow Gunderson Road to be built if it were either: (a) in the city's UGB; or (b) Clackamas County approved an "exception" in accordance with state law that would allow the road to be built on rural land outside the UGB.
6. Initially, during the preapplication period, the applicant considered filing an exception application with Clackamas County to extend Gunderson. However, senior planning staff at the county were not supportive of an exception. The applicant discusses the exception in more detail on page 3 of its August 20, 2019 letter to city staff (Exhibit P). After concluding that an exception would not be approved, the applicant submitted the application and proposed relying solely on Melissa Avenue for access to the subdivision. As discussed further in Exhibit P, the applicant asserts that state law prohibits the city from denying the application for only proposing one access point from Melissa Avenue. The city attorney will address these assertions at the hearing on December 17.
7. After the application was deemed complete, the applicant chose to hold a neighborhood meeting regarding the proposed subdivision, which occurred on September 18, 2019 at the Sandy library. Subsequent to that meeting, on September 26, the applicant, its representatives and its attorney met with city staff and the city attorney to discuss issues related to the application. The parties discussed the impacts to Melissa Avenue and the residents of Nicolas Glen if a second access was not provided. At the conclusion of that meeting, the applicant agreed to explore a UGB expansion that would, if approved, permit the construction of Gunderson Road and provide a second access into and out of the proposed subdivision.
8. Ideally, a UGB expansion and the specifics of how Gunderson Road could be built and financed would occur prior to considering the subdivision application. However, this approach does not work for the applicant for reasons it can discuss at the December 17 hearing. Instead, the applicant is proposing that the city impose a condition of approval on its subdivision application that would require the applicant to seek, in a subsequent application process, an expansion of the UGB to allow the applicant to construct Gunderson Road, subject to certain contingencies. The applicant summarizes this proposal in a November 25, 2019 letter to the city (Exhibit W).

9. The specific details of the second access intersecting with HWY 211 are still being defined by the City of Sandy, the Oregon Department of Transportation (“ODOT”), and the applicant. The city, the county, the Oregon Department of Land Conservation and Development (“DLCD”) and ODOT have discussed the concept of a possible UGB expansion to accommodate a Gunderson Road connection. While the county had some procedural questions, these agencies have not expressed opposition to the concept and DLCD understood the justification for it. The land to be added to the UGB, and upon which Gunderson Road would be built, is under the control of the applicant. The amount of land added to the UGB would essentially be limited to the right-of-way necessary to accommodate constructing Gunderson Road from the subdivision to HWY 211 in accordance with the city’s right-of-way standards for a minor arterial road. The basis for adding the land to the UGB would be to satisfy an unmet need for a transportation facility and it would not justify any other type of development (e.g. additional housing or commercial development). The applicant currently intends to seek a UGB expansion in early January 2020. The city would need to hold at least two hearings on the proposed expansion – one before the planning commission and one before the city council. If approved, the county would also need to hold a hearing to amend its comprehensive plan map to account for the change to Sandy’s UGB.
10. Although there are significant details to address, staff is encouraged that the applicant is seeking a solution to provide a second access to the subdivision. As of the date of this report, a draft condition of approval is being considered that the city could ultimately impose on the subdivision, which we intend to discuss at the hearing on December 17.

PUBLIC COMMENTS

11. Neighbors in the vicinity of the proposed subdivision and other members of the public have expressed significant interest in and concern regarding the proposed subdivision, particularly regarding the impacts it may have on city infrastructure and services. As of the date of this report, the city has received approximately 40 written comments from the public. These comments are contained in the record in Exhibits DD through QQQ. The vast majority of the public comments express concern with traffic and access issues, particularly the effect of adding 100 new homes if a second access is not provided to the subdivision. As discussed above, city staff shares this concern.

PROCEDURAL ISSUES

12. The Planning Commission hearing was originally scheduled to be held on October 28, 2019. The applicant agreed to postpone the original hearing to a later date to consider a second access into the proposed subdivision. The original 120-day deadline was December 20, 2019. On October 15, 2019 the City of Sandy received a notice from the applicant’s attorney granting an extension of the 120-day clock to February 8, 2020 (Exhibit Q).
13. Notification of the proposal was originally mailed to property owners within 500 feet of the subject property and to affected agencies on September 12, 2019 regarding the October 28, 2019 public hearing. On October 16, 2019 a notice was mailed to property owners within 500 feet of the subject property stating that the October 28, 2019 meeting was cancelled. On November 27, 2019 notification of the revised proposal was mailed to property owners within 500 feet of the subject property and a legal notice was published in the Sandy Post on December 4, 2019 regarding the rescheduled public hearing on December 17, 2019.

14. Agency comments were initially received from the City Engineer, PGE, the Parks and Trails Advisory Board, and ODOT. On November 21, 2019, the applicant submitted updated materials to city staff (Exhibits R-U). On November 25, 2019, the applicant through its legal counsel clarified its intention to seek a UGB expansion to allow a Gunderson Road connection, subject to certain conditions (Exhibit W). On December 5, 2019, the applicant's traffic consultant submitted a memo (Exhibit X) that outlines anticipated changes in trip distributions from the subdivision if Gunderson Road were built and connected to HWY 211. As of the date of this report, the city has not received comments from other agencies or outside consultants to the city relative to the applicant's November 21 revised submittals or the December 5 memo from the applicant's traffic consultant. Staff would like to have these comments to guide the planning commission's review of the application. In particular, staff would like to have the city's traffic consultant review the applicant's December 5 submittal regarding anticipated trip redistribution if Gunderson Road were constructed. As of the date of this report, the city is also anticipating construction cost estimates for the Gunderson Road connection. These estimates are important for the city to consider in order to adequately respond to certain conditions that accompany the applicant's willingness to accept the condition of approval described above.
15. In light of the Thanksgiving holiday, planning staff schedules, staff workloads (exacerbated by the departure of one of the city's associate planners) and details that remain to be considered relative to a Gunderson Road connection, a number of code sections are still being evaluated by staff. Staff anticipates continuing to work on a customary staff report for the planning commission's consideration.
16. Staff understands from talking with the city attorney that the applicant anticipates there will be a desire and a need to allow the planning commission to consider additional evidence and testimony after the December 17 hearing, prior to the planning commission making a decision on the application. Staff concurs with this and an approach that the applicant's attorney and the city attorney have discussed for the planning commission's consideration is discussed below.

RECOMMENDATION

Staff recommends the Planning Commission open a public hearing to receive public testimony. Once the hearing has been completed staff recommends the Planning Commission close the public hearing but leave the record open in accordance with state law, specifically ORS 197.763(6).

Given the upcoming holidays and the issues relating to the condition of approval for the additional access from Gunderson Road, the city attorney believes the best way to proceed is to have an initial open record period that would end on January 14, 2020. During this first open record period, any party would be able to submit any additional evidence or testimony that is relevant to the application. Then, a second open record period would begin that would run through January 28, 2020. During this second open record period, parties would be able to submit evidence and testimony that responds to issues raised during the first open record period, but parties would not be able to raise new issues. A final period of seven days would be reserved exclusively for the applicant to submit its final argument. This period would expire on February 4, 2020.

Staff would review the submissions and put together a summary of what was received, as well as a final recommendation to the planning commission. The planning commission would then reconvene in a public meeting to deliberate and make a decision on the application. Consistent with the poll staff recently sent to commissioners, the date of that meeting would be February 11, 2020. Based on discussions with the city attorney, staff understands that this proposed schedule is acceptable to the applicant and that the applicant would extend the 120-day deadline for the amount of time between December 17 and the date the commission would reconvene to make a decision on February 11, 2020.

RECEIVED

JAN 16 2020

CITY OF SANDY

Exhibit III

JAN 16 2020

January 15th, 2020

Les & Kathy Geren
37721 SE Ponder Ln.
Sandy, OR 97055

To Whom It May Concern:

For the past 46 years we have owned the property east of the proposed development Bailey Meadows. We own a strip of land from our home to Highway 211 via Ponder Lane. We recently had the property line resurveyed and are planning on building a security fence on the west side of our property, which is the east side of what is called Ponder Lane. We plan on installing a gate on both ends of our property. One gate will be where there is a direct access to our home and property. The second gate will be on the south end of our property where Ponder Lane heads east towards Highway 211. Both gates would be electronic gates with punch boxes for emergency vehicle access.

This will assure us that we can continue to receive semi-trucks to our barn for our business, Geren's Farm Supply, as well make our multiple trips to the barn to retrieve hay or straw for said business. It will also assure that the only access to Highway 211 via Ponder Lane will be for the four existing homes with no restrictions.

Looking at the plot plan for Bailey Meadows, they need to have pylons installed to prevent access to Ponder Lane, and have traffic exist via Avenue 2 and the proposed Gunderson access to Highway 211.

We are sharing our plans to assist in the planning of Bailey Meadows and to reassure the state highway department that there would be limited access to Highway 211 via Ponder Lane.

Thank you,


Les Geren
503-668-5913

19023 sub/VAR/Tree
Bailey Meadows

January 15th, 2020

To whom it may concern:

We want to address an awareness of the seasonal spring that lives on two properties on Ponder Lane and runs through a culvert on the corner of Ponder Lane. When it isn't running we still have storm runoff that exits the properties from the North and East in the same manner. This would be running down the South end of Bailey Meadows to No Name creek and eventually makes its way to Tickle Creek and a man made pond on land adjacent to this property. This could impact the proposed housing on plots 55 thru 64.

Thank you for including these concerns in the overall land management plan.



Existing
Drainage
Area

1/9/2020

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1/1

**Exhibit JJJJ**

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

Kelly O'Neill Jr. <koneill@ci.sandy.or.us>

Tue, Jan 21, 2020 at 11:27 AM

To: "Robinson, Michael C." <MRobinson@schwabe.com>, Cody Bjugan <cody@investpdx.com>

Cc: Emily Meharg <emeharg@ci.sandy.or.us>, David Doughman <David@gov-law.com>, Marisol Martinez <mmartinez@ci.sandy.or.us>

Mike and Cody - Below is a new public comment regarding Bailey Meadows.

Emily - Please make 15 copies of the email you received from the Crosswhites for the meeting on Thursday.

----- Forwarded message -----

From: **Emily Meharg** <emeharg@ci.sandy.or.us>

Date: Tue, Jan 21, 2020 at 8:58 AM

Subject: Fwd: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

To: Kelly O'Neill Jr. <koneill@ci.sandy.or.us>

----- Forwarded message -----

From: **Melissa Reeb** <melissa.reeb@gmail.com>

Date: Mon, Jan 20, 2020 at 9:50 PM

Subject: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

To: <emeharg@cityofsandy.com>

Cc: Brian ICE <crosswhb@yahoo.com>

Dear Mrs. Meharg,

I am writing you to voice my family's concern about the proposed subdivision, Bailey Meadows. We are concerned about the impact it will have on our neighborhood. We are residents of Melissa Ave and find this proposal extremely concerning.

*944 additional car trips per day on OUR street. We have a two year old and 4 year old. There are many families with young children in our neighborhood too. Safety is a concern for us. More cars, more accidents, more strangers driving by our home.

*Emergency Vehicle Access in and out. Response time will be drastically reduced, which is scary. If we ever need to evacuate our home (forest fire, earthquake) the only escape route (Melissa AVE) would be heavily clogged by an excess of vehicles. The outcome devastating for our neighborhood and the proposed neighborhood.

*The ONLY access to these new homes would be Melissa AVE. Our street will be overburdened, along with Dubarko, Bluff, Ruben and 362nd.

*With more cars there will be more noise, more pollution (tickle creek, air quality and surrounding areas) and ultimately it will lower home values on our street/ neighborhood. Not many families want a home on a street that has literally thousands of cars driving by everyday. (Usually WAY too fast)

*Our little neighborhood's parks and trails (which is one of my favorite parts of living in Sandy and this neighborhood) would become overcrowded and more dangerous. Per the developer they don't plan on adding another park. That's a lot more families who will be occupying our existing parks and trails.

*We are very concerned about this new development and the impacts it is going to have on our quiet, safe, small town neighborhood. We are seriously considering moving because of this. We moved here to start a family in a small community/ neighborhood that would be great for raising kids. This development is going to have a huge impact on so many families including ours.

1/22/2020

City of Sandy Mail - Fwd: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

Thank you for letting us voice our concerns.

Melissa and Brian Crosswhite

1/23/2020

City of Sandy Mail - Fwd: Bailey Meadows



Exhibit KKKK

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows

2 messages

Kelly O'Neill Jr. <koneill@ci.sandy.or.us>
To: Planning Commission <planningcommission@ci.sandy.or.us>
Cc: Marisol Martinez <mmartinez@ci.sandy.or.us>

Wed, Jan 22, 2020 at 9:21 PM

Another public comment for the record for tomorrow night's hearing.

-Kelly

----- Forwarded message -----

From: **Emily Sheldon** <emilinaamoon@gmail.com>
Date: Wed, Jan 22, 2020, 9:18 PM
Subject: Bailey Meadows
To: <emeharg@cityofsandy.com>, <koneill@cityofsandy.com>

January 22, 2010

Dear Ms. Meharg,

I am writing to voice my family's concerns regarding the new subdivision: Bailey Meadows. My primary concern is the detrimental impact to our safety, not to mention the burden this development will have on our quiet street and neighborhood. First, I would like to apologize for the lateness of this letter. Next, I would like to address my concerns.

Traffic concerns: 944 additional car trips is just too many on Melissa Ave. Melissa Ave is a narrow street in which residents park curbside. This congestion already makes Melissa only navigable via one lane to travel up and down. Currently, residents are patient and accommodating but with 100 new homes this is likely to no longer be the case. Melissa Ave also has a steep grade and is very unsafe in the winter with ice & snow. From reviewing the current staff reports and traffic analysis, it is presumed some of the brunt of additional traffic will be directed to the newly constructed Gunderson Rd (if that even happens). This is also concerning because Gunderson Rd to Melissa Ave will become a bypass for other residents of the City of Sandy. Bringing with it a myriad of other concerns such as speed and an increase in petty crimes. This brings leads me to my next concern.

The Traffic Analysis: The traffic analysis was engineered by Lancaster Engineering. Meaning, Todd Mobley who sits on the City of Sandy's Planning Commission prepared the traffic analysis. The same Todd Mobley provides a public testimonial for the Developer, Allied Homes and Development on their website. Albeit, Mr. Mobley recused himself from the Planning Commission in regards to Bailey Meadows. But, this raises many questions and concerns about the impartiality and fairness of the study. How many other traffic analyses has Lancaster Mobley done for the City of Sandy? Were they impartial? As a constituent of the City of Sandy, I find this completely disturbing and a conflict of interest. While I am not an engineer or traffic analyst, I do not believe the findings of this study to be accurate. Also, the intersection of Hwy 211 and Dubarko were left out of the traffic study. Why, was this, as I would suspect this new roadway intersection will only become a replication of this dangerous intersection. It may in fact be worse, as the proposed area had little shoulder to allow people time and space to react to potential hazards. Also, I do not believe that the data regarding traffic collisions to be an accurate reflection of the described intersections. While the study includes traffic collisions that have been reported to the DMV, I believe it would be imperative to include all data that is reported in the Sandy Police and Fire Log. Not all crashes meet the criteria necessary to be reported to the DMV. Why aren't these included. And, if they were, how would they change the results of the study?

<https://mail.google.com/mail/u/0?ik=256091e41c&view=pt&search=all&permthid=thread-f%3A1656495157297106198&siml=msg-f%3A16564951572...> 1/2

1/23/2020

City of Sandy Mail - Fwd: Bailey Meadows

Safety: If the development were to be approved without the construction of Gunderson Rd, the City of Sandy will put all residents of both the Nicholas Glen neighborhood as well as Bailey Meadows (and other surrounding neighborhoods & residents) in harm's way. With only one entrance and exit into the neighborhoods, emergency vehicles entrance and exit will be severely diminished. In case of natural disaster, this design creates a huge bottleneck and blocks evacuation for residents. This is frightening.

Lack of Park: Why doesn't the City of Sandy require a park in Bailey Meadows. Why do they leave an out for developers to pay a rather small fee in lieu of? Why is the Park's Master Plan completely disregarded? Without a park, the residents of both neighborhoods will have a decreased standard of living and the existing nearby parks will face undue strain.

Trees: Lastly, when I last spoke to you regarding the removal of the massive trees that line the property I found out that the giant Spruce behind my next door neighbor's home will remain. Yet, the 3 companion trees that block what will be Melissa Ave will be removed. This is terrifying. When the developers grade the property to prepare to build they will damage the root system which secures the tree. Additionally, when the other trees in the group are removed there will no longer be any shelter for this tree, which is commonly pushed toward my home during heavy winds. This causes a HUGE concern that this tree will fall on my house and my family will suffer injury or more. Who is responsible to remove this tree, and who should be responsible when it falls on someone's home, largely due to the root and securement being destroyed during roadway excavation of this project.

In conclusion, I would like to ask the City of Sandy & the Planning Commission to take these points into careful consideration. Kindly, I would also like to request that a new traffic study & analysis is executed by an unbiased engineering firm. While I do not want to directly call into question Mr. Mobley's ethics or integrity, this does raise a concern of possible biases toward a specific developer and a conflict of interest. On Allied Homes Website, Mr. Mobley is quoted as saying that he "*fortunate enough to work on the opposite side of a number of land deals with Cody Bjugan and the team at Allied Development*" (<https://discoverallieddevelopment.com/allied-land-development-testimonials/>). Is this the standard of professionalism and fairness that we, as a city, want to project to not only the public, but also other developers. Especially when so much of the study was based upon estimates and professional experience.

Thank you for your time,
Emily Sheldon

Kelly O'Neill Jr. <koneill@ci.sandy.or.us>

Wed, Jan 22, 2020 at 9:22 PM

To: Cody Bjugan <cody@investpdx.com>, "Robinson, Michael C." <MRobinson@schwabe.com>

Cc: David Doughman <David@gov-law.com>, Emily Meharg <emeharg@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

Another comment for the public hearing tomorrow night.

-Kelly

[Quoted text hidden]

Kathleen Walker
15920 SE Bluff Rd.
Sandy, Oregon 97055

Exhibit LLLL

January 23, 2020

Dear Planning Commission and City Council:

Road Access: Staff Report Item #7 Page 22 of 960 and Exhibit W on Page 471 of 960: We appreciate the developer's willingness to work with the City, County, ODOT and other agencies to provide the secondary egress for the proposed development. We respectfully disagree with their opinion that development of adequate transportation as outlined in the TSP is not required for development or cannot be required under State statute. This is especially in light of the already over capacity single egress on local access street Melissa Avenue and the fact that the fire department found that temporary access gates on Ponder were not sufficient for fire fighting..

Staff Report Item #9: *"9. Ideally, a UGB expansion and the specifics of how Gunderson Road could be built and financed would occur prior to considering the subdivision application. However, this approach does not work for the applicant. Instead, the applicant is proposing that the city impose a condition of approval on its subdivision application that would require the applicant to seek, in a subsequent application process, an expansion of the UGB to allow the applicant to construct Gunderson Road, subject to certain contingencies. The applicant summarizes this proposal in a November 25, 2019 letter to the city (Exhibit W)."*

While this condition of approval is hopeful, it only requires the applicant to seek, and not receive approval for the UGB expansion to build out Gunderson Road. While it is understandable that the decision for the UGB expansion is outside of the applicant's control, it is a key component to the success of the development and must be acquired and built as part of the development and not as a subsequent request. In addition, it appears that one of the contingencies desired by the applicant in Exhibit W is that the City have jurisdiction over Highway 211, rather than ODOT. While this has been a desire by the City for years, and ODOT can be onerous to work with on projects like this, it is unrealistic to make this large ask a contingency for development of Gunderson. Jurisdictional decisions like that take years to complete. In fact any "contingencies" desired by the developer should be spelled out to the public prior to the condition for approval for the Bailey Meadows being drafted and not at a later date. Nevertheless, we appreciate the effort all sides have made to work together on developing this badly needed secondary access.

Staff Report #29, #37 and #49 and Exhibit W: For clarification, is Exhibit W proposing to only develop "a portion" - one lane of Gunderson? It appears that the proposed width of this minor arterial should exceed those of the local streets. The entire road to lane road needs to be built as outlined in Staff Report #49. It should also include room for bike lane access because once curbs and sidewalks go in, it will be difficult to make room for bikes. The use on Melissa will not be abated if Gunderson is not built for full use by the new subdivision! Please ensure the Condition of Approval does not leave loopholes for the future.

Staff Report #30: It is very difficult to assess and approve a development in front of the public and planning commission when major roads, and access points to lots are not clearly depicted on the final plan being approved. I was not able to review a final revised plan in the 900+ pages!

The orientation and access of lots 55-59 should require a variance (which could be issued) to face away from Gunderson. If they do not plan to seek the variance, then they should be required to build Gunderson to the end of the block (lot 55). It is unclear what pedestrian access from their front door will lead to. The applicant should submit the Plan Set prior to approval of the plan by the planning commission.

Park land and staff report # 57, #62, and #64 The discussion at a City workshop was not specific (and intentionally so) to Bailey Meadows. The entire Nicholas Glen subdivision including open space along Tickle Creek was prior to even having both a Parks Master Plan or a Tickle Creek Trail. Please clarify the staff report. The Parks Board and neighbors were unanimous in their desire for these 100 homes and Nicholas Glen to have access to a park. On a positive note, the option for the applicant to donate 2+ acres of park land adjacent to the Gunderson Road and Bailey Meadows development represents success. Without a complete revised plat map, it is difficult to know. Assuming the City can accept the required park land and any additional land they want to get off the tax rolls, this would be a win for everyone. This should be a condition for approval.

In conclusion, I appreciate and am grateful for the steady positive progress at addressing the concerns of the community regarding traffic and park land. I encourage you to strongly and clearly clarify that approval of the proposed development is contingent on construction of the entire Gunderson Road (with at least one bike lane and sidewalks) prior to building permits being issued. Also, require as a condition for approval, dedication of park property to the City adjacent to the subdivision but outside the UGB as proposed.

Kindest Regards,

Kathleen Walker



Kelly O'Neill <koneill@ci.sandy.or.us>

Exhibit MMMM

Open Recod Period

Robinson, Michael C. <MRobinson@schwabe.com>

Thu, Jan 23, 2020 at 5:12 PM

To: "Kelly O'Neill, Jr" <koneill@ci.sandy.or.us>, "David Doughman Esq." <david@gov-law.com>

Cc: Cody Bjugan <cody@investpdx.com>

Corrected email

Sent from my iPhone

> On Jan 23, 2020, at 5:00 PM, Robinson, Michael C. <MRobinson@schwabe.com> wrote:

>

> David, confirming that because tonight is the initial evidentiary hearing, the applicant will ask that the hearing be closed but the written record held open for two 7 day periods, the first ending on January 30 at 5pm for anyone to submit argument and evidence and the second ending on February 6 at 5pm for rebuttal of first open record periods without new issues. The applicant will waive final written argument and will extend the 120-day period by 14 days if this schedule is granted. We understand that the Planning Commission would return on February 11 to deliberate on the application without accepting public testimony.

>

> Sent from my iPhone

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OPEN RECORD PERIOD #1 FOR BAILEY MEADOWS

FILE NO. 19-023 SUB/VAR/TREE
JANUARY 24, 2020 - JANUARY 30, 2020 AT 5:00 P.M.



PUBLIC TESTIMONY





Exhibit NNNN

Kelly O'Neill <koneill@ci.sandy.or.us>

Nicholas Glenn community

Marie Debatty <debattym@yahoo.com>
Reply-To: "debattym@yahoo.com" <debattym@yahoo.com>
To: "koneill@cityofsandy.com" <koneill@cityofsandy.com>

Mon, Jan 27, 2020 at 6:20 AM

I was unable to attend the last meeting concerning my neighborhood. I along with others have taken this issue at hand very seriously. As I hope you have also.

I implore you and your committee to not allow Baily Meadows to come in and over take our quiet neighborhood. By abusing us with there grandiose ideas of overtaking our only way in and out. By there way of wanting to take over Melissa for all there trucks and all other equipment which it takes to build a development. They will come in and rape us of peace. Disheval our lives get there money and leave. Not caring one bit about of their ability to destroy our quiet community. Pure greed. Please stand up for us.

And remember this all began because people did not see into the future when they allowed this property to be part of urban growth planning. This is after all the city of Sandy fault.

Marie DeBatty

[Sent from Yahoo Mail on Android](#)



Exhibit 0000

Emily Meharg <emeharg@ci.sandy.or.us>

urgent concerns reg: UGB expansion and Developers plans

Karen Higgins <khiggins.chwb@gmail.com>
To: emeharg@cityofsandy.com

Mon, Jan 27, 2020 at 3:43 PM

Dear Emily and City of Sandy Commisioners,

I am a Sandy resident, living on Rachael Dr. at Melissa Rd, wishing to voice my urgent concerns regarding the present plans for Bailey Meadows Subdivision and the UGB expansion.

First of all, I strongly oppose any development until it is clear who will pay for the construction of Gunderson and where the funds will come from. As a Sandy taxpayer, I can not afford any increase in property taxes, especially when it is for a development that I strongly oppose. I believe the developer should be paying for the UGB expansion.

As mentioned multiple times by several concerned neighbors at prior public meetings, we are all upset about the amount of increased auto traffic on Dubarko, Melissa and Rachael streets. If this development goes through, there must be some serious safety measures implemented for the intersections of Melissa&Rachael; Dubarko&Melissa and Solso&Melissa due to the huge increase of auto traffic. With a back up of traffic waiting to get through intersections on a very steep hill, Melissa, there will be dangerous instabilities for school buses and during icy winters. This is totally unacceptable and totally unsafe!

Realizing that the City of Sandy is expanding and looks for more progress, I understand that this new development would bring monetary gain for Sandy, but I ask for the respect of the taxpayers who have lived here and supported this city for many years that you would hear and acknowledge the safety of your current residents.

Thank you,
Karen Higgins
37487 Rachael Dr.
Sandy, Or 97055

Exhibit PPPP

Erin Findlay

37616 Rachael Drive
Sandy, OR 97055
(503) 312-2608
stewstac@hotmail.com

January 27th, 2020

Emily Meharg (via email: emeharg@cityofsandy.com)

City of Sandy, Planning Division
39250 Pioneer Blvd.
Sandy, OR 97055

Dear Ms. Meharg,

This is my follow-up letter in response to the most recent staff report and planning commission meeting for the proposed development of Bailey Meadows.

I was really pleased to see so many conditions added to the staff report. We have come a long way from that first neighbor meeting with developers. I know that our planning department has put in many hours for this subdivision alone.

I never thought that I would be in favor of a UGB expansion. Newcomers often seek out Sandy for residence because of how protected it seems to be. In comparison to many Oregon cities, Sandy still gives the *appearance* of supported and controlled growth (i.e. well-designed and planned for).

I will voice my support for the UGB expansion, allowing Gunderson road to be developed for the safety of current and future neighbors. I will also support any additional land applications necessary for the development of Gunderson road.

I have learned so much recently about Oregon law as it pertains to land use. I continue to be surprised that our laws support a developer's ability to build -- regardless of the existing infrastructure or funds needed.

Does the city inherit the financial burden of Gunderson road?

How do small cities survive this?

If, in the future, our city is unable to fund water treatment, sufficient fire/police services, safe and well-maintained city roads, etc. who is accountable?

I hold the developers accountable. Doing what you can (the very minimum) in compliance with state law is very different from “best practice”. I believe that they are doing more, by seeking out the UGB expansion. But, putting the “cart before the horse”, we know that the UGB has not been approved as of yet.

If the UGB is not approved, and this subdivision moves forward regardless, it is not best practice. Everyone should be made aware if this complete disregard for public safety.

If protecting the safety of current and future residents is not mandated by current Oregon land use laws, then it falls upon us (neighbors, city, developers) to ensure that best practice still prevails.

I am asking that the City of Sandy also take a stand for best practice. I am not as familiar with the types of legal or fiscal risks the city might undertake when standing up for best practice.

So, without a clear understanding of what our small city risks in taking a stand, I've listed below what I would like to see rewritten within the conditions:

- Do not allow any development, until the UGB is expanded.
- Once the UGB is expanded, do not allow any development until it is clear who will pay for the construction of Gunderson and where those funds will come from. If the city must pay, do not allow development until the city *can* pay...and still provide sufficient infrastructure on all other levels.
- Include all possible safety measures for the intersections of Melissa/Rachael, Solso/Melissa, and Dubarko/Melissa.
 - Add, within the conditions, a 4-way stop at Melissa/Rachael.
 - Include speed bumps where they can be effective in reducing speed.
 - Create a designated school bus stop area on Rachael, above Melissa that is well-marked. Loading/unloading students on the hill is already unsafe.
 - Ensure that the speed limit is well-marked throughout our neighborhood. *If Melissa will start to operate vehicle numbers more similar to Dubarko, it should include similar speed limit signage, etc.*
 - Consider adding designated, well-marked, reflective crosswalks. Portions of our streets are well-lit. Others are not.
 - Please make pedestrian safety a priority. Sadly, we know very well that pedestrians, including children, have been hit and

killed while following all safety rules/laws. Good drivers do not need nearly as much support. Unfortunately, there are drivers who need even more. Once Melissa connects to 211, all drivers including visitors watching their GPS screens, are likely to use Melissa as an alternative route.

Thank you for including this additional letter with the testimony.

Sincerely,

Erin Findlay



Exhibit QQQQ

Emily Meharg <emeharg@ci.sandy.or.us>

One more chance to speak up

Tom Newell <tom.newell@live.com>
To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Mon, Jan 27, 2020 at 4:04 PM

Hi Emily.....

I am writing today concerning file number 19-023 SUB/VAR/TREE, the Bailey Meadows development.

Please include this email in comments regarding the proposal.

Following last week's Planning Commission meeting, I am disturbed by the developers belief (as presented by their representatives) they are being Good Neighbors through potential litigation and lawsuits if the City does not bow to their every desire.

My common-sense keeps yelling out to me that this 100 home development SHOULD NOT PROCEED unless AND until there is a new, major(central) single point of ingress and regress (Gunderson Road) for the access to the subdivision. Melissa should remain a barricaded Emergency Exit only and Ponder Road should be the second access to Bailey Meadows. This fits the minimal requirements established for the Nicolas Glen development (we have only one way in and barricaded Emergency Exit at Solso Drive). NO homes should be built until roads are complete.

Other concerns seem to have brought forward regarding who will pay for street construction. I don't understand why it wouldn't automatically be the developers, who would pass the cost on to the new property owners (not the entire City of Sandy population).

Sidebar: if Melissa is 'punched through' and Gunderson is completed.....there will be too much traffic thru Nicolas Glen that result from travelers "short-cutting" from Hwy 211 to Dubarko or Dubarko to Hwy 211. Safety issue here, as noted that traffic already exceeds capacity of these streets.

Thank you for allowing this one more round of input from your city residents. Thank you for your full attention and consideration.

Tom Newell
18007 Rachael Drive
Sandy, Or 97055
503-477-2911

Sent from [Mail](#) for Windows 10



Exhibit RRRR

Emily Meharg <emeharg@ci.sandy.or.us>

Bailey Meadows Proposal

1 message

Cary Mallon <cary.mallon@gmail.com>
To: emeharg@ci.sandy.or.us

Tue, Jan 28, 2020 at 8:52 AM

Hello Emily,

I am writing to oppose the proposed Bailey Meadows subdivision application. There are several reasons for my opposition.

1. It is unconscionable to approve a doubling of traffic on Melissa Avenue when the city knows that the traffic load on that street is already over capacity.
2. The application has no plans for park space. There is precedent and policy for developers to include park space in their projects.
3. There hasn't been approval of expansion of the UGB.
4. The proposal, as I understand it, may require the city to pay for road access through Gunderson Rd. Developers should pay for their own access.
5. The developer should be willing to bring construction equipment to the property by way of Hwy 211, not via Melissa avenue.

I know growth is inevitable, but growth should be done wisely and without profit being made on the backs of city taxpayers and nearby residents.

Cary Mallon
37537 Rachael Dr
Sandy, OR

RECEIVED
JAN 29 2020
CITY OF SANDY

January 27th, 2020

Exhibit SSSS

Les & Kathy Geren
37721 SE Ponder Ln.
Sandy, OR 97055

After the hearing on Bailey Meadows, January 23rd, 2020 we understand that all concerns must be brought up during the fact finder period in order to be appealed after the committee reaches their decision.

We have no concerns at this time, but we have not seen the final plan. We continue to need to have our current access for semi's to access our barn with deliveries of straw, local hay, eastern oregon grass hay, grass/alfalfa mix hay and alfalfa hay for our business, Geren's Farm Supply. Our trucks access our barn multiple times a week to keep product in the store for our customers.

We have provided for and been responsible for the maintenance of Ponder Lane, including rock, grading and asphalt since 1974. This includes the entire North to South stretch of Ponder Lane. Due to the fact the county has taken zero responsibility for Ponder Lane, we desire to continue to use it as we have for the past 46 years. We are optimistic that we will feel no impact on our business.

We are eagerly awaiting for the final plan from the planning commission and thank them for performing a thankless job for our community.

19-023
Bailey Meadows
Les Geren
503-319-5660

January 28, 2020

Exhibit TTTT

To Planning Commission and City Council,

I want comment on the Bailey Meadows subdivision, since moving here in 2003 and purchasing a home in the Nicholas Glenn subdivision I wondered why there was only one access point into and out this subdivision, the codes in the 1980's were not as robust as today's. Current Oregon State Fire Codes (2019 Appendix D107.1) as well as the 2014 codes are very clear that there shall be more than one "Fire Access" road into and out of one and two family dwelling subdivisions. These access roads shall comply either with public road standards or with the fire code for private access road ways. This where there are more than 30 homes or 100 multifamily home units. So if the developers want to use Mellissa for the primary access the existing homes would be required to be added to the count, currently far exceeding the 30 single-family homes required by Oregon State Fire Code, they might be able to install fire sprinkler in all the new homes to avoid the required second access road.

Another issue that should be considered is that the grade of Mellissa is pretty steep and there has been times where weather causes all kinds of issues of vehicles trying to get up and down the hill safely. The Oregon Fire code has a maximum grade of 10%, which could be modified to maximum 15% grade.

The Bailey Meadows subdivision may not be stopped, but it shall be held to all state and local requirements. Yes, growth coming, but it shall be based on the capacity of the services of the City, Fire District. The developer shall be the one to building the roads to access the subdivision and the entire infrastructure needed at no cost to the City of Sandy, the City of Sandy will pay for the maintenance of the entire infrastructure once the subdivision is signed off and approved, so there will be a cost us all. If the UGB is not successful in gaining approval the developer should have to redesign the proposed subdivision or seek the secondary access from an area already approved for growth. Gunderson Road shall be improved the developer, not the City.

The City and those that are charged to protect the City along with every citizen need to remember that once this built people will come and what do you do if "The Big earthquake" hits the area, how will emergency services and citizens get in or out of the single access road?

My concern about community play areas goes back the Nicholas Glenn Subdivision, the City allowed the developer to build the park/ play area once all homes were done, oh and we don't have one! Maybe we should learn from that mistake.

Thank you

Robert Mottice

18050 Rachael Drive

Sandy, Oregon 97055

Exhibit UUUU

City of Sandy
Planning Division/Commission
Sandy, OR

Date: January 28, 2020

Re: Proposed Bailey Meadows Subdivision

I own the Nicholas Glen home located at 37506 Rachael Drive (re: tax lot 6100). I purchased the home in early 2018 knowing full well someday there would be homes built on the property behind my home. I expected the development to be more intelligently designed/implemented. I did not expect the development to be an island of homes surrounded by multiple land owners with limited access into and out of the subdivision.

I wrote my first letter to the Sandy Planning Division/Commission after attending the first AKS September 18, 2019 meeting. I attended the December 17, 2019 meeting but provided no public comment during the meeting or letter after that meeting. I attended the commission meeting of January 23, 2020. I did not provide public input as what I had planned to say in opposition to the Bailey Meadows subdivision was expressed well by my neighbors.

The following four points is a response to what I heard in the Planning Commission, Director and Legal statements and discussion per the synopsis of public input. Unable to challenge or comment once public input was complete was very frustrating.

- 1.) Director: Two key points of public input that were not stated (maybe intentionally) in the synopsis:
 - **Our neighborhood input requests the commission to delay the approval of the subdivision until the expansion of the UGB is approved for the proposed road improvement/expansion into the subdivision from Highway 211 and the proposed park.**
 - **Our neighborhood input requests the commission to delay the construction of the subdivision until the expansion and second road improvement from Highway 211 into the subdivision is completed.**

The staff report recommendation is to approve the Bailey Meadows subdivision and allow up to 30 homes be built prior to the improvement of the road from Highway 211. This recommendation totally ignores public input. This leaves Melissa Avenue the only access to and from the proposed subdivision for all construction equipment and construction personal making Melissa Avenue a very busy unsafe street during construction. In addition there is no guarantee the requested UGB expansion will be approved.

- 2.) Director: If traffic usage of any given road/street in Sandy exceeds recommended usage, the commission can still approve the subdivision and can state the traffic usage as an exception in its approval. The city of Sandy does not have a legal safety liability if the subdivision is approved with this exception.

As stated during public input, it is very hard to believe/trust the travel usage models/numbers in the report. If the UGB expansion is approved and the road improvement into the Bailey Meadows subdivision is completed, Melissa Avenue will continue to be the primary access into and out of the Bailey Meadows subdivision with the secondary access road to Highway 211 little used. For work, shopping and recreation the primary route for this subdivision will be Melissa Avenue to access Highway 26. It is also possible the proposed Highway 211 access road could result into a new shortcut from Highway 211 through Melissa Avenue to the west side of Sandy.

- 3.) Legal: Literally stated the city of Sandy could be sued if the Bailey Meadows subdivision is not approved. The commission was basically told to approve the subdivision. The roll of the commission seems to be one of not representing the citizens of Sandy but to insure the city of Sandy is not sued.

- 4.) Director: The term “needed housing” does not mean low cost housing. The intent of the term is to legally make a statement there is a need to the proposed housing intended to meet future population growth. ...Argument 1: if there is no housing and there is no growth...Argument 2: the city of Sandy is a bedroom community, there is not industry/companies planning to move to Sandy to justify needed housing...Argument 3: if the housing is needed, the infrastructure of increased road capacity and public safety (and schools) to support population growth must be indirectly common sense considered and not ignored though they cannot be legally considered per the State Oregon.

When this subdivision is approved (it will be per the commission, staff and legal discussion in the meeting of January 16), it is my request is to have the Planning Commission provide a “valued-add” statement in the approval that fully justifies the need for this subdivision in our community.

Plans to extend Mellissa Avenue

I stated this in my first letter and restating it here. My house and lot is on the corner of Melissa Avenue and Rachael Drive. As this impact my house and property, I would like to see detailed concept drawings of what will be done to understand any impact extending Melissa Avenue into the subdivision may have on my property.

Thank you,
Paul Savage
37506 Rachael Drive
Sandy, OR 97055

Exhibit VVVV

Planning Commission

January 28, 2021

City Hall

39250 Pioneer Blvd.

Sandy, OR 97055

To Whom It May Concern,

Re: Bailey Meadows Subdivision

I want to voice my concern
regarding the Bailey Meadows
Subdivision,

WHO IS GOING TO PAY
FOR THE CONSTRUCTION
OF GUNDERSON ROAD TO
HWY. 211 ???

MELISSA AVE. IS NOT
WIDE ENOUGH FOR THE
ADDITIONAL TRAFFIC OF
100-200 CARS- SINCE MOST
FAMILIES HAVE 2 CARS!!!

(over)

THE ADDITIONAL TRAFFIC
IS A HUGE CONCERN TO ALL
THE FAMILIES IN THE AREA!!!

Sec. 17.86 OF THE CITY CODE
REQUIRES DEDICATED PARKLAND
WHO IS GOING TO PAY FOR THAT
SINCE YOU MENTIONED THE
LOCATION IN YOUR SUBDIVISION
AT THE JANUARY 23, 2020
MEETING???

Your Truly,
Therese Wackin
18790 Myra Ct.
Sandy, OR 97055



Exhibit WWWW

Emily Meharg <emeharg@ci.sandy.or.us>

Testimony - Bailey Meadows - 19-023 SUB/VAR

Sarah Bettey <sarahbettey2978@hotmail.com>
To: "emeharg@cityofsandy.com" <emeharg@cityofsandy.com>

Wed, Jan 29, 2020 at 10:10 AM

January 29, 2020

Ms. Meharg,

I am writing in follow-up to the other letters of concern I have submitted regarding the proposed Bailey Meadows subdivision.

I am glad to see that there has been some progress towards our goals and that the developers are looking to make adjustments to their plans to make things safer and create less impact on our existing Nicholas Glen neighborhood. I attended both the December 17th 2019 and January 23rd, 2020 meetings and saw some positive progress. I appreciate all the work that the planning commission and city staff have put into this project already.

We all still have questions: We still wonder who is slated to pay for this Gunderson Road project if it is approved? The city? The developers? I do not believe the answer was clear in any meeting.

As I understand it, the developer can say "we tried" and then still be allowed to proceed with the subdivision, pay their park fees, and direct all traffic up Melissa Ave if the UGB expansion is denied. This is unacceptable. I would like to see it a prerequisite that the UGB expansion must be approved and the construction of Gunderson Rd and other connecting surface streets in the Bailey Meadows complex completed before a single home is built. If the UGB expansion is not approved, then the development should also not be approved.

I would like the construction traffic, including utility vehicles, lumber and concrete/asphalt trucks, etc. be required to primarily access the subdivision off the highway onto Gunderson Rd instead of up Melissa Ave and through our small, quiet neighborhood.

Something that has not been addressed much in the meetings is the huge trench that will be dug up Melissa to expand the utilities. I worry how this will affect our traffic and the quiet community during this construction. I would like to know more about a timeline as to when and how long this will happen. This will potentially affect the neighborhood's ability to get services from emergency vehicles and school buses being able to access the neighborhood for quite some time and this is a huge safety concern. Again, if we had the second access already in place from the expansion of Gunderson Rd before the rest of the neighborhood progresses, it would help alleviate this concern greatly.

I agree with the suggestion of putting a 4-way stop at the intersection at the top of the hill at Melissa Ave and Rachel Ave instead of the proposed 2-way stop. I think this 4-way stop should also include crosswalks for pedestrian safety. I would also like to see at least one speed bump installed about halfway down the hill to also help slow down traffic. This could be done immediately as even without the added traffic that will clearly happen with the addition of this development and access to Hwy 211, cars already speed up and down the Melissa Ave hill. I would also ask that speed limit signs be added along Melissa Ave to reinforce. There are currently no speed limit signs in Nicholas Glen.

As someone that lives on Melissa Ave, I still feel my family and our neighbors are going to be greatly impacted by this development in a negative way. The safety of our current and future neighbors needs to be the number one priority.

Thank you again for continuing to work towards solutions to our concerns and for including this letter as additional testimony.

Sarah Bettey
18195 Melissa Ave
Sandy OR 97055

Dear Planning Commission members and Sandy City staff: **Exhibit XXXX**

The initial draft of this letter was not done by me but done by someone that has more knowledge than I on the legal aspects of my concerns and my neighborhood's concerns on the proposed Bailey Meadows subdivision. The points outlined in this letter accurately and better express in detail the concerns I have expressed in the two letters I have previously sent to you the issues/concerns of myself and my neighborhood.

We appreciate the appearance of cooperation from the developer to construct the necessary arterial (Gunderson Road) at the January 23rd meeting and the inclusion of some parkland within the UGB.

We are concerned about the lack of any specifics on the Development Agreement that is referenced in #49 and Condition #D3, especially the timing and the details on who pays what. Mr. Robinson alluded to the City paying part of the costs in his oral testimony, but no specifics were mentioned. The City has just committed to building out Bell Street to 362nd, so we are concerned that their budgets are tapped out. In addition, Gunderson Road is not currently in the UGB and is not on the CIP list that allows the City to use SDC's to help fund this share. While we can agree that a small portion of traffic from the existing Nicholas Glen may use the Gunderson Road, and therefore a cost share agreement may be appropriate, what if the City cannot come up with the funds? What is an equitable split? What if the UGB gets denied? How does the availability of City funds affect the 30th house condition? What are the assurances that we do not end up with 30 homes and then stall with no road? All these should be addressed in the Development Agreement.

Approval of a Type III land use development by the planning commission prior to the approval of a development agreement to share costs for construction of Gunderson Road to 211, which is integral to the intent of the Conditions for Approval violates the 2017 ORS 94.504, that states:

2) A development agreement shall specify:

- (a) The duration of the agreement;*
- (b) The permitted uses of the property;*
- (c) The density or intensity of use;*
- (d) The maximum height and size of proposed structures;*
- (e) Provisions for reservation or dedication of land for public purposes;*
- (f) A schedule of fees and charges;*
- (g) A schedule and procedure for compliance review;*
- (h) Responsibility for providing infrastructure and services;*
- (i) The effect on the agreement when changes in regional policy or federal or state law or rules render compliance with the agreement impossible, unlawful or inconsistent with such laws, rules or policy;*
- (j) Remedies available to the parties upon a breach of the agreement;*
- (k) The extent to which the agreement is assignable; and*
- (L) The effect on the applicability or implementation of the agreement when a city annexes all or part of the property subject to a development agreement.*

(3) A development agreement shall set forth all future discretionary approvals required for the development specified in the agreement and shall specify the conditions, terms, restrictions and requirements for those discretionary approvals.

(4) A development agreement shall also provide that construction shall be commenced within a specified period of time and that the entire project or any phase of the project be completed by a specified time.

(5) A development agreement shall contain a provision that makes all city or county obligations to expend moneys under the development agreement contingent upon future appropriations as part of the local budget process. The development agreement shall further provide that nothing in the agreement requires a city or county to appropriate any such moneys.

(6) A development agreement must state the assumptions underlying the agreement that relate to the ability of the city or county to serve the development. The development agreement must also specify the procedures to be followed when there is a change in circumstances that affects compliance with the agreement.

...(9) ORS [94.504 \(Development agreements\)](#) to [94.528 \(Recording\)](#) do not limit the authority of a city or county to take action pursuant to ORS [456.270 \(Definitions for ORS 456.270 to 456.295\)](#) to [456.295 \(Action affecting covenant\)](#). [1993 c.780 §1; 2005 c.315 §1; 2007 c.691 §7]

The Development Agreement should have been finalized prior to, or at least concurrent with, the land use decision. The land use decision cannot be made without final agreement of the items listed above to ensure that the proposed development (amended with the Development Agreement) meets development code and the Transportation System Plan as outlined in ORS 94.508: In addition the Development Agreement should be consistent with the development phasing required in SDC17.100.60 D.20.

(1) A development agreement shall not be approved by the governing body of a city or county unless the governing body finds that the agreement is consistent with local regulations then in place for the city or county.

(2) The governing body of a city or county shall approve a development agreement or amend a development agreement by adoption of an ordinance declaring approval or setting forth the amendments to the agreement. Notwithstanding ORS [197.015 \(Definitions for ORS chapters 195, 196, 197 and ORS 197A.300 to 197A.325\)](#) (10)(b), the approval or amendment of a development agreement is a land use decision under ORS chapter 197. [1993 c.780 §2; 2005 c.22 §74; 2007 c.354 §27]

17: Unless otherwise provided by the development agreement, the comprehensive plan, zoning ordinances and other rules and policies of the jurisdiction governing permitted uses of land, density and design applicable to the development of the property subject to a development agreement shall be the comprehensive plan and those ordinances, rules and policies of the jurisdiction in effect at the time of approval of the development agreement. [1993 c.780 §4]

We continue to be concerned about the developer's positions stated that street requirements are not adequately documented and therefore do not apply to this development. It is unclear, and no finding of fact is stated in the staff report that would indicate the Comprehensive Plan, Transportation System Plan and City Development Code are not adequate to apply as they have applied in many recent and past development proposals. One argument made was that the TSP was not adopted as an amendment to Sandy's Comprehensive Plan

The City of Sandy's 2011 Transportation System Plan (TSP) that involved some of you planning commission members and City Council members, is an element and amendment to the City's Comprehensive Plan. The City's TSP addresses development outside the UGB, including the proposed Gunderson Road. Following is the introduction to the City's TSP as well as pertinent parts of the

Ordinance Adopting the TSP as an element and amendment to the City's Comprehensive Plan. I ask that the entire TSP, Adoption Ordinance and Exhibits be incorporated into the record by reference.

City of Sandy Transportation System Plan - Chapter 1 - 2011 Transportation Plan Introduction

The City of Sandy, in cooperation with the Oregon Department of Transportation (ODOT), has completed a thorough review of its transportation system with this update to the City Transportation System Plan (TSP). This TSP serves as the transportation element of the City of Sandy Comprehensive Land Use Plan, establishing a system of facilities and services to meet local transportation needs through the year 2029.

OAR 660 Division 12 (also referred to as the state Transportation Planning Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of their comprehensive plans. While cities with populations less than 10,000 may qualify for a whole or partial exemption from this requirement (Sandy's population was estimated at 9,570 as of the 2010 Census), the City of Sandy has chosen to undertake this planning effort because the plan will serve as a valuable resource for staff, policy makers, and the public. Having an adopted TSP establishes the function, capacity, and location of future transportation facilities, informs the community of the level of investment needed for facilities to support anticipated growth and development, and better positions the City to compete for scarce transportation funding. ...

ORDINANCE NO. 2011-12 - AN ORDINANCE ADOPTING A NEW TRANSPORTATION SYSTEM PLAN (TSP) TO ADDRESS THE REQUIREMENTS OF GOAL 12.

...WHEREAS, OAR 660 Division 12 (also referred to as the state Transportation Plan Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of comprehensive plans; and

WHEREAS, while this rule allows cities with populations less than 10,000 (Sandy's population is 9,655), a whole or partial exemption from these requirements, the City of Sandy has chosen to undertake this planning effort to establish a system of facilities and services to meet local transportation needs through the year 2029; ...

NOW, THEREFORE, THE CITY OF SANDY DOES ORDAIN AS FOLLOWS: Section 1. The Transportation System Plan for the City of Sandy dated December 2011 is hereby adopted, attached as Exhibit A and incorporated herein by reference. The information and data contained in Exhibit A supersedes any that exists to the contrary in the Transportation System Plan adopted by Ordinance No. 12-97 or its background documents. Section 2. The Transit Master Plan adopted by Ordinance No. 2009-02 is incorporated as an element of the new Transportation System Plan. Section 3. The adoption of the Transportation System Plan is supported by findings, attached hereto as Exhibit B and incorporated herein by reference.

There was also comments that the standards identified in the TSP were not spelled out in Development Code. **See Section 17.10.30** Code Definitions where classifications are reiterated.

...B. Arterial Streets: These interconnect and support the arterial highway system and link major commercial, residential, industrial, and institutional areas.

C. Residential Minor Arterial: A hybrid between minor arterial and collector street which allows moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. Intended to provide some relief to the strained arterial system while ensuring a safe residential

environment. Paved width of 38 feet to 50 feet, minimum three-lane cross section, and may include on-street parking.

D. Collector Streets: These provide both access and circulation within residential neighborhoods and commercial/industrial areas.

E. Local Streets: The primary function is to provide access to immediately adjacent land. Service to through-traffic movement on local streets is discouraged

SDC Section 17.84 “provides general information regarding improvements required with residential, commercial, and industrial development. It is intended to clarify timing, extent, and standards for improvements required in conjunction with development. In addition to the standards in this chapter, additional standards for specific situations are contained in other chapters. “

The TSP and its standards are incorporated by reference in **Section 17.84.50 STREET REQUIREMENTS** and reference **accepted traffic engineering practices (clear and objective)** including:

A. Traffic evaluations may be required of all development proposals in accordance with the following:

1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections.

Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.

2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

1. Arterial streets should generally be spaced in one-mile intervals. ...

C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, “through traffic” means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:

The TSP’s “Functional Classification Management Objectives” (page 17 of TSP) sets the standard for Local Streets like Melissa Avenue

Local Street

Local streets have the sole function of providing immediate access to adjacent land. These streets have a typical capacity between 800 and 1,000 ADT. Service to through traffic movements on local streets is deliberately discouraged by design.

Contrary to comments made to the Planning Commission by the Developers representative, the City’s Traffic Engineering Report did express concerns about this development related to traffic capacity, road conditions and safety on Melissa Avenue. Therefore, under the codes already mentioned, we need to

ensure that approval of the subdivision is based on UGB incorporation and completion of a feasible Development Agreement. Their Traffic Report Exhibit Y said:

Gunderson Road is classified in the City of Sandy TSP Figure 5 as a minor arterial street. A minimum off 34 feet right of way dedication will ne required along the entire site frontage as per City of Sandy Development Code, chapter 17.84. This roadway will be extended in the future as the surrounding properties develop around this site.

A half improvement would be required on Gunderson Road to include 22 foot wide paved surface, curb cuts on one side, 5 foot planter strips and 6 foot wide sidewalks along the south plat boundary line as per the TSP. At the request of the City we have developed a layout to this site ...

Melissa Avenue is classified by the City of Sandy TSP figure 5 as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations.

We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case evacuation is needed...

The comments made by the developer’s representative imply that the word “allude” in their report was a suggestion and not a requirement. As referenced in the appropriate code stated above, the Comprehensive Plan, TSP, and Sandy Development Code all incorporate the TSP by reference. SDC 17.84.50 refers to them as “minimum standards” and “accepted traffic engineering practices”. If a development proposed an expected AADT of 1,100 it may be debatable, but the finding that the AADT with this development will be 2,490 - three times the 800 and 2.5 times the 1000 AADT threshold under accepted traffic engineering practices, as concluded by the City’s Traffic Engineer, should leave no doubt that there is a definite need for the Gunderson connection and that the City Plans and Code language are sufficient to require it. Similarly, there are not specified pipe diameters for potential water and sewer needs in our Code, but the fact that we need adequate water and sewer systems are not questioned or allowed to be undersized and overloaded with proposed development.

The Condition for Approval as well as the finalized Development Agreement must require incorporation of Gunderson Road into the UGB as well as construction of Gunderson Road in order for Bailey Meadows development to be consistent with SDC 17.100.60 E and F:

E. Approval Criteria. The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.102 and the following approval criteria: ...

3. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy.(TSP).

4. Adequate public facilities are available or can be provided to serve the proposed subdivision.

5. All proposed improvements meet City standards.

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

F. Conditions. The Director or Planning Commission may require dedication of land and easements and may specify such conditions or modifications of the tentative plat as deemed necessary.

Gunderson Road must be constructed and Melissa Ave must be managed under SDC 17.100.100 to ensure that development provides safe options, and addresses

B 2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

To further refute the comments that the SDC does not contain objective standards in the City's Code, SDC 17.100.110 references specific drawings and incorporates by reference and summary statements, the TSP itself.

Again, while we appreciate the intent to move forward with Gunderson and we understand the complication of the parcel being outside the UGB, we want to be on the record with all the reasons and rationale for why existing City Code, TSP, and Comprehensive Plan call for the development to construct secondary access by way of Gunderson Road. We believe in order to meet all the While it may be appropriate for the City to pitch in some of the costs (to the extent the existing Nicholas Glen neighbors may use the Gunderson Road), the City and its taxpayers should not be required to shoulder the costs for a necessary arterial road that primarily benefits and allows development for the proposed Bailey Meadows subdivision.

We believe in "responsible growth", and that Bailey Meadows must meet SDC17.100.310: In order to do that, we must condition approval with the UGB expansion to feasibly meet this code.

17.100.310 REQUIRED IMPROVEMENTS

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

... I. Streets

Needed Housing Exemptions:

The developer's blanket justification for Bailey Meadows not having to implement conditions they find onerous, and in their conclusion are "subjective", or could cause "unreasonable costs or delay" as stated in the 900 page report, appears to be House Bill 2001 including the premise that the statutes under "Needed Housing" apply to Bailey Meadows. The HB2001 revised housing rules 1) required that the City allow duplexes on single family zones - which is immaterial, as duplexes are not being proposed in Bailey Meadows. 2) It allows the City to consider (and does not prohibit) middle housing on these zones - again not proposed in this development. And then there are the developers frequent references that exceptions are warranted because the 100 almost half million dollar homes proposed in Bailey Meadows fall under the "Needed Housing" provision. A reading of the definition should clarify this.

2017 ORS 197.303¹ - "Needed housing" defined:

*As used in ORS [197.307](#) (Effect of need for certain housing in urban growth areas), "needed housing" means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary **at price ranges and rent levels that are affordable to households within the county with a variety of incomes, INCLUDING but not limited to households with low incomes, very low incomes and extremely low incomes**, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a.*

The key term is **INCLUDING** ...households with low incomes, to extremely low incomes. There are **NO** lots or homes **INCLUDED** in Bailey Meadows that are affordable to low, very low, or extremely low incomes. On the contrary, the developer has indicated that the homes will start at \$450,000 (almost half a million dollars!). The legislature defined needed housing with the intent to reduce barriers to provide housing for low to extremely low income people in need of housing. There is not a shortage of housing in the Sandy area for \$450k plus. These “Needed Housing” statutes are not a one size fits all loophole for developers wanting to build large, expensive single family lots and get a fast tracked development, where they either refuse to implement or put the costs of any onerous development conditions they find “subjective” or “unreasonable” on City taxpayers. The City’s lawyer should come up with the same interpretation! Bailey Meadows does not come under any provisions of HB2001. At a minimum, if there is any part of the new state statutes that over ride, compromise, or eliminate our Comprehensive Plan, TSP, or Development Code, applicable under the Bailey Meadows proposal, those statutes should be outlined in the Findings of Fact section of the Staff Report and they were not. Similarly, other than general mentions of the ORS197.303 and 197.307 by the developer, there were no specifics of how the Bailey Meadows Subdivision meets the criteria under these statutes or how they override our code.

Park land dedication:

It is unclear what the proposal is currently. The initial application states they intend to pay a fee in lieu of park land dedication. A later filing mentions dedication of just over 2 acres of park land outside the proposed development and within the UGB. A preliminary assessment of this proposed land is that it is very wet. *SDC 17.86.20 (3) The parkland must be able to accommodate play structures, play fields, picnic areas, or other active park use facilities. The average slope of the active use parkland shall not exceed 15%.* It appears that drainage and possible grading would be necessary to meet this part of the code.

SDC 17.86.20 (1) Homes must front on the parkland as shown in the example below: If this dedication is instead of the fee, then the requirements that homes face the park would require a new Condition for Approval, or a Request for a Variance from the developer. If they do not want to request a variance, then there would need to either be a Condition for Approval to have the final plat show homes that face the park, or, the developer can pay the fee in lieu to meet the City’s requirement and at the same time, donate land outside the UGB to the City outside the parkland dedication process. This last alternative was alluded as the intent by the developer’s attorney at the hearing. Whatever the proposal is, it should be clearly documented and Conditions of Approval #12 should be edited to ensure the park land policies in 17.86 are met.

In conclusion, we believe the Development Agreement should be developed and approved by City Council prior to, or concurrently with, the Planning Commission approval to ensure that Gunderson is primarily paid for by the benefitting entity Bailey Meadows developers. The City needs to ensure that they can come up with their share with available funds and addition of Gunderson onto the SDC roads CIP. And finally, we need to ensure for the developers and the neighbors that Gunderson can in fact be built before the 31st home is built, given they plan to break ground this summer. We reiterate our belief and it is reflected in our record, that the new 2001 House Bill does not come into play with Bailey Meadows as it is neither duplexes or middle housing, nor does it meet “needed housing” intended for low incomes. We support the donation of park land within the UGB, while paying the fee in lieu to meet parkland dedication policies.

Again, we support the Developer and City finalizing the Development Agreement to construct Gunderson Road prior to build out of Bailey Meadows. Like Mr. Robinson, we raise all these points, rationale, and references to ensure they are on the record for the Planning Commission and in the case of appeal.

Thank you,

Paul Savage
37506 Rachael Drive
Sandy, OR 97055

1/30/2020

City of Sandy Mail - Fwd: Concerns about Bailey Meadows Subdivision



Exhibit YYYY

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Concerns about Bailey Meadows Subdivision

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 8:59 AM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Corri Baldwin** <corri.baldwin@gmail.com>

Date: Wed, Jan 29, 2020 at 10:57 PM

Subject: Concerns about Bailey Meadows Subdivision

To: <emeharg@cityofsandy.com>

Dear Emily,

I am writing to you today with more concerns about the proposed development of Bailey Meadows Subdivision. After the meeting on 1/23, I feel very uneasy about the proposed development, even with the application of the UGB expansion.

My first concern is that if the UGB expansion gets denied, the development will still happen. For the safety of the community, both current and future, there absolutely has to be another road built. Melissa Ave is already beyond capacity and we cannot stress enough the major safety concerns with the addition of more cars. I believe that there should not be any developing happening until the UGB is approved to be expanded.

My second concern is who would be paying for road development, City of Sandy, or the Developers? It needs to be clear on who is paying for the road, and if it is indeed the city, development should not occur until the city can pay for road and still continue to provide sufficient infrastructure on all levels.

Another concern I have is, even with another road for new development, Melissa Ave will have more traffic. The intersection of Rachael/Melissa is already dangerous with the one stop sign. I witness near accidents frequently as I live on Rachael right at the top of Melissa. There needs to be a 4 way stop at this intersection. This needs to be a condition of approval. People to speed up and done Melissa and with the already narrow road due to parked cars, there should be speed bumps in place if there is to be more traffic with the new development.

I believe that if the conditions of no development if no UGB expansion approval, clear plan on payment of Gunderson Road, and updated safety with a 4 way stop at Melissa and Rachael are not made and rewritten into plan, this should not be approved.

The safety of both neighborhoods should be a top priority and if these conditions aren't met, I do not think that this would be a safe or smart decision.

Thank you,

Corri Schell
37524 Rachael Drive

1/30/2020

City of Sandy Mail - Fwd: Bailey Meadows



Exhibit ZZZZ

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 9:03 AM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Mike Schell** <c.m.towing2018@gmail.com>

Date: Wed, Jan 29, 2020 at 11:41 PM

Subject: Bailey Meadows

To: <emeharg@cityofsandy.com>

Dear Emily,

I am a resident of the Nicholas Glen neighborhood and have some major concerns with the upcoming possible development of Bailey Meadows. To start off it would be really helpful to have a clear understanding of what the city of Sandy is doing? How can any plans be approved or property be developed with out the UGB being expanded first??? It seems as though no one cares about how important this should be to the city before development of any level starts.

After attending the last few meetings the city has held over this controversy of development and the UGB expansion. This next request is made with little regard from the city of Sandy I'm sure. But to see all development suspended until it's clear as to who will pay for the Gunderson Rd construction would be appropriate. As a Tax payer, business owner and member of the community I would like to know where the funds are supposed to appear from? If the city is supposed to pay where will these funds come from? I think its fair to say if the City must pay then all development of the project should still be halted until the city can afford to pay. The city should also be able to provide sufficient Infrastructure on all other levels before construction begins.

Again after going to these meeting I feel as though its pointless to complain about safety issues this Development brings, but I'm going to anyway... I think its more than a joke that that because the Developer has Big Money the city is willing to look the other way when it comes to road usage. The problem with using the existing streets Melissa / Rachael, Solso / Melissa and last but not least Dubarko / Melissa. These are all over capacity now. The streets are filled with kids, pets, and adults who walk play and ride bikes on them every day added with the current vehicle traffic this is INSANE to think the city is okay with using it in the new plan. This is Unacceptable to let this developer build and not address the issue of safety in the last meeting that was made very clear they don't care and will not be addressing the issue further.. **Over Capacity means Over Capacity.** The developer needs build another route that doesn't jeopardize the neighbors already here and if the route is not approved then building shouldn't start. Everyone agrees this is not right and we all feel like the developers money shouldn't buy the right to be negligent with safety for all.

I firmly believe that there is a solution to all the above problems, I think its important to consider Traffic and pedestrian safety, and most of all the developer should come up with a plan that insures that. The city should not entertain the idea of proceeding forward with out a strong plan in place. So far there has been many ideas thrown around, but nothing has clear direction or actions put in-place to show the community that the city cares about the people. With that said if the city cares as they claim to about this small community then action needs to take place, Roads with traffic control devices should be put in place with a way to enforce them. Not just install a stop sign or two and call it good. There is a speed limit, and one Stop sign on Melissa and Rachael now and few people acknowledge it as it is. So imagine adding all these new cars and people this will result in an injury crash. And when it does will the city think that the over capacity of the street was a good idea to over look??? I'd bet the Legal action to follow would be devastating to the city.. **The Bottom line is we need a strong clear plan, with new roads to paid for and in-place before building** can be approved or started with no exceptions no excuses..

Thank you,

Mike Schell
37524 Rachael Dr.

<https://mail.google.com/mail/u/0?ik=256091e41c&view=pt&search=all&permthid=thread-f%3A1657173504958908542&siml=msg-f%3A16571735049...> 1/2

Exhibit AAAAA

Dear Planning Commission and City Planning Staff:

January 29th, 2020

I would like to submit the following points onto the Bailey Meadows record. I would ask that the elaboration of the rationale cited in K. Walker's written testimony submitted January 30th, be incorporated to my letter by reference for the purposes of any future appeals.

The Development Agreement referenced in the Conditions for Approval has not been drafted yet. There is no consensus on who is paying what, and when, to build Gunderson Road. It is not possible to clarify or confirm Conditions for Approval without this agreement completed at the time of Plan approval. It should be drafted and finalized prior to, or concurrently with, the Conditions for Approval for the proposed development in order to meet the terms under 2017 ORS 94.504 and be consistent with the development phasing required in SDC 17.100.60 D.20 and the requirements in ORS 94.518.

While the developer has indicated a willingness to construct Gunderson Road as part of their development, they continue to go on the record as saying they do not believe they are required to, by law, based on vaguely referenced shortcomings in our Comprehensive Plan, Transportation System Plan, and Sandy Development Code and by House Bill 2001. I would like to incorporate by reference all three of those documents and specifically the Sandy Ordinance 2011-12 that adopted our TSP in 2011 making it an element and amendment to our Comprehensive Plan. SDC 17.10.30, 17.84, 17.100.60,


The Condition for Approval as well as the finalized Development Agreement must require incorporation of Gunderson Road into the UGB, as well as construction of Gunderson Road in order for Bailey Meadows development to be consistent with SDC 17.100.60 E and F and other sections of SDC 17.100.

There is no Finding of Fact that states how Bailey Meadows falls under any provisions of House Bill 2001 with no duplexes, or affordable housing for low to very low incomes. Therefore all the provisions in our City Code, TSP and Comprehensive Plan related to streets and traffic are in affect and are clear and objective standards to guide responsible development, as they have done for many years here in Sandy.

I support the developer's proposal to donate park land in the UGB and pay the fee in lieu of parkland dedication policies in SDC 17.86.

I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely,



Email to emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit BBBB

Dear Planning Commission and City Planning Staff:

January 29th, 2020

I would like to submit the following points onto the Bailey Meadows record. I would ask that the elaboration of the rationale cited in K. Walker's written testimony submitted January 30th, be incorporated to my letter by reference for the purposes of any future appeals.

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I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely,

Email to:
emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

RECEIVED

JAN 30 2020

CITY OF SANDY

Gretchen M. Benson 1/29/2020

Exhibit CCCCC

Dear Planning Commission and City Planning Staff:

January 29th, 2020

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There is no Finding of Fact that states how Bailey Meadows falls under any provisions of House Bill 2001 with no duplexes, or affordable housing for low to very low incomes. Therefore all the provisions in our City Code, TSP and Comprehensive Plan related to streets and traffic are in affect and are clear and objective standards to guide responsible development, as they have done for many years here in Sandy.

I support the developer's proposal to donate park land in the UGB and pay the fee in lieu of parkland dedication policies in SDC 17.86.

I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely,



(or Rachael)

Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit DDDDD

Dear Planning Commission and City Planning Staff:

January 29th, 2020

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Treera L. Siewell

Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit EEEEE

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Sincerely,

Karen Higgins
37457 Rachel Dr.

Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit FFFFF

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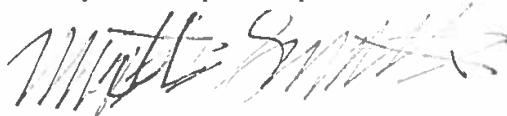
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Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit KKKKK

Dear Planning Commission members and City staff:

We appreciate the appearance of cooperation from the developer to construct the necessary arterial (Gunderson Road) at the January 23rd meeting and the inclusion of some parkland within the UGB.

We are concerned about the lack of any specifics on the Development Agreement that is referenced in #49 and Condition #D3, especially the timing and the details **on who pays what**. Mr. Robinson alluded to the City paying part of the costs in his oral testimony, but no specifics were mentioned. The City has just committed to building out Bell Street to 362nd, so we are concerned that their budgets are tapped out. In addition, Gunderson Road is not currently in the UGB and is not on the CIP list that allows the City to use SDC's to help fund this share. While we can agree that a small portion of traffic from the existing Nicholas Glen may use the Gunderson Road, and therefore a cost share agreement may be appropriate, what if the City cannot come up with the funds? What is an equitable split? **What if the UGB gets denied? How does the availability of City funds affect the 30th house condition? What are the assurances that we do not end up with 30 homes and then stall with no road?** All these should be addressed in the Development Agreement.

Approval of a Type III land use development by the planning commission prior to the approval of a development agreement to share costs for construction of Gunderson Road to 211, which is integral to the intent of the Conditions for Approval violates the 2017 ORS 94.504, that states:

2) A development agreement shall specify:

- (a) The duration of the agreement;*
- (b) The permitted uses of the property;*
- (c) The density or intensity of use;*
- (d) The maximum height and size of proposed structures;*
- (e) Provisions for reservation or dedication of land for public purposes;*
- (f) A schedule of fees and charges;*
- (g) A schedule and procedure for compliance review;*
- (h) Responsibility for providing infrastructure and services;*
- (i) The effect on the agreement when changes in regional policy or federal or state law or rules render compliance with the agreement impossible, unlawful or inconsistent with such laws, rules or policy;*
- (j) Remedies available to the parties upon a breach of the agreement;*
- (k) The extent to which the agreement is assignable; and*
- (L) The effect on the applicability or implementation of the agreement when a city annexes all or part of the property subject to a development agreement.*

(3) A development agreement shall set forth all future discretionary approvals required for the development specified in the agreement and shall specify the conditions, terms, restrictions and requirements for those discretionary approvals.

(4) A development agreement shall also provide that construction shall be commenced within a specified period of time and that the entire project or any phase of the project be completed by a specified time.

(5) A development agreement shall contain a provision that makes all city or county obligations to expend moneys under the development agreement contingent upon future appropriations as part of the local budget process. The development agreement shall further provide that nothing in the agreement requires a city or county to appropriate any such moneys.

(6) A development agreement must state the assumptions underlying the agreement that relate to the ability of the city or county to serve the development. The development agreement must also specify the procedures to be followed when there is a change in circumstances that affects compliance with the agreement.

...(9) ORS 94.504 (Development agreements) to 94.528 (Recording) do not limit the authority of a city or county to take action pursuant to ORS 456.270 (Definitions for ORS 456.270 to 456.295) to 456.295 (Action affecting covenant). [1993 c.780 §1; 2005 c.315 §1; 2007 c.691 §7]

The Development Agreement should have been finalized prior to, or at least concurrent with, the land use decision. The land use decision cannot be made without final agreement of the items listed above to ensure that the proposed development (amended with the Development Agreement) meets development code and the Transportation System Plan as outlined in ORS 94.508: In addition the Development Agreement should be consistent with the development phasing required in SDC17.100.60 D.20.

(1) A development agreement shall not be approved by the governing body of a city or county unless the governing body finds that the agreement is consistent with local regulations then in place for the city or county.

(2) The governing body of a city or county shall approve a development agreement or amend a development agreement by adoption of an ordinance declaring approval or setting forth the amendments to the agreement. Notwithstanding ORS 197.015 (Definitions for ORS chapters 195, 196, 197 and ORS 197A.300 to 197A.325) (10)(b), the approval or amendment of a development agreement is a land use decision under ORS chapter 197. [1993 c.780 §2; 2005 c.22 §74; 2007 c.354 §27]

17: Unless otherwise provided by the development agreement, the comprehensive plan, zoning ordinances and other rules and policies of the jurisdiction governing permitted uses of land, density and design applicable to the development of the property subject to a development agreement shall be the comprehensive plan and those ordinances, rules and policies of the jurisdiction in effect at the time of approval of the development agreement. [1993 c.780 §4]

We continue to be concerned about the developer's positions stated that street requirements are not adequately documented and therefore do not apply to this development. It is unclear, and no finding of fact is stated in the staff report that would indicate the Comprehensive Plan, Transportation System Plan and City Development Code are not adequate to apply as they have applied in many recent and past development proposals. One argument made was that the TSP was not adopted as an amendment to Sandy's Comprehensive Plan

The City of Sandy's 2011 Transportation System Plan (TSP) that involved some of you planning commission members and City Council members, is an element and amendment to the City's Comprehensive Plan. The City's TSP addresses development outside the UGB, including the proposed Gunderson Road. Following is the introduction to the City's TSP as well as pertinent parts of the Ordinance Adopting the TSP as an element and amendment to the City's Comprehensive Plan. I ask that the entire TSP, Adoption Ordinance and Exhibits be incorporated into the record by reference.

City of Sandy Transportation System Plan - Chapter 1 - 2011 Transportation Plan Introduction

The City of Sandy, in cooperation with the Oregon Department of Transportation (ODOT), has completed a thorough review of its transportation system with this update to the City Transportation System Plan (TSP). This TSP serves as the transportation element of the City of Sandy Comprehensive Land Use Plan, establishing a system of facilities and services to meet local transportation needs through the year 2029.

OAR 660 Division 12 (also referred to as the state Transportation Planning Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of their comprehensive plans. While cities with populations less than 10,000 may qualify for a whole or partial exemption from this requirement (Sandy's population was estimated at 9,570 as of the 2010 Census), the City of Sandy has chosen to undertake this planning effort because the plan will serve as a valuable resource for staff, policy makers, and the public. Having an adopted TSP establishes the function, capacity, and location of future transportation facilities, informs the community of the level of investment needed for facilities to support anticipated growth and development, and better positions the City to compete for scarce transportation funding. ...

ORDINANCE NO. 2011-12 - AN ORDINANCE ADOPTING A NEW TRANSPORTATION SYSTEM PLAN (TSP) TO ADDRESS THE REQUIREMENTS OF GOAL 12.

...WHEREAS, OAR 660 Division 12 (also referred to as the state Transportation Plan Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of comprehensive plans; and

WHEREAS, while this rule allows cities with populations less than 10,000 (Sandy's population is 9,655), a whole or partial exemption from these requirements, the City of Sandy has chosen to undertake this planning effort to establish a system of facilities and services to meet local transportation needs through the year 2029; ...

NOW, THEREFORE, THE CITY OF SANDY DOES ORDAIN AS FOLLOWS: Section 1. The Transportation System Plan for the City of Sandy dated December 2011 is hereby adopted, attached as Exhibit A and incorporated herein by reference. The information and data contained in Exhibit A supersedes any that exists to the contrary in the Transportation System Plan adopted by Ordinance No. 12-97 or its background documents. Section 2. The Transit Master Plan adopted by Ordinance No. 2009-02 is incorporated as an element of the new Transportation System Plan. Section 3. The adoption of the Transportation System Plan is supported by findings, attached hereto as Exhibit B and incorporated herein by reference.

There was also comments that the standards identified in the TSP were not spelled out in Development Code. See **Section 17.10.30** Code Definitions where classifications are reiterated.

...B. Arterial Streets: These interconnect and support the arterial highway system and link major commercial, residential, industrial, and institutional areas.

C. Residential Minor Arterial: A hybrid between minor arterial and collector street which allows moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. Intended to provide some relief to the strained arterial system while ensuring a safe residential

environment. Paved width of 38 feet to 50 feet, minimum three-lane cross section, and may include on-street parking.

D. Collector Streets: These provide both access and circulation within residential neighborhoods and commercial/industrial areas.

E. Local Streets: The primary function is to provide access to immediately adjacent land. Service to through-traffic movement on local streets is discouraged

SDC Section 17.84 *"provides general information regarding improvements required with residential, commercial, and industrial development. It is intended to clarify timing, extent, and standards for improvements required in conjunction with development. In addition to the standards in this chapter, additional standards for specific situations are contained in other chapters. "*

The TSP and its standards are incorporated by reference in **Section 17.84.50 STREET REQUIREMENTS** and reference **accepted traffic engineering practices (clear and objective)** including:

A. Traffic evaluations may be required of all development proposals in accordance with the following:

- 1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.*

- 2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.*

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

- 1. Arterial streets should generally be spaced in one-mile intervals. ...*

C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, "through traffic" means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:

The TSP's "Functional Classification Management Objectives" (page 17 of TSP) sets the standard for Local Streets like Melissa Avenue

Local Street

Local streets have the sole function of providing immediate access to adjacent land. These streets have a typical capacity between 800 and 1,000 ADT. Service to through traffic movements on local streets is deliberately discouraged by design.

Contrary to comments made to the Planning Commission by the Developers representative, the City's Traffic Engineering Report did express concerns about this development related to traffic capacity, road conditions and safety on Melissa Avenue. Therefore, under the codes already mentioned, we need to

ensure that approval of the subdivision is based on UGB incorporation and completion of a feasible Development Agreement. Their Traffic Report Exhibit Y said:

Gunderson Road is classified in the City of Sandy TSP Figure 5 as a minor arterial street. A minimum off 34 feet right of way dedication will ne required along the entire site frontage as per City of Sandy Development Code, chapter 17.84. This roadway will be extended in the future as the surrounding properties develop around this site.

A half improvement would be required on Gunderson Road to include 22 foot wide paved surface, curb cuts on one side, 5 foot planter strips and 6 foot wide sidewalks along the south plat boundary line as per the TSP. At the request of the City we have developed a layout to this site ...

Melissa Avenue is classified by the City of Sandy TSP figure 5 as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations.

We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case evacuation is needed...

The comments made by the developer's representative imply that the word "allude" in their report was a suggestion and not a requirement. As referenced in the appropriate code stated above, the Comprehensive Plan, TSP, and Sandy Development Code all incorporate the TSP by reference. SDC 17.84.50 refers to them as "minimum standards" and "accepted traffic engineering practices". If a development proposed an expected AADT of 1,100 it may be debatable, but the finding that the AADT with this development will be 2,490 - three times the 800 and 2.5 times the 1000 AADT threshold under accepted traffic engineering practices, as concluded by the City's Traffic Engineer, should leave no doubt that there is a definite need for the Gunderson connection and that the City Plans and Code language are sufficient to require it. Similarly, there are not specified pipe diameters for potential water and sewer needs in our Code, but the fact that we need adequate water and sewer systems are not questioned or allowed to be undersized and overloaded with proposed development.

The Condition for Approval as well as the finalized Development Agreement must require incorporation of Gunderson Road into the UGB as well as construction of Gunderson Road in order for Bailey Meadows development to be consistent with SDC 17.100.60 E and F:

E. Approval Criteria. The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.102 and the following approval criteria: ...

3. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy.(TSP).

4. Adequate public facilities are available or can be provided to serve the proposed subdivision.

5. All proposed improvements meet City standards.

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

F. Conditions. The Director or Planning Commission may require dedication of land and easements and may specify such conditions or modifications of the tentative plat as deemed necessary.

Gunderson Road must be constructed and Melissa Ave must be managed under SDC 17.100.100 to ensure that development provides safe options, and addresses

B 2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

To further refute the comments that the SDC does not contain objective standards in the City's Code, SDC 17.100.110 references specific drawings and incorporates by reference and summary statements, the TSP itself .

Again, while we appreciate the intent to move forward with Gunderson and we understand the complication of the parcel being outside the UGB, we want to be on the record with all the reasons and rationale for why existing City Code, TSP, and Comprehensive Plan call for the development to construct secondary access by way of Gunderson Road. We believe in order to meet all the While it may be appropriate for the City to pitch in some of the costs (to the extent the existing Nicholas Glen neighbors may use the Gunderson Road), the City and its taxpayers should not be required to shoulder the costs for a necessary arterial road that primarily benefits and allows development for the proposed Bailey Meadows subdivision.

We believe in "responsible growth", and that Bailey Meadows must meet SDC17.100.310: In order to do that, we must condition approval with the UGB expansion to feasably meet this code.

17.100.310 REQUIRED IMPROVEMENTS

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

... I. Streets

Needed Housing Exemptions:

The developer's blanket justification for Bailey Meadows not having to implement conditions they find onerous, and in their conclusion are "subjective", or could cause "unreasonable costs or delay" as stated in the 900 page report, appears to be House Bill 2001 including the premise that the statutes under "Needed Housing" apply to Bailey Meadows. The HB2001 revised housing rules 1) required that the City allow duplexes on single family zones - which is immaterial, as duplexes are not being proposed in Bailey Meadows. 2) It allows the City to consider (and does not prohibit) middle housing on these zones - again not proposed in this development. And then there are the developers frequent references that exceptions are warranted because the 100 almost half million dollar homes proposed in Bailey Meadows fall under the "Needed Housing" provision. A reading of the definition should clarify this.

2017 ORS 197.303' - "Needed housing" defined:

As used in ORS 197.307 (Effect of need for certain housing in urban growth areas), "needed housing" means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary at price ranges and rent levels that are affordable to households within the county with a variety of incomes, INCLUDING but not limited to households with low incomes, very low incomes and extremely low incomes, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a.

The key term is **INCLUDING** ...households with low incomes, to extremely low incomes. There are **NO** lots or homes **INCLUDED** in Bailey Meadows that are affordable to low, very low, or extremely low incomes. On the contrary, the developer has indicated that the homes will start at \$450,000 (almost half a million dollars!). The legislature defined needed housing with the intent to reduce barriers to provide housing for low to extremely low income people in need of housing. There is not a shortage of housing in the Sandy area for \$450k plus. These "Needed Housing" statutes are not a one size fits all loophole for developers wanting to build large, expensive single family lots and get a fast tracked development, where they either refuse to implement or put the costs of any onerous development conditions they find "subjective" or "unreasonable" on City taxpayers. The City's lawyer should come up with the same interpretation! Bailey Meadows does not come under any provisions of HB2001. At a minimum, if there is any part of the new state statutes that over ride, compromise, or eliminate our Comprehensive Plan, TSP, or Development Code, applicable under the Bailey Meadows proposal, those statutes should be outlined in the Findings of Fact section of the Staff Report and they were not. Similarly, other than general mentions of the ORS197.303 and 197.307 by the developer, there were no specifics of how the Bailey Meadows Subdivision meets the criteria under these statutes or how they override our code.

Park land dedication:

It is unclear what the proposal is currently. The initial application states they intend to pay a fee in lieu of park land dedication. A later filing mentions dedication of just over 2 acres of park land outside the proposed development and within the UGB. A preliminary assessment of this proposed land is that it is very wet. *SDC 17.86.20 (3) The parkland must be able to accommodate play structures, play fields, picnic areas, or other active park use facilities. The average slope of the active use parkland shall not exceed 15%.* It appears that drainage and possible grading would be necessary to meet this part of the code.

SDC 17.86.20 (1) Homes must front on the parkland as shown in the example below: If this dedication is instead of the fee, then the requirements that homes face the park would require a new Condition for Approval, or a Request for a Variance from the developer. If they do not want to request a variance, then there would need to either be a Condition for Approval to have the final plat show homes that face the park, or, the developer can pay the fee in lieu to meet the City's requirement and at the same time, donate land outside the UGB to the City outside the parkland dedication process. This last alternative was alluded as the intent by the developer's attorney at the hearing. Whatever the proposal is, it should be clearly documented and Conditions of Approval #12 should be edited to ensure the park land policies in 17.86 are met.

In conclusion, we believe the Development Agreement should be developed and approved by City Council prior to, or concurrently with, the Planning Commission approval to ensure that Gunderson is primarily paid for by the benefitting entity Bailey Meadows developers. The City needs to ensure that they can come up with their share with available funds and addition of Gunderson onto the SDC roads CIP. And finally, we need to ensure for the developers and the neighbors that Gunderson can in fact be built before the 31st home is built, given they plan to break ground this summer. We reiterate our belief and it is reflected in our record, that the new 2001 House Bill does not come into play with Bailey Meadows as it is neither duplexes or middle housing, nor does it meet "needed housing" intended for low incomes. We support the donation of park land within the UGB, while paying the fee in lieu to meet parkland dedication policies.

Again, we support the Developer and City finalizing the Development Agreement to construct Gunderson Road prior to build out of Bailey Meadows. Like Mr. Robinson, we raise all these points, rationale, and references to ensure they are on the record for the Planning Commission and in the case of appeal.



**Exhibit LLLLL**

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Letter of Concern Bailey Meadows Subdivision

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 11:03 AM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Gigi Duncan** <gigiduncanhome@gmail.com>

Date: Thu, Jan 30, 2020 at 10:46 AM

Subject: Letter of Concern Bailey Meadows Subdivision

To: <emeharg@cityofsandy.com>

I am writing to ask the Planning Commission to consider the following:

1) The Nicholas Glen neighborhood was allowed to be built with no park and only 1 access road. It is currently at the highest end of what is considered a "safe" level of traffic. Adding any additional traffic from the proposed subdivision will most certainly raise traffic to an unsafe level on Melissa Ave. We heard from Staff that the Commission would be in violation for not punching Melissa through to a new neighborhood but we ask the Planning Commission to weight the safety of our neighborhood vs the requirement to connect our already taxes road. We feel that safety of the citizens should always be the #1 factor in any decision of this kind.

Please do not run any additional traffic through our neighborhood. If you Must, please add a 4 way stop at the top of Rachael and Melissa and speed bumps down Melissa, although we believe this is still unsafe for us.

2) The UGB expansion and access from the proposed subdivision out to Hwy 211 must be a condition of approval. This will create a safe access for the citizens of the Bailey Meadows subdivision and a needed park. We feel that the park is imperative in keeping with the vision of the City of Sandy and the State of Oregon.

3) Please condition that there be a plan (approved by the city) for the excavation of Melissa Ave for the utility access by the proposed subdivision (regardless of new subdivision access onto Melissa), a timeframe and deadline, notification requirements of the residents, access plan for the residents and strict guidelines for improvements of Melissa after excavation.

Many of the citizens living in Nicholas Glen are concerned about our safety with the intrusion of another subdivision. We feel that the spirit and vision of our city are very much in line with the State of Oregon in desiring parks, green space and responsible growth. I think perhaps we could learn from the mistakes when creating our Nicholas Glen subdivision that we did not have a dedicated park and our street was not created to handle more traffic than our current subdivision has. I am hoping that the Planning Commission, our only line of defense, will recognize the need to protect our community but demanding the new subdivision have it's own access and not further tax our one street. With the new subdivision having it's own access, it's own park, and adequate roads for future growth extending to it's parameters, the City will be setting up the next few developments for success.

Thank you again for your time and we hope you hear us.

Sincerely,

Gigi Duncan
18275 Rachael Drive
Sandy OR 97055

1/30/2020

City of Sandy Mail - Fwd: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE



Exhibit M M M M M

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 2:55 PM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Melissa Reeb** <melissa.reeb@gmail.com>

Date: Thu, Jan 30, 2020 at 2:53 PM

Subject: Bailey Meadows Subdivision File No. 19-023 SUB/VAR/TREE

To: <emeharg@cityofsandy.com>

Cc: Brian ICE <crosswhb@yahoo.com>

Dear Mrs Meharg-

We are writing today about the proposed subdivision Bailey Meadows. After attending the meeting on 1/23/2020 we have some concerns and requests we'd like to share with you.

Our biggest concern is around safety. We are worried that the Urban Growth Boundary will not be approved, thus preventing the construction of Gunderson road and the proposed park. That the 100 houses will be built regardless whether or not the UGB is approved, and we'll end up with Melissa Ave as the only entrance and exit to our subdivision AND then to an additional 100 homes. Melissa Ave is already out of compliance with excessive traffic on our local road. Adding close to a thousand more daily trips is unacceptable and a disregard of public safety. OUR safety, OUR children's safety! We're not ok with this and don't believe that our city should be ok with this either.

We believe and plea that the developer should not be approved to start building until the UGB is approved, AND that their development plan is approved contingent upon the new park and Gunderson road being built as part of it's written plan.

Also please require them to include safety measures such as:

- 4 way stop at Melissa and Rachael
- Speed bumps on Melissa Ave
- Speed limit signs clearly posted on Melissa Ave
- Designated school bus stop on Rachael in a safe place for our children to load and unload.

As a mom of a toddler and a preschooler, living on Melissa Ave, I legitimately fear for our family's safety. Thank you so much for considering and acknowledging our concerns and requests regarding public safety, my children's safety, and the approval of this new development.

Melissa and Brian Crosswhite
Aubrianna and Austin Crosswhite

18298 Melissa Ave, Sandy, OR 97055

Exhibit NNNNN

Dear Planning Commission and City Planning Staff:

January 29th, 2020

I would like to submit the following points onto the Bailey Meadows record. I would ask that the elaboration of the rationale cited in K. Walker's written testimony submitted January 30th, be incorporated to my letter by reference for the purposes of any future appeals.

The Development Agreement referenced in the Conditions for Approval has not been drafted yet. There is no consensus on who is paying what, and when, to build Gunderson Road. It is not possible to clarify or confirm Conditions for Approval without this agreement completed at the time of Plan approval. It should be drafted and finalized prior to, or concurrently with, the Conditions for Approval for the proposed development in order to meet the terms under 2017 ORS 94.504 and be consistent with the development phasing required in SDC17.100.60 D.20 and the requirements in ORS 94.518.

While the developer has indicated a willingness to construct Gunderson Road as part of their development, they continue to go on the record as saying they do not believe they are required to, by law, based on vaguely referenced shortcomings in our Comprehensive Plan, Transportation System Plan, and Sandy Development Code and by House Bill 2001. I would like to incorporate by reference all three of those documents and specifically the Sandy Ordinance 2011-12 that adopted our TSP in 2011 making it an element and amendment to our Comprehensive Plan. SDC 17.10.30, 17.84, 17.100.60,

The Condition for Approval as well as the finalized Development Agreement must require incorporation of Gunderson Road into the UGB, as well as construction of Gunderson Road in order for Bailey Meadows development to be consistent with SDC 17.100.60 E and F and other sections of SDC 17.100.

There is no Finding of Fact that states how Bailey Meadows falls under any provisions of House Bill 2001 with no duplexes, or affordable housing for low to very low incomes. Therefore all the provisions in our City Code, TSP and Comprehensive Plan related to streets and traffic are in affect and are clear and objective standards to guide responsible development, as they have done for many years here in Sandy.

I support the developer's proposal to donate park land in the UGB and pay the fee in lieu of parkland dedication policies in SDC 17.86.

I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely, 

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JAN 30 2020

CITY OF SANDY

Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit OOOOO

Dear Planning Commission and City Planning Staff:

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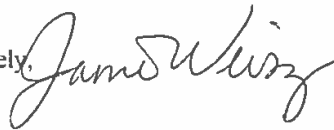
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I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely,



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CITY OF SANDY

Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

Exhibit P P P P P

Dear Planning Commission and City Planning Staff:

January 29th, 2020

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I support the developer's proposal to donate park land in the UGB and pay the fee in lieu of parkland dedication policies in SDC 17.86.

I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely,

 Erin Findlay

Email to:

emeharg@cityofsandy.com before Thursday, January 30th at 5pm.

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CITY OF SANDY

**Exhibit QQQQQ**

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 3:33 PM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **emilnamoon** <emilnamoon@gmail.com>

Date: Thu, Jan 30, 2020 at 3:20 PM

Subject: Bailey Meadows

To: <emeharg@cityofsandy.com>

Dear Ms. Meharg & Sandy Planning Commission members,

As a constituent & resident of the Nicholas Glen subdivision I am writing to express my continued concerns.

First, I am most concerned about the removal of the 3 trees on the Melissa St. Stub. The removal of those will expose the 4th tree, my next door neighbor's tree (the largest to the wind & any grading & utility work will damage its root system. It is unbelievable that the city of Sandy & the developers would fail to consider the risks of leaving such a hazard behind. If the tree were to fall on my house, or my neighbors I will make sure both parties are held accountable to the fullest extent possible.

Next, I continue to be concerned by the traffic study conducted by Mr. Mobley's engineering firm. The conflict of interest is undeniable and was especially disappointing to see one of our city's representatives recuse himself from the planning board and go sit in the seat that was saved to him by the developers. What! The lense is clearly fractured & the traffic study appears to be skewed in favor of the developer. I would like to request that the remaining members of the Planning Commission condition any approval of Bailey Meadows upon a new traffic study, done by a unbiased engineering firm.

The City of Sandy should be working to protect the CURRENT resident's safety & concerns. Not protecting themselves from threats of a developer with deep pockets.

Next, I will copy & paste more concerns that were eloquently stated by another resident of the City of Sandy & that I wholeheartedly agree with.

I would like to submit the following points onto the Bailey Meadows record. I would ask that the elaboration of the rationale cited in K. Walker's written testimony submitted January 30th, be incorporated to my letter by reference for the purposes of any future appeals.

The Development Agreement referenced in the Conditions for Approval has not been drafted yet. There is no consensus on who is paying what, and when, to build Gunderson Road. It is not possible to clarify or confirm Conditions for Approval without this agreement completed at the time of Plan approval. It should be drafted and finalized prior to, or concurrently with, the Conditions for Approval for the proposed development in order to meet the terms under 2017 ORS 94.504 and be consistent with the development phasing required in SDC17.100.60 D.20 and the requirements in ORS 94.518.

While the developer has indicated a willingness to construct Gunderson Road as part of their development, they continue to go on the record as saying they do not believe they are required to, by law, based on vaguely referenced shortcomings in our Comprehensive Plan, Transportation System Plan, and Sandy Development Code and by House Bill 2001. I would like to incorporate by reference all three of those documents and specifically the Sandy Ordinance 2011-12 that adopted our TSP in 2011 making it an element and amendment to our Comprehensive Plan. SDC 17.10.30, 17.84, 17.100.60,

1/30/2020

City of Sandy Mail - Fwd: Bailey Meadows

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I support the developer's proposal to donate park land in the UGB and pay the fee in lieu of parkland dedication policies in SDC 17.86.

I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Thank you for your time,

Emily Sheldon

Sent from my T-Mobile 4G LTE Device

Exhibit RRRRR

January, 30, 2020

Dear Planning Commission members and City staff:

We appreciate the appearance of cooperation from the developer to construct the necessary arterial (Gunderson Road) at the January 23rd meeting and the inclusion of some parkland within the UGB.

We are concerned about the lack of any specifics on the Development Agreement that is referenced in #49 and Condition #D3, especially the timing and the details on who pays what. Mr. Robinson alluded to the City paying part of the costs in his oral testimony, but no specifics were mentioned. The City has just committed to building out Bell Street to 362nd, so we are concerned that their budgets are tapped out. In addition, Gunderson Road is not currently in the UGB and is not on the CIP list that allows the City to use SDC's to help fund this share. While we can agree that a small portion of traffic from the existing Nicholas Glen may use the Gunderson Road, and therefore a cost share agreement may be appropriate, what if the City cannot come up with the funds? What is an equitable split? What if the UGB gets denied? How does the availability of City funds affect the 30th house condition? What are the assurances that we do not end up with 30 homes and then stall with no road? All these should be addressed in the Development Agreement.

Approval of a Type III land use development by the planning commission prior to the approval of a development agreement to share costs for construction of Gunderson Road to 211, which is integral to the intent of the Conditions for Approval violates the 2017 ORS 94.504, that states:

2) A development agreement shall specify:

- (a) The duration of the agreement;*
- (b) The permitted uses of the property;*
- (c) The density or intensity of use;*
- (d) The maximum height and size of proposed structures;*
- (e) Provisions for reservation or dedication of land for public purposes;*
- (f) A schedule of fees and charges;*
- (g) A schedule and procedure for compliance review;*
- (h) Responsibility for providing infrastructure and services;*
- (i) The effect on the agreement when changes in regional policy or federal or state law or rules render compliance with the agreement impossible, unlawful or inconsistent with such laws, rules or policy;*
- (j) Remedies available to the parties upon a breach of the agreement;*
- (k) The extent to which the agreement is assignable; and*
- (L) The effect on the applicability or implementation of the agreement when a city annexes all or part of the property subject to a development agreement.*

(3) A development agreement shall set forth all future discretionary approvals required for the development specified in the agreement and shall specify the conditions, terms, restrictions and requirements for those discretionary approvals.

(4) A development agreement shall also provide that construction shall be commenced within a specified period of time and that the entire project or any phase of the project be completed by a specified time.

(5) A development agreement shall contain a provision that makes all city or county obligations to expend moneys under the development agreement contingent upon future appropriations as part of the

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local budget process. The development agreement shall further provide that nothing in the agreement requires a city or county to appropriate any such moneys.

(6) A development agreement must state the assumptions underlying the agreement that relate to the ability of the city or county to serve the development. The development agreement must also specify the procedures to be followed when there is a change in circumstances that affects compliance with the agreement.

...(9) ORS [94.504 \(Development agreements\)](#) to [94.528 \(Recording\)](#) do not limit the authority of a city or county to take action pursuant to ORS [456.270 \(Definitions for ORS 456.270 to 456.295\)](#) to [456.295 \(Action affecting covenant\)](#). [1993 c.780 §1; 2005 c.315 §1; 2007 c.691 §7]

The Development Agreement should have been finalized prior to, or at least concurrent with, the land use decision. The land use decision cannot be made without final agreement of the items listed above to ensure that the proposed development (amended with the Development Agreement) meets development code and the Transportation System Plan as outlined in ORS 94.508: In addition the Development Agreement should be consistent with the development phasing required in SDC17.100.60 D.20.

(1) A development agreement shall not be approved by the governing body of a city or county unless the governing body finds that the agreement is consistent with local regulations then in place for the city or county.

(2) The governing body of a city or county shall approve a development agreement or amend a development agreement by adoption of an ordinance declaring approval or setting forth the amendments to the agreement. Notwithstanding ORS [197.015 \(Definitions for ORS chapters 195, 196, 197 and ORS 197A.300 to 197A.325\)](#) (10)(b), the approval or amendment of a development agreement is a land use decision under ORS chapter 197. [1993 c.780 §2; 2005 c.22 §74; 2007 c.354 §27]

17: Unless otherwise provided by the development agreement, the comprehensive plan, zoning ordinances and other rules and policies of the jurisdiction governing permitted uses of land, density and design applicable to the development of the property subject to a development agreement shall be the comprehensive plan and those ordinances, rules and policies of the jurisdiction in effect at the time of approval of the development agreement. [1993 c.780 §4]

We continue to be concerned about the developer's positions stated that street requirements are not adequately documented and therefore do not apply to this development. It is unclear, and no finding of fact is stated in the staff report that would indicate the Comprehensive Plan, Transportation System Plan and City Development Code are not adequate to apply as they have applied in many recent and past development proposals. One argument made was that the TSP was not adopted as an amendment to Sandy's Comprehensive Plan

The City of Sandy's 2011 Transportation System Plan (TSP) that involved some of you planning commission members and City Council members, is an element and amendment to the City's Comprehensive Plan. The City's TSP addresses development outside the UGB, including the proposed Gunderson Road. Following is the introduction to the City's TSP as well as pertinent parts of the Ordinance Adopting the TSP as an element and amendment to the City's Comprehensive Plan. I ask that the entire TSP, Adoption Ordinance and Exhibits be incorporated into the record by reference.

City of Sandy Transportation System Plan - Chapter 1 - 2011 Transportation Plan Introduction

The City of Sandy, in cooperation with the Oregon Department of Transportation (ODOT), has completed a thorough review of its transportation system with this update to the City Transportation System Plan (TSP). This TSP serves as the transportation element of the City of Sandy Comprehensive Land Use Plan, establishing a system of facilities and services to meet local transportation needs through the year 2029.

OAR 660 Division 12 (also referred to as the state Transportation Planning Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of their comprehensive plans. While cities with populations less than 10,000 may qualify for a whole or partial exemption from this requirement (Sandy's population was estimated at 9,570 as of the 2010 Census), the City of Sandy has chosen to undertake this planning effort because the plan will serve as a valuable resource for staff, policy makers, and the public. Having an adopted TSP establishes the function, capacity, and location of future transportation facilities, informs the community of the level of investment needed for facilities to support anticipated growth and development, and better positions the City to compete for scarce transportation funding. ...

ORDINANCE NO. 2011-12 - AN ORDINANCE ADOPTING A NEW TRANSPORTATION SYSTEM PLAN (TSP) TO ADDRESS THE REQUIREMENTS OF GOAL 12.

...WHEREAS, OAR 660 Division 12 (also referred to as the state Transportation Plan Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of comprehensive plans; and

WHEREAS, while this rule allows cities with populations less than 10,000 (Sandy's population is 9,655), a whole or partial exemption from these requirements, the City of Sandy has chosen to undertake this planning effort to establish a system of facilities and services to meet local transportation needs through the year 2029; ...

NOW, THEREFORE, THE CITY OF SANDY DOES ORDAIN AS FOLLOWS: Section 1. The Transportation System Plan for the City of Sandy dated December 2011 is hereby adopted, attached as Exhibit A and incorporated herein by reference. The information and data contained in Exhibit A supersedes any that exists to the contrary in the Transportation System Plan adopted by Ordinance No. 12-97 or its background documents. Section 2. The Transit Master Plan adopted by Ordinance No. 2009-02 is incorporated as an element of the new Transportation System Plan. Section 3. The adoption of the Transportation System Plan is supported by findings, attached hereto as Exhibit B and incorporated herein by reference.

There was also comments that the standards identified in the TSP were not spelled out in Development Code. See Section 17.10.30 Code Definitions where classifications are reiterated.

...B. Arterial Streets: These interconnect and support the arterial highway system and link major commercial, residential, industrial, and institutional areas.

C. Residential Minor Arterial: A hybrid between minor arterial and collector street which allows moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. Intended to provide some relief to the strained arterial system while ensuring a safe residential

environment. Paved width of 38 feet to 50 feet, minimum three-lane cross section, and may include on-street parking.

D. Collector Streets: These provide both access and circulation within residential neighborhoods and commercial/industrial areas.

E. Local Streets: The primary function is to provide access to immediately adjacent land. Service to through-traffic movement on local streets is discouraged

SDC Section 17.84 “provides general information regarding improvements required with residential, commercial, and industrial development. It is intended to clarify timing, extent, and standards for improvements required in conjunction with development. In addition to the standards in this chapter, additional standards for specific situations are contained in other chapters. “

The TSP and its standards are incorporated by reference in **Section 17.84.50 STREET REQUIREMENTS** and reference **accepted traffic engineering practices (clear and objective)** including:

- A. Traffic evaluations may be required of all development proposals in accordance with the following:*
- 1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.*
 - 2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.*

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:

- 1. Arterial streets should generally be spaced in one-mile intervals. ...*

C. Local streets shall be designed to discourage through traffic. NOTE: for the purposes of this section, “through traffic” means the traffic traveling through an area that does not have a local origination or destination. To discourage through traffic and excessive vehicle speeds the following street design characteristics shall be considered, as well as other designs intended to discourage traffic:

The TSP’s “Functional Classification Management Objectives” (page 17 of TSP) sets the standard for Local Streets like Melissa Avenue

Local Street

Local streets have the sole function of providing immediate access to adjacent land. These streets have a typical capacity between 800 and 1,000 ADT. Service to through traffic movements on local streets is deliberately discouraged by design.

Contrary to comments made to the Planning Commission by the Developers representative, the City’s Traffic Engineering Report did express concerns about this development related to traffic capacity, road conditions and safety on Melissa Avenue. Therefore, under the codes already mentioned, we need to

ensure that approval of the subdivision is based on UGB incorporation and completion of a feasible Development Agreement. Their Traffic Report Exhibit Y said:

Gunderson Road is classified in the City of Sandy TSP Figure 5 as a minor arterial street. A minimum off 34 feet right of way dedication will ne required along the entire site frontage as per City of Sandy Development Code, chapter 17.84. This roadway will be extended in the future as the surrounding properties develop around this site.

A half improvement would be required on Gunderson Road to include 22 foot wide paved surface, curb cuts on one side, 5 foot planter strips and 6 foot wide sidewalks along the south plat boundary line as per the TSP. At the request of the City we have developed a layout to this site ...

Melissa Avenue is classified by the City of Sandy TSP figure 5 as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations.

We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case evacuation is needed...

The comments made by the developer's representative imply that the word "allude" in their report was a suggestion and not a requirement. As referenced in the appropriate code stated above, the Comprehensive Plan, TSP, and Sandy Development Code all incorporate the TSP by reference. SDC 17.84.50 refers to them as "minimum standards" and "accepted traffic engineering practices". If a development proposed an expected AADT of 1,100 it may be debatable, but the finding that the AADT with this development will be 2,490 - three times the 800 and 2.5 times the 1000 AADT threshold under accepted traffic engineering practices, as concluded by the City's Traffic Engineer, should leave no doubt that there is a definite need for the Gunderson connection and that the City Plans and Code language are sufficient to require it. Similarly, there are not specified pipe diameters for potential water and sewer needs in our Code, but the fact that we need adequate water and sewer systems are not questioned or allowed to be undersized and overloaded with proposed development.

The Condition for Approval as well as the finalized Development Agreement must require incorporation of Gunderson Road into the UGB as well as construction of Gunderson Road in order for Bailey Meadows development to be consistent with SDC 17.100.60 E and F:

E. Approval Criteria. The Director or Planning Commission shall review the tentative plat for the subdivision based on the classification procedure (Type II or III) set forth in Section 17.102 and the following approval criteria: ...

3. The proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy. (TSP).

4. Adequate public facilities are available or can be provided to serve the proposed subdivision.

5. All proposed improvements meet City standards.

6. The phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops.

F. Conditions. The Director or Planning Commission may require dedication of land and easements and may specify such conditions or modifications of the tentative plat as deemed necessary.

Gunderson Road must be constructed and Melissa Ave must be managed under SDC 17.100.100 to ensure that development provides safe options, and addresses

B 2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

To further refute the comments that the SDC does not contain objective standards in the City's Code, SDC 17.100.110 references specific drawings and incorporates by reference and summary statements, the TSP itself .

Again, while we appreciate the intent to move forward with Gunderson and we understand the complication of the parcel being outside the UGB, we want to be on the record with all the reasons and rationale for why existing City Code, TSP, and Comprehensive Plan call for the development to construct secondary access by way of Gunderson Road. While it may be appropriate for the City to pitch in some of the costs (to the extent the existing Nicholas Glen neighbors may use the Gunderson Road), the City and its taxpayers should not be required to shoulder the majority of costs for a necessary arterial road that primarily benefits and allows development for the proposed Bailey Meadows subdivision.

We believe in "responsible growth", and that Bailey Meadows must meet SDC17.100.310: In order to do that, we must condition approval with the UGB expansion and complete the Development Plan concurrent with the Planning Commission decision to feasibly meet this code.

17.100.310 REQUIRED IMPROVEMENTS

The following improvements shall be installed at no expense to the city, consistent with the design standards of Chapter 17.84, except as otherwise provided in relation to oversizing.

... I. Streets

Needed Housing Exemptions:

The developer's blanket justification for Bailey Meadows not having to implement conditions they find onerous, and in their conclusion are "subjective", or could cause "unreasonable costs or delay" as stated in the 900 page report, appears to be House Bill 2001 including the premise that the statutes under "Needed Housing" apply to Bailey Meadows. The HB2001 revised housing rules 1) required that the City allow duplexes on single family zones - which is immaterial, as duplexes are not being proposed in Bailey Meadows. 2) It allows the City to consider (and does not prohibit) middle housing on these zones - again not proposed in this development. And then there are the developers frequent references that exceptions are warranted because the 100 almost half million dollar homes proposed in Bailey Meadows fall under the "Needed Housing" provision. A reading of the definition should clarify this.

2017 ORS 197.303¹ - "Needed housing" defined:

*As used in ORS [197.307](#) (Effect of need for certain housing in urban growth areas), "needed housing" means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary **at price ranges and rent levels that are affordable to households within the county with a variety of incomes, INCLUDING but not limited to households with low incomes, very low incomes and extremely low incomes**, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a.*

The key term is **INCLUDING** ..households with low incomes, to extremely low incomes. There are **NO** lots or homes **INCLUDED** in Bailey Meadows that are affordable to low, very low, or extremely low

incomes. On the contrary, the developer has indicated that the homes will start at \$450,000 (almost half a million dollars!). The legislature defined needed housing with the intent to reduce barriers to provide housing for low to extremely low income people in need of housing. There is not a shortage of housing in the Sandy area for \$450k plus. These "Needed Housing" statutes are not a one size fits all loophole for developers wanting to build large, expensive single family lots and get a fast tracked development, where they either refuse to implement or put the costs of any onerous development conditions they find "subjective" or "unreasonable" on City taxpayers. The City's lawyer should come up with the same interpretation! Bailey Meadows does not come under any provisions of HB2001. At a minimum, if there is any part of the new state statutes that over ride, compromise, or eliminate our Comprehensive Plan, TSP, or Development Code, applicable under the Bailey Meadows proposal, those statutes should be outlined in the Findings of Fact section of the Staff Report and they were not. Similarly, other than general mentions of the ORS197.303 and 197.307 by the developer, there were no specifics of how the Bailey Meadows Subdivision meets the criteria under these statutes or how they override our code.

Park land dedication:

It is unclear what the proposal is currently. The initial application states they intend to pay a fee in lieu of park land dedication. A later filing mentions dedication of just over 2 acres of park land outside the proposed development and within the UGB. A preliminary assessment of this proposed land is that it is very wet. *SDC 17.86.20 (3) The parkland must be able to accommodate play structures, play fields, picnic areas, or other active park use facilities. The average slope of the active use parkland shall not exceed 15%.* It appears that drainage and possible grading would be necessary to meet this part of the code.

SDC 17.86.20 (1) Homes must front on the parkland as shown in the example below: If this dedication is instead of the fee, then the requirements that homes face the park would require a new Condition for Approval, or a Request for a Variance from the developer. If they do not want to request a variance, then there would need to either be a Condition for Approval to have the final plat show homes that face the park, or, the developer can pay the fee in lieu to meet the City's requirement and at the same time, donate land outside the UGB to the City outside the parkland dedication process. This last alternative was alluded as the intent by the developer's attorney at the hearing. Whatever the proposal is, it should be clearly documented and Conditions of Approval #12 should be edited to ensure the park land policies in 17.86 are met.

In conclusion, the Development Agreement should be finalized and approved by City Council prior to, or concurrently with, the Planning Commission approval to ensure that Gunderson is primarily paid for by Bailey Meadows developers. We need to condition approval on UGB incorporation. We need to ensure the City has the available funds and add Gunderson onto the SDC roads CIP. Finally, we need to ensure for the developers and the neighbors that Gunderson can in fact be built before the 31st home is built, given they plan to break ground this summer. We reiterate our belief and it is reflected in our record, that the new 2001 House Bill does not come into play with Bailey Meadows as it is neither duplexes or middle housing, nor does it meet "needed housing" intended for low incomes. We support the donation of park land within the UGB, while paying the fee in lieu to meet parkland dedication policies.

Again, we support the Developer and City finalizing the Development Agreement to construct Gunderson Road prior to build out of Bailey Meadows. Like Mr. Robinson, we raise all these points, rationale, and references to ensure they are on the record for the Planning Commission, and in the case of appeal.

Kindest Regards,

Kathleen Walker

Exhibit SSSSS

From: Tim Sellin
18256 Melissa Avenue
Sandy, OR 97055

To: City of Sandy – Planning Commission
c/o Senior Planner – Emily Meharg

Continued Concerns for Bailey Meadows Subdivision

1. The Nicolas Glen neighborhood, of which I reside on Melissa Avenue [proper], was established and built with no park and only one access road. According to the given traffic studies, it's nearly maxed out on what is a safe level of traffic. The addition of the new subdivision would only INCREASE the amount of traffic flow, to what I'm sure is considered an UNSAFE level.

Possibly, instead of punching Melissa Avenue through to the new development, it can be an emergency access ONLY, of which a park could be the nucleus between the aged and new development? From the last town hall meeting, I understood that any future park would be placed directly against Highway 211. I believe this would be a mistake and placement between the two neighborhoods would be more prudent, safe and logistically possible.

Fellow neighbors have also suggested that at the very least the intersection of Melissa Avenue and Rachel Drive be a 4-Way stop with the employment of speed hump down the hill.

2. The Urban Growth Boundary expansion and access from the Bailey Meadows subdivision out to Highway 211 MUST BE A CONDITION OF APPROVAL. As it's written currently, I believe there to be a loophole, of which Melissa Avenue would still be the only access into Bailey Meadows... and that would be a CATASTROPHIC MISTAKE. Not only would this create a safer access for residents of the new neighborhood, the desired park that would inevitably be required would too have better access. We feel that establishing the park NOW would properly focus the vision of the City of Sandy and the State of Oregon, versus kicking the can further down the road.

It's also in my humble opinion, that Gunderson Road [the proposed name for new access to Highway 211], be made a PREREQUISITE to Bailey Meadows' approval. As such, it should be developed at the cost of the Builder, NOT paid for by our tax dollars.

3. The Nicolas Glen neighborhood would also like to request that there be a plan [reviewed and approved by the City] for the excavation of Melissa Avenue for the utility access proposed by the new subdivision. Timeframes, deadlines and a myriad of other logistics should be established BEFORE DEVELOPMENT for two main reasons:
 - a. The existing residents safe egress and timely egress into and out of the neighborhood.
 - b. The busses that pick-up students during the school year... year-long snow-route pickup at the bottom of the Melissa Avenue hill, intersecting Dubarko Road IS NOT AN OPTION.

Many of the citizens living in Nicolas Glen are concerned about safety with the intrusion of another subdivision. We feel that the spirit and vision of our City are very much in line with the State of Oregon in desiring parks, green space and responsible growth. As the only line of defense against irresponsible growth and development of future housing, I'd implore the Planning Commission to 'pump the brakes' on allowing ANY DEVELOPMENT to occur without Bailey Meadows having its OWN ACCESS off of Highway 211.

Thank you very much for your consideration,

A handwritten signature in black ink that reads "Tim Sellin". The signature is fluid and cursive, with the first name "Tim" and last name "Sellin" clearly legible.

Tim Sellin
9 year resident at 18256 Melissa Avenue
503.799.7195
tim.sellin@gmail.com

Exhibit TTTTT

Dear Planning Commission and City Planning Staff:

January 30th, 2020

I would like to submit the following points onto the Bailey Meadows record. I would ask that the elaboration of the rationale cited in K. Walker's written testimony submitted January 30th, be incorporated to my letter by reference for the purposes of any future appeals.

The Development Agreement referenced in the Conditions for Approval has not been drafted yet. There is no consensus on who is paying what, and when, to build Gunderson Road. It is not possible to clarify or confirm Conditions for Approval without this agreement completed at the time of Plan approval. It should be drafted and finalized prior to, or concurrently with, the Conditions for Approval for the proposed development in order to meet the terms under 2017 ORS 94.504 and be consistent with the development phasing required in SDC17.100.60 D.20 and the requirements in ORS 94.518.

While the developer has indicated a willingness to construct Gunderson Road as part of their development, they continue to go on the record as saying they do not believe they are required to, by law, based on vaguely referenced shortcomings in our Comprehensive Plan, Transportation System Plan, and Sandy Development Code and by House Bill 2001. I would like to incorporate by reference all three of those documents and specifically the Sandy Ordinance 2011-12 that adopted our TSP in 2011 making it an element and amendment to our Comprehensive Plan. SDC 17.10.30, 17.84, 17.100.60,

The Condition for Approval as well as the finalized Development Agreement must require incorporation of Gunderson Road into the UGB, as well as construction of Gunderson Road in order for Bailey Meadows development to be consistent with SDC 17.100.60 E and F and other sections of SDC 17.100.

There is no Finding of Fact that states how Bailey Meadows falls under any provisions of House Bill 2001 with no duplexes, or affordable housing for low to very low incomes. Therefore all the provisions in our City Code, TSP and Comprehensive Plan related to streets and traffic are in affect and are clear and objective standards to guide responsible development, as they have done for many years here in Sandy.

I support the developer's proposal to donate park land in the UGB and pay the fee in lieu of parkland dedication policies in SDC 17.86.

I appreciate the effort all parties have made to find compromise and ensure safe roads, secondary access to the development, and potential park land in the area.

Sincerely,

Richard Sheldon

1/31/2020

City of Sandy Mail - Fwd: Bailey Meadows



Exhibit UUUUU

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows

1 message

Kelly O'Neill Jr. <koneill@ci.sandy.or.us>

Thu, Jan 30, 2020 at 4:27 PM

To: Marisol Martinez <mmartinez@ci.sandy.or.us>, Emily Meharg <emeharg@ci.sandy.or.us>

Marisol - Another comment.

----- Forwarded message -----

From: **Laura Kvamme** <notellk@yahoo.com>

Date: Thu, Jan 30, 2020 at 4:01 PM

Subject: Bailey Meadows

To: koneill@ci.sandy.or.us <koneill@ci.sandy.or.us>

Laura Kvamme
37438 Rachael dr
Sandy OR 97055

To whom it may concern, After the last planning commission meeting I still have some concerns That I would like to have entered into the Bailey meadows development submission.

Drainage:

Currently the run off water drains to the South of my property line into the proposed Bailey Meadows. I am concerned that the builder may have to change the elevation of the land by raising it to allow for the water and sewer systems to work for the new house leaving surface water to drain on to my property.

Construction safety:

I understand that Melissa will have to be under construction because new sewer and water lines will have to be installed to handle increased usage by the new development. My concern is for the safety of myself and my neighbors should there be an emergency event. The access to our neighborhood will be severely restricted during the road construction phase. I am concerned that emergency vehicles won't be able to reach a neighbor in need because they can't make the tight turn or have to wait for a flagger to let them through when seconds count. Is it possible for the gundersen road extension to be put in 1st to mitigate this safety issue?

More staff hours required:

I know our city staff has done a remarkable job of sifting through the 6" 900 page document the developers submitted. I am sure the Bailey Meadows submission is not the only project that Emily and Kelly have to work on at this time. Is this the appropriate time to ask for more staff hours delegated to this process and the updating of our city building codes?

Thank you for your time and attention.

Sincerely Laura Kvamme

[Sent from Yahoo Mail on Android](#)

--

Kelly O'Neill Jr.
Development Services Director

City of Sandy
Development Services Department
[39250 Pioneer Blvd](#)
[Sandy, OR 97055](#)
(503) 489-2163
koneill@ci.sandy.or.us

<https://mail.google.com/mail/u/0?ik=256091e41c&view=pt&search=all&permthid=thread-f%3A1657201443088359970&simpl=msg-f%3A16572014430...> 1/1

**Exhibit VVVVV**

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey Meadows Concerns

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 5:05 PM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Nicole Green** <nic_mystic2005@yahoo.com>

Date: Thu, Jan 30, 2020 at 5:00 PM

Subject: Bailey Meadows Concerns

To: <emeharg@cityofsandy.com>

When we purchased our home in the Nicholas Glen neighborhood, many factors influenced our decision. First and foremost was the safety of our family, particularly that of our Autistic son. We are writing to plead with the Planning Commission to protect the safety of our neighborhood and to please consider the following:

1) The Nicholas Glen neighborhood was allowed to be built with no park and only 1 access road. It is currently at the highest end of what is considered a "safe" level of traffic. Adding any additional traffic from the proposed subdivision will most certainly raise traffic to unsafe levels
Please do not run any additional traffic through our neighborhood.

2) The UGB expansion and access from the proposed subdivision out to Hwy 211 must be a condition of approval. This will create a safe access for the citizens of the Bailey Meadows subdivision and a needed park. We feel that the park is imperative in keeping with the vision of the City of Sandy and the State of Oregon.

Many of the citizens living in Nicholas Glen are deeply concerned about our safety with the intrusion of another subdivision. Perhaps we could learn from the mistakes when creating our Nicholas Glen subdivision that we did not have a dedicated park and our street was not created to handle more traffic than our current subdivision has. We are hoping hoping that the Planning Commission, our only line of defense, will recognize the need to protect our community but demanding the new subdivision have it's own access and not further tax our one street. With the new subdivision having it's own access, it's own park, and adequate roads for future growth extending to it's parameters, the City will be setting up the next few developments for success.

Thank you again for your time and we hope you hear us.

Sincerely,

Martin and Nicole Van Wagner

Sent from my iPhone

1/31/2020

City of Sandy Mail - Fwd: Proposed Bailey Meadows Subdivision



Exhibit WWWW

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Proposed Bailey Meadows Subdivision

1 message

Emily Meharg <emeharg@ci.sandy.or.us>

Thu, Jan 30, 2020 at 5:03 PM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Guimar D.D.** <gddevaere@gmail.com>

Date: Thu, Jan 30, 2020 at 5:00 PM

Subject: Proposed Bailey Meadows Subdivision

To: <emeharg@cityofsandy.com>

City of sandy planning Commission,

I am writing yet another letter about the proposed Bailey Meadows subdivision. My family and I own a home in the Nicholas Glen neighborhood. We are worried about several issues surrounding the Bailey Meadows subdivision. First and foremost, we are very concerned about safety. Safety for the many children that have the freedom to play without worry of the traffic in our now safe neighborhood. Our neighborhood is the type of neighborhood you dream of. Still a safe place for our kids to play and socialize. This would be completely destroyed by the proposed changes.

The proposed subdivision will increase traffic tremendously. The city has already admitted that Melissa is already over the allotted amount of vehicle traffic. How can the city of Sandy ignore the traffic rules set forth by the DOT. Will there be traffic lights, speed bumps, or other safety features added to our single road? If so, who will pay for this? The developer of the new neighborhood, or the city/residents of Sandy? This would be very expensive, and can we really afford all the the extra expense of this new neighborhood?

We also have great concern about the UGB. If it is approved by ODOT who will be paying for the road into the UGB? Again, the developer, or the city/residents of Sandy? We would like the proposed neighborhood to not be approved unless the UGB is approved. This should be a priority since having only one road Melissa to go through both neighborhoods would be extremely unsafe.

Thank you,

Guimar DeVaere
18176 Rachael Dr.
Sandy OR 97055

APPLICANT SUBMITTAL



Exhibit XXXXX



January 29, 2019

City of Sandy Planning Commission
c/o: Kelly O'Neil Jr. - Development Services Director
City of Sandy
Development Services Department
39250 Pioneer Boulevard
Sandy, OR 97055

RE: CITY OF SANDY BAILEY MEADOWS SUBDIVISION (FILE NO. 19-023 SUB/VAR/TREE) FIRST OPEN RECORD PERIOD

Kelly,

This letter responds to written and verbal public testimony in the record regarding the Bailey Meadows Subdivision application.

Drainage

1. During the January 23, 2020 Planning Commission Hearing for Bailey Meadows Subdivision, public testimony was provided related to stormwater management for the project.

Response: Considered together, the Existing Conditions Plan, the Preliminary Grading & Erosion & Sediment Control Plan, and the Preliminary Composite Utility Plan illustrate that due to existing topography and the project's grading design, surface stormwater runoff will not be directed towards existing residential development to the north. Stormwater runoff is planned to be captured and routed through a system of underground pipes and conveyed to a vegetated stormwater management facility (in the lowest portion of the site) where it will be treated for water quality and detained per City of Sandy standards. From there, stormwater will continue to the west consistent with the historic direction of flow from the property.

Timing for Occupancy for the first 30 homes

2. Public testimony included questions regarding the following Condition of Approval listed in the Staff Report:

"E. Gunderson Road shall be constructed and accepted by the City prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval."

Response: The Bailey Meadows Subdivision application involves the creation of 100 lots for the future construction of new single-family detached homes. Upon approval of the UGB Amendment application, the construction of Gunderson Road is anticipated to take several months longer than the subdivision. A mechanism needs to be in place in order to allow home occupancy prior to completion of this off-site improvement.

BEND, OR | KEIZER, OR | TUALATIN, OR | VANCOUVER, WA
www.aks-eng.com

Sincerely,

AKS ENGINEERING & FORESTRY, LLC



Montgomery B. Hurley, PE, PLS - Principal
503-563-6151 | monty@aks-eng.com
12965 SW Herman Road, Suite 100
Tualatin, OR 97062



Response to Open Record Period Ending January 30, 2020
Bailey Meadows Subdivision

January 29, 2020
Page 2 of 2

January 30, 2020

Michael C. Robinson
Admitted in Oregon
T: 503-796-3756
C: 503-407-2578
mrobinson@schwabe.com

Mr. Jerry Crosby, Chair
City of Sandy Planning Commission
Sandy City Hall
39250 Pioneer Boulevard
Sandy, OR 97055

RE: City of Sandy File No. 19-203 SUB/VAR/TREE; Application by Allied Homes & Development (the "Applicant") for Approval of Bailey Meadows Tentative Subdivision Plan Application; Applicant's first open record period submittal

Dear Chair Crosby and Members of the Sandy Planning Commission:

This office represents the Applicant. This letter and its exhibits are the Applicant's first open record period submittal. This letter is timely submitted prior to the close of the first open record period on Thursday, January 30, 2020 at 5:00 p.m.

I have asked Mr. O'Neill to place a copy of this letter before you prior to your deliberation on February 11, 2020 and in the official Planning Department file for this Application.

1. Status.

The Sandy Planning Commission (the "Planning Commission") opened the public hearing on this tentative subdivision application on January 23, 2020 at 6:30 p.m. Chair Crosby read the announcements required by ORS 197.763(5) and explained the hearing process. Planning Director O'Neill provided the Staff Report. The Planning Commission took testimony from the Applicant and opponents of the Application. The Planning Director then provided a recap. The Sandy City Attorney also offered comments. Finally, the Applicant offered rebuttal to opposition testimony received by the Planning Commission.

At the request of the Applicant, the Planning Commission closed the public hearing but left the written record open pursuant to ORS 197.763(6)(a) for two seven-day periods. The first seven-day period allows for argument and evidence to be submitted by anyone and ends on January 30, 2020 at 5:00 p.m. The second seven-day period allows for argument and evidence rebutting first open record period submittals without new issues and ends on February 6, 2020 at 5:00 p.m. The Applicant waived final written argument under ORS 197.763(6)(e). The Applicant extended the 120-day period in ORS 227.178(1) by fourteen days.

2. Introduction.

This letter begins with three important concepts.

Mr. Jerry Crosby, Chair
January 30, 2020
Page 2

First, this Application is decided based on the approval criteria in effect on the date it was submitted. ORS 227.178(3). The approval criteria are subject to state law requirements, including statutes related to the Application status as a “limited land use decision,” as defined in ORS 197.015(12) (**Exhibit 1**) and ORS 197.195(1) (**Exhibit 2**), requiring that the City incorporate specific provisions of its Comprehensive Plan, including the Transportation System Plan (the “TSP”), in order to apply those standards to the tentative subdivision application. *Paterson v. City of Bend*, 49 Or LUBA 160, *aff’d in part, rev’d and rem’d on other grounds*, 201 Or App 344, 118 P3d 842 (2005); *Oster v. City of Silverton*, ___ Or LUBA ___ (LUBA No. 2018-103, May 8, 2019). The Application is also subject to the standards applying to residential development within Urban Growth Boundaries (the “UGB”) under ORS 197.303(1) (referred to in this letter as “Needed Housing,” ORS 197.307(4), ORS 197.522, and ORS 227.175(4)(e) (**Exhibits 3-6**)).

In applying the approval criteria to this Application, the Planning Commission is constrained by the fact that this Application is both a Limited Land Use Application and a Needed Housing Application and it may only apply provisions within the Sandy Development Code (the “SDC”) (the City’s acknowledged land use regulations) that are clear and objective. While the Applicant may choose to address all standards, the legal standard is that this application is subject to only clear and objective standards in the SDC.

Second, the Applicant has the legal burden of proof to show that the relevant approval criteria are satisfied by substantial evidence. Substantial evidence has been described by the Oregon Land Use Board of Appeals (“LUBA”) and the Oregon courts as evidence that a reasonable person would believe. As Planning Director O’Neill explained at the conclusion of the initial evidentiary hearing, the Applicant has satisfied all of the approval standards related to the tentative subdivision in the Single-Family Residential (“SFR”) zoning district applying to lot sizes, dimensional standards and other requirements for development of the tentative subdivision.

Finally, while the Applicant respects its neighbors and understands that they have an important role to play in the public hearing process, simply because there are a number of persons opposed to this Application does not mean that the Planning Commission must act on the Application because of opposition, any more than the fact that the Planning Commission must act on the Application because the Applicant wants it to approve the Application.

The Planning Commission’s decision is based on whether the Applicant has satisfied the relevant approval criteria as governed by state law with substantial evidence. If the Planning Commission applies this standard, it can find, based on the record before it, that the approval criteria have been satisfied by substantial evidence and can approve the Application.

3. Classification of Application.

This Application is both a “Limited Land Use” decision and a “Needed Housing” Application.

Mr. Jerry Crosby, Chair
January 30, 2020
Page 3

A. Limited Land Use Application.

A Limited Land Use application is defined in ORS 197.015(12) as including a land division within an Urban Growth Boundary (“UGB”). This Application concerns approval of a tentative subdivision inside the City’s UGB. Therefore, the Application qualifies as a Limited Land Use Application.

The importance of the Application’s qualification as a Limited Land Use Application is that, as explained above, only approval criteria in the SDC may be applied to the Application. ORS 197.195(1) requires, as explained in the *Paterson* and *Silverton* cases, that if cities want to apply provisions in their Comprehensive Plans, including their Transportation System Plans (the “TSP”), they must incorporate specific goals and policies from the Plans into their land use regulations. Otherwise, Plan goals and policies cannot apply to a Limited Land Use Application.

The SDC does not refer to the “Functional Classification Management Objectives” at TSP Chapter 3, Page 17 (**Exhibit 7**), which reference vehicle trip levels for Local Streets. Therefore, that section page of the TSP is not incorporated into the SDC. For example, SDC 17.100.70 refers to the “Street Design Standards” in the TSP but the Street Design Standards are found at TSP Page 18, not TSP Page 17. Additionally, SDC 17.100.110 refers to functional definitions of each street type as described in the TSP but does not incorporate that section nor does that TSP section include the average daily trip description found at TSP Page 17 but instead only describes the purpose of the local streets.

Because TSP Chapter 3, Page 17 is not expressly incorporated into the SDC, it may not be applied to this Application. Further, even if TSP Chapter 3, Page 17 were properly incorporated into the SDC, there is another reason that the City may not apply it. That is because the word “typical” is not mandatory (the TSP does not use the word “shall,” or otherwise mandate that local streets shall not carry more than 1,000 daily vehicle trips) and because the word “typical” is subjective and may not be applied to the Application because it is also a Needed Housing Application.

Because the Application is a Limited Land Use Application, the Planning Commission is limited to applying only the applicable provisions of the SDC. As explained below, those applicable provisions must also be clear and objective.

B. Needed Housing.

ORS 197.303(1), which uses the phrase “Needed Housing,” applies to all residential developments inside UGBs. This tentative subdivision application is inside the City’s UGB. ORS 197.303(1) (**Exhibit 3**) further describes Needed Housing as including all prices and rent levels for housing including, among other types of housing, detached single-family dwellings. This tentative subdivision application creates lots for single-family detached dwellings. The City of Sandy’s population exceeds the 2,500 population threshold for application of the Needed Housing Statutes. ORS 197.303(2). The City has not taken an exception to the Needed Housing Statutes under ORS 197.303(3).

Mr. Jerry Crosby, Chair
January 30, 2020
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Because this Application is subject to the Needed Housing Statutes, it is also subject to three other statutes. The first statute is ORS 197.307(4) (**Exhibit 4**). This statute provides that the City may apply only clear and objective conditions, standards and procedures to a Needed Housing application. This tentative subdivision application does not include a variance application nor is it a Planned Unit Development. Therefore, the Applicant has chosen the clear and objective path and the Planning Commission is limited to applying clear and objective standards, conditions and procedures to the Application. This Application is not disqualified from being treated as a Needed Housing application because it is not within a central city designation. ORS 197.307(5).

Taken together, these two statutes limit the discretion that the City may apply to this tentative subdivision application by requiring that only clear and objective approval standards, conditions and procedures contained in the SDC may be applied to the Application.

One other matter merits attention. Several of the neighbors were disappointed that the Applicant raised these statutes at the initial evidentiary hearing on January 23, 2020. As the Applicant explained that night, ORS 197.763(1) requires the Applicant to raise issues with enough specificity so that the public and the Planning Commission understands the issues. The Applicant had to raise these statutes, or otherwise would waive them and, more importantly, neither the public nor the Planning Commission would be properly aware of them. The Applicant has never threatened to sue the City but as the Planning Commission's announcements at the commencement of the initial evidentiary hearing stated, any person involved in the public hearing process must preserve issues in the event that someone appeals the City's final decision to the Oregon Land Use Board of Appeals ("LUBA"). Even if the Applicant is satisfied with the City's final decision on the Application, someone else could file an appeal to LUBA and the Applicant must have preserved the statutory provisions in order to raise them before LUBA.

As noted above, two other statutes are relevant because this Application is properly classified as a Needed Housing application. The first is ORS 197.522. This statute requires that in the event that the Planning Commission finds that the Application fails to satisfy an applicable SDC provision, it must give the Applicant an opportunity to either amend the Application or provide a condition of approval. In other words, in its final deliberation on the Application, if the Planning Commission were to come to a tentative decision that an approval criterion were not met, it should allow the Applicant the opportunity either at the hearing or in a subsequent open record period to amend the Application or propose a condition of approval. However, in this case, the substantial evidence before the Planning Commission demonstrates that the Applicant has satisfied all of the approval criteria, clear and objective or otherwise, that apply to this Application. Planning Director O'Neill made the same statement during the initial evidentiary hearing with respect to the SFR zoning district requirements for the tentative subdivision.

The second applicable statute is ORS 227.175(4). This statute also applies to Needed Housing applications.

4. Response to other issues raised at the initial evidentiary hearing.

A. Traffic.

The starting point for the traffic analysis is the Applicant's evidence in the form of a Traffic Impact Analysis ("TIA") from Lancaster Mobley. All of the evidence submitted by Lancaster Mobley demonstrates that the tentative subdivision application will satisfy relevant SDC standards, including SDC 17.84.50.A.2 and 17.100.100.B.

The City wisely asked not one but two consultants to review the TIAs. Both consultants, Curran-McLeod and John Replinger, concluded that the Applicant's TIA was properly prepared, was consistent with City standards and that its conclusions were appropriate and accurate. The result of this evidence is that the Planning Commission can find that additional vehicles trips from this Application, even if the UGB is not amended, are consistent with applicable SDC requirements.

The Curran-McLeod September 27, 2019 memorandum, the Staff Report to the Planning Commission and the John Replinger January 20, 2020 memorandum all refer to the TSP as "alluding" to a limitation on vehicle trips. The fact that none of these documents state that this TSP provision is a mandatory provision supports the conclusion that this TSP provision is, at best, a guideline and not a mandatory standard even if the issue of its application to a Limited Land Use Application and a Needed Housing Application could be resolved.

Exhibit 8 is a January 29, 2020 memorandum from Lancaster Mobley responding to issues raised at the public hearing. The memorandum also addresses street surface conditions in the adjacent subdivision and concludes that the street surface conditions are adequate. Even if the street conditions were not adequate, those conditions are a pre-existing condition and not the responsibility of the Applicant and may not be conditioned (nor is the City proposing to do so) to improve past deficiencies not caused by the Application.

Finally, the fact that the Application property is within the City and its UGB, demonstrates that it is appropriate for development. Had the City not wanted the property to develop, it could have excluded the property from the UGB or not have annexed the property to the City. However, having annexed the property, the City made a determination that the property was appropriate for development because it could be developed in the SFR zoning district with appropriate City services and facilities.

For these reasons, the Planning Commission can find that relevant SDC standards concerning traffic are satisfied.

B. Schools.

As Planning Director O'Neill stated, schools are not a relevant approval criterion in the SDC. **Exhibit 9** is ORS 195.110(13). This statute provides that school capacity may not be a basis for a decision on the Application unless three factors are present in the record. None of

Mr. Jerry Crosby, Chair
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Page 6

these factors are present in this record, so ORS 195.110(13) prohibits schools from being an approval consideration.

C. Boundary disputes.

As Planning Director O'Neill stated, boundary disputes due to encroachments on the tentative subdivision property are not a criterion for tentative subdivision approval. However, the Applicant wants the public and the Planning Commission to know that it intends to resolve these issues prior to recording the final plat. There are several ways to resolve these issues and it is this Applicant's intent to do its best to resolve the encroachment disputes in as friendly a way as possible.

D. Parks.

The Staff Report to the Planning Commission correctly concludes that a fee-in-lieu payment is appropriate instead of a park land dedication for this Application pursuant to SDC 17.86.10. However, in addition to that recommendation, with which the Applicant agrees, the Planning Commission should consider two other factors.

First, the Applicant is seeking to expand the UGB to provide park land dedication to the City greater than that what would be required under SDC 17.86.10. The Applicant understands the public's desire for a park and while it cannot provide that park land within its tentative subdivision, it is seeking to do so through the UGB expansion.

Second, SDC 17.86.40 providing the choice between a park land dedication and a fee-in-lieu, is subjective because it involves discretion. The application of this discretionary choice is prohibited by ORS 197.307(4).

E. Public services and facilities.

Curran-McLeod's memorandum concludes that all public services are adequate to serve the proposed tentative subdivision. The Applicant agrees with those conditions of approval recommended by the Planning Department to the Planning Commission concerning public services and facilities.

F. Connection of Melissa Drive to the proposed tentative subdivision.

Several persons asked the Planning Commission to prohibit a vehicular connection to the proposed tentative subdivision and the adjacent subdivision. As Planning Director O'Neill pointed out, such a condition would not conform to SDC 17.84.50.E and 17.100.100.F which requires street connectivity. This clear and objective SDC provision requires that the streets be connected.

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G. Conditions of approval.

The Applicant has discussed several minor modifications to the conditions of approval with the Planning Director. In general, these modifications clarify what might otherwise be ambiguous or subjective conditions. The Applicant reserves this issue for additional testimony in the second open record period.

5. Conclusion.

The Applicant appreciates all of the issues raised in this hearing but those issues must be related to approval criteria that the Planning Commission will consider in making its decision on the Application. As explained in this letter and the Applicant's testimony at the initial evidentiary hearing, those approval criteria are clear and objective approval criteria contained in the SDC.

For all of the reasons explained in the Applicant's oral and written testimony, the Applicant respectfully requests that the Planning Commission approve the Application with the recommended conditions of approval, as may be modified.

Very truly yours,



Michael C. Robinson

MCR:jmhi
Enclosures

cc: Mr. Cody Bjugan *(via email) (w/enclosures)*
Mr. Monty Hurley *(via email) (w/enclosures)*
Mr. Chris Goodell *(via email) (w/enclosures)*
Ms. Marie Holladay *(via email) (w/enclosures)*
Mr. Rand Waltz *(via email) (w/enclosures)*
Mr. Daniel Stumpf *(via email) (w/enclosures)*
Mr. Todd Mobley *(via email) (w/enclosures)*
Ms. Emily Meharg *(via email) (w/enclosures)*
Mr. David Doughman *(via email) (w/enclosures)*

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“Limited land use decision”:

(a) Means a final decision or determination made by a local government pertaining to a site within an urban growth boundary that concerns:

(A) The approval or denial of a tentative subdivision or partition plan, as described in ORS 92.040 (Application for approval of subdivision or partition) (1).

(B) The approval or denial of an application based on discretionary standards designed to regulate the physical characteristics of a use permitted outright, including but not limited to site review and design review.

(b) Does not mean a final decision made by a local government pertaining to a site within an urban growth boundary that concerns approval or denial of a final subdivision or partition plat or that determines whether a final subdivision or partition plat substantially conforms to the tentative subdivision or partition plan.

2017 ORS 197.195¹

Limited land use decision

- (1) A limited land use decision shall be consistent with applicable provisions of city or county comprehensive plans and land use regulations. Such a decision may include conditions authorized by law. Within two years of September 29, 1991, cities and counties shall incorporate all comprehensive plan standards applicable to limited land use decisions into their land use regulations. A decision to incorporate all, some, or none of the applicable comprehensive plan standards into land use regulations shall be undertaken as a post-acknowledgment amendment under ORS 197.610 (Submission of proposed comprehensive plan or land use regulation changes to Department of Land Conservation and Development) to 197.625 (Acknowledgment of comprehensive plan or land use regulation changes). If a city or county does not incorporate its comprehensive plan provisions into its land use regulations, the comprehensive plan provisions may not be used as a basis for a decision by the city or county or on appeal from that decision.

2017 ORS 197.303¹ needed housing defined



This section is amended
effective August 8, 2019

Chapter 639 Oregon Laws 2019 (HB 2001)

Relating to housing; creating new provisions; amending ORS 197.296, 197.303, 197.312 and 455.610 and section 1, chapter 47, Oregon Laws 2018; and declaring an emergency.



This section is amended
effective August 8, 2019

Chapter 640 Oregon Laws 2019 (HB 2003)

Relating to buildings; creating new provisions; amending ORS 197.296, 197.299, 197.303, 197.319, 197.320, 215.416, 215.441, 227.175, 227.500 and 455.062 and section 1, chapter 47, Oregon Laws 2018, and section 3, chapter 97, Oregon Laws 2019 (rolled Senate Bill 39); and declaring an emergency.

(1) As used in ORS 197.307 (effect of need for certain housing in urban growth areas), needed housing means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary at price ranges and rent levels that are affordable to households within the county with a variety of incomes, including but not limited to households with low incomes, very low incomes and extremely low incomes, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a. Needed housing includes the following housing types:

- (a)** Attached and detached single-family housing and multiple family housing for both owner and renter occupancy;
- (b)** Government assisted housing;
- (c)** Mobile home or manufactured dwelling parks as provided in ORS 197.475 (Policy) to 197.490 (Restriction on establishment of park);

Exhibit 3
Page 1 of 2

- (d) Manufactured homes on individual lots planned and zoned for single-family residential use that are in addition to lots within designated manufactured dwelling subdivisions; **and**
- (e) Housing for farmworkers.
- (2) Subsection (1)(a) and (d) of this section does not apply to:

 - (a) A city with a population of less than 2,500.
 - (b) A county with a population of less than 15,000.
- (3) A local government may take an exception under ORS 197.732 (Goal exceptions) to the definition of needed housing in subsection (1) of this section in the same manner that an exception may be taken under the goals. [1981 c.884 §6; 1983 c.795 §2; 1989 c.380 §1; 2011 c.354 §2; 2017 c.745 §4]

¹ Legislative Counsel Committee, *CHAPTER 197—Comprehensive Land Use Planning*, https://www.oregonlegislature.gov/bills_laws/ors/ors197.html (2017) (last accessed Mar. 30, 2018).

2017 ORS 197.307¹

Effect of need for certain housing in urban growth areas

- approval standards for residential development
- placement standards for approval of manufactured dwellings



This section is amended

effective October 1, 2019

Chapter 401 Oregon Laws 2019 (HB 2423)

Relating to small homes; creating new provisions; amending ORS 197.307, 446.003, 455.010, 455.135, 455.156 and 455.610; repealing ORS 455.615; and prescribing an effective date.

- (1) The availability of affordable, decent, safe and sanitary housing opportunities for persons of lower, middle and fixed income, including housing for farmworkers, is a matter of statewide concern.
- (2) Many persons of lower, middle and fixed income depend on government assisted housing as a source of affordable, decent, safe and sanitary housing.
- (3) When a need has been shown for housing within an urban growth boundary at particular price ranges and rent levels, needed housing shall be permitted in one or more zoning districts or in zones described by some comprehensive plans as overlay zones with sufficient buildable land to satisfy that need.
- (4) Except as provided in subsection (6) of this section, a local government may adopt and apply only clear and objective standards, conditions and procedures regulating the development of housing, including needed housing. The standards, conditions and procedures:
 - (a) May include, but are not limited to, one or more provisions regulating the density or height of a development.

Exhibit 4
Page 1 of 4

- (b) May not have the effect, either in themselves or cumulatively, of discouraging needed housing through unreasonable cost or delay.
- (5) The provisions of subsection (4) of this section do not apply to:
 - (a) An application or permit for residential development in an area identified in a formally adopted central city plan, or a regional center as defined by Metro, in a city with a population of 500,000 or more.
 - (b) An application or permit for residential development in historic areas designated for protection under a land use planning goal protecting historic areas.
- () In addition to an approval process for needed housing based on clear and objective standards, conditions and procedures as provided in subsection (4) of this section, a local government may adopt and apply an alternative approval process for applications and permits for residential development based on approval criteria regulating, in whole or in part, appearance or aesthetics that are not clear and objective if:
 - (a) The applicant retains the option of proceeding under the approval process that meets the requirements of subsection (4) of this section;
 - (b) The approval criteria for the alternative approval process comply with applicable statewide land use planning goals and rules; **and**
 - (c) The approval criteria for the alternative approval process authorize a density at or above the density level authorized in the zone under the approval process provided in subsection (4) of this section.
- (7) Subject to subsection (4) of this section, this section does not infringe on a local government's prerogative to:
 - (a) Set approval standards under which a particular housing type is permitted outright;
 - (b) Impose special conditions upon approval of a specific development proposal; **or**
 - (c) Establish approval procedures.
- () In accordance with subsection (4) of this section and ORS 197.314 (Required siting of manufactured homes), a jurisdiction may adopt any or all of the following

placement standards, or any less restrictive standard, for the approval of manufactured homes located outside mobile home parks:

- (a) The manufactured home shall be multisectional and enclose a space of not less than 1,000 square feet.
- (b) The manufactured home shall be placed on an excavated and back-filled foundation and enclosed at the perimeter such that the manufactured home is located not more than 12 inches above grade.
- (c) The manufactured home shall have a pitched roof, except that no standard shall require a slope of greater than a nominal three feet in height for each 12 feet in width.
- (d) The manufactured home shall have exterior siding and roofing which in color, material and appearance is similar to the exterior siding and roofing material commonly used on residential dwellings within the community or which is comparable to the predominant materials used on surrounding dwellings as determined by the local permit approval authority.
- (e) The manufactured home shall be certified by the manufacturer to have an exterior thermal envelope meeting performance standards which reduce levels equivalent to the performance standards required of single-family dwellings constructed under the state building code as defined in ORS 455.010 (Definitions for ORS chapter 455).
- () The manufactured home shall have a garage or carport constructed of like materials. A jurisdiction may require an attached or detached garage in lieu of a carport where such is consistent with the predominant construction of immediately surrounding dwellings.
- () In addition to the provisions in paragraphs (a) to (f) of this subsection, a city or county may subject a manufactured home and the lot upon which it is sited to any development standard, architectural requirement and minimum size requirement to which a conventional single-family residential dwelling on the same lot would be subject. [1981 c.884 §5; 1983 c.795 §3; 1989 c.380 §2; 1989 c.964 §6; 1993 c.184 §3; 1997 c.733 §2; 1999 c.357 §1; 2001 c.613 §2; 2011 c.354 §3; 2017 c.745 §5]

¹ Legislative Counsel Committee, *CHAPTER 197—Comprehensive Land Use Planning*, https://www.oregonlegislature.gov/bills_laws/ors/ors197.html (2017) (last accessed Mar.

30, 2018).

2017 ORS 197.522¹

Local government to approve subdivision partition or construction

• conditions

- (1)** As used in this section:
 - (a)** Needed housing has the meaning given that term in ORS 197.303 (Needed housing defined).
 - (b)** Partition has the meaning given that term in ORS 92.010 (Definitions for ORS 92.010 to 92.192).
 - (c)** Permit means a permit as defined in ORS 215.402 (Definitions for ORS 215.402 to 215.438 and 215.700 to 215.780) and a permit as defined in ORS 227.160 (Definitions for ORS 227.160 to 227.186).
 - (d)** Subdivision has the meaning given that term in ORS 92.010 (Definitions for ORS 92.010 to 92.192).
- (2)** A local government shall approve an application for a permit, authorization or other approval necessary for the subdivision or partitioning of, or construction on, any land for needed housing that is consistent with the comprehensive plan and applicable land use regulations.
- (3)** If an application is inconsistent with the comprehensive plan and applicable land use regulations, the local government, prior to making a final decision on the application, shall allow the applicant to offer an amendment or to propose conditions of approval that would make the application consistent with the plan and applicable regulations. If an applicant seeks to amend the application or propose conditions of approval:
 - (a)** A county may extend the time limitation under ORS 215.427 (Final action on permit or zone change application) for final action by the governing body of a county on an application for needed housing and may set forth a new time limitation for final action on the consideration of future amendments or proposals.

- (b)** A city may extend the time limitation under ORS 227.178 (Final action on certain applications required within 120 days) for final action by the governing body of a city on an application for needed housing and may set forth a new time limitation for final action on the consideration of future amendments or proposals.
- (4)** A local government shall deny an application that is inconsistent with the comprehensive plan and applicable land use regulations and that cannot be made consistent through amendments to the application or the imposition of reasonable conditions of approval. [1999 c.838 §4; 2015 c.374 §3]

Note: 197.522 (Local government to approve subdivision, partition or construction) was added to and made a part of ORS chapter 197 by legislative action but was not added to any smaller series therein. See Preface to Oregon Revised Statutes for further explanation.

¹ Legislative Counsel Committee, *CHAPTER 197—Comprehensive Land Use Planning*, https://www.oregonlegislature.gov/bills_laws/ors/ors197.html (2017) (last accessed Mar. 30, 2018).

- (a) A city may not approve an application unless the proposed development of land would be in compliance with the comprehensive plan for the city and other applicable land use regulation or ordinance provisions. The approval may include such conditions as are authorized by ORS 227.215 (Regulation of development) or any city legislation.
- (b) (A) A city may not deny an application for a housing development located within the urban growth boundary if the development complies with clear and objective standards, including but not limited to clear and objective design standards contained in the city comprehensive plan or land use regulations.
- (B) This paragraph does not apply to:
- (i) Applications or permits for residential development in areas described in ORS 197.307 (Effect of need for certain housing in urban growth areas) (5); or
- (ii) Applications or permits reviewed under an alternative approval process adopted under ORS 197.307 (Effect of need for certain housing in urban growth areas) (6).
- (c) A city may not reduce the density of an application for a housing development if:
- (A) The density applied for is at or below the authorized density level under the local land use regulations; and
- (B) At least 75 percent of the floor area applied for is reserved for housing.
- (d) A city may not reduce the height of an application for a housing development if:
- (A) The height applied for is at or below the authorized height level under the local land use regulations;
- (B) At least 75 percent of the floor area applied for is reserved for housing; and
- (C) Reducing the height has the effect of reducing the authorized density level under local land use regulations.
- (e) Notwithstanding paragraphs (c) and (d) of this subsection, a city may reduce the density or height of an application for a housing development if the reduction is necessary to resolve a health, safety or habitability issue or to comply with a protective measure adopted pursuant to a statewide land use planning goal.
- (f) As used in this subsection:
- (A) "Authorized density level" means the maximum number of lots or dwelling units or the maximum floor area ratio that is permitted under local land use regulations.

- (B) "Authorized height level" means the maximum height of a structure that is permitted under local land use regulations.
- (C) "Habitability" means being in compliance with the applicable provisions of the state building code under ORS chapter 455 and the rules adopted thereunder.

Functional Classification Management Objectives

Major Arterial

Major arterials are typically three to five-lane highways that operate as two-way streets or as a one-way couplet. These roads are intended to handle high volumes of traffic, typically 16,000 ADT (Average Daily Traffic) or more. Major arterials provide greater regional mobility, are managed to favor through traffic capacity and safety over direct access, and should generally be spaced approximately one mile apart. Private driveway access, on-street parking, and traffic calming measures are typically discouraged along major arterial routes and the provision of bike lanes or shoulders is required.

Minor Arterial

Minor arterials are high-volume, intra-city streets providing connectivity and parallel features and should generally be spaced approximately one mile apart. These roads have a typical capacity between 8,000 and 16,000 ADT. Minor arterials are generally the most critical classification for circulation in the urban areas of Sandy and are intended to serve longer local trips. Private driveway access is discouraged where access to facilities of lower classification is available and traffic calming measures and on-street parking should be avoided. The provision of bike lanes is required.

Residential Minor Arterial

Residential minor arterials are a hybrid between minor arterial and collector type streets that allows for moderate to high traffic volumes on streets where over 90% of the fronting lots are residential. These roads have similar typical capacity to minor arterials, 6,000 to 10,000 ADT. They are intended to provide some relief to the strained arterial system while ensuring a safe residential environment. Residential minor arterials may include on-street parking and traffic calming measures may be applied. Direct access to properties is managed in a manner similar to collector streets. The provision of bike lanes is required.

Collector

Collector streets provide both access and circulation within and between residential and commercial areas. These roads have a typical capacity between 2,000 and 6,000 ADT. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access (compared to arterials), and penetrate residential neighborhoods, distributing trips from the local street system to minor and major arterials. Collectors may provide on-street parking, may incorporate traffic calming measures, and should be spaced approximately one-half mile apart. Bike lanes are required on collectors.

Local Street

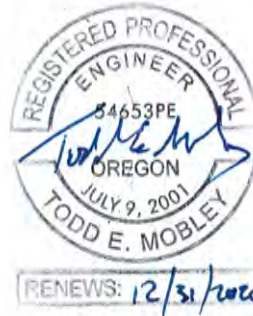
Local streets have the sole function of providing immediate access to adjacent land. These streets have a typical capacity between 800 and 1,000 ADT. Service to through traffic movements on local streets is deliberately discouraged by design. All other City streets in the City of Sandy that are not designated as arterial streets or collector streets are considered to be local streets. Local streets may allow on-street parking and may incorporate traffic calming measures. Bike lanes are not required.



321 SW 4th Ave., Suite 400
 Portland, OR 97204
 503.248.0313
 lancastermobley.com

Memorandum

To: City of Sandy Planning Commission
 Copy: Cody Bjugan, Allied Homes & Development
 From: Todd E. Mobley, PE
 Date: January 29, 2020
 Subject: 19-023 SUB/VAR/TREE Bailey Meadows Subdivision



Introduction

This memo is written to offer rebuttal to testimony received in writing and in person at the two Planning Commission hearings that have been held for the subject application.

Trip Generation

Multiple comments were received referring to the new trip impacts from the proposed subdivision, including some opinions that the homes in the Nicholas Glen subdivision generates more traffic than other neighborhoods. It is explained in detail on page five of the Transportation Impact Study (TIS)¹, but the traffic counts conducted on Melissa Avenue as part of the TIS show that trip rates from the existing neighborhood are on average 32 percent lower than the national average trip rates published in the Trip Generation Manual². Still, at the request of the City's contract traffic engineer and to provide a conservative, worst-case analysis, the trip rates from the manual, not the measured local trip rates, were used to estimate trips from Bailey Meadows. Accordingly, the traffic volumes and associated impacts from all of the transportation analyses in the record are likely overstated by approximately 32 percent.

Melissa Avenue Pavement Condition

There are many comments in the record regarding the condition of Melissa Avenue. This includes comments from the neighbors as well as Curran-McLeod³ (the contract City Engineer) as Exhibit Y of the Staff Report. It is noted in Exhibit Y that, "Currently, the street is in bad condition." and "The traffic volumes (sic) increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure." These statements were also addressed by AKS Engineering and Forestry⁴ prior to the January 23, 2020 hearing. There are two important notes regarding the pavement condition on Melissa Avenue:

1. Maintenance was performed on the entire length of Melissa Avenue in September 2019. Attached to this memo is a map provided by the City of Sandy Public Works Department indicating which streets in the City were to receive a slurry sealing treatment in early September of 2019. It is possible that Curran-

¹ Exhibits F, V, and X attached to the Staff Report from Lancaster Engineering (recently changed to Lancaster Mobley)

² Trip Generation Manual, 10th Edition, published in September 2017 by the Institute of Transportation Engineers.

³ Exhibit Y attached to the Staff Report. September 27, 2019 letter from Curran-McLeod, Inc.

⁴ Exhibit GGGG attached to the Staff Report. January 10, 2020 letter from Montgomery Hurley, PE, AKS Engineering & Forestry

McLeod's site visit was conducted prior to this application, but even then the street had received an application crack sealing and did not appear to be in bad condition.

2. It is our finding that the street has undergone appropriate maintenance by the City of Sandy since it was constructed in the late 1990's and like the local residential streets in other neighborhoods of similar vintage (Sandy Bluff, Cascadia Village, etc.), it is generally in good condition. The finding that additional traffic could cause "complete failure" is not substantiated or supported by evidence.

Traffic Control at Melissa Avenue and Rachael Drive

Many comments were also heard regarding concerns for safety and traffic speeds at this intersection after completion of Bailey Meadows and connection to the existing right-of-way stub. Currently there is a stop sign for southbound traffic approaching Rachael Drive, and since this is a "T" intersection, that signing is consistent with standard rules of the road. Multiple neighbors spoke in favor of installing a four-way stop at the intersection.

It is agreed that with the new south leg of the intersection, a stop sign should be installed on at least the new northbound leg of the intersection. Installation of additional signs to implement a four-way stop is at the discretion of the City and based on comments made by City Staff at the hearing, this treatment is already being considered.



DAY 3 - 09/06 - FRIDAY

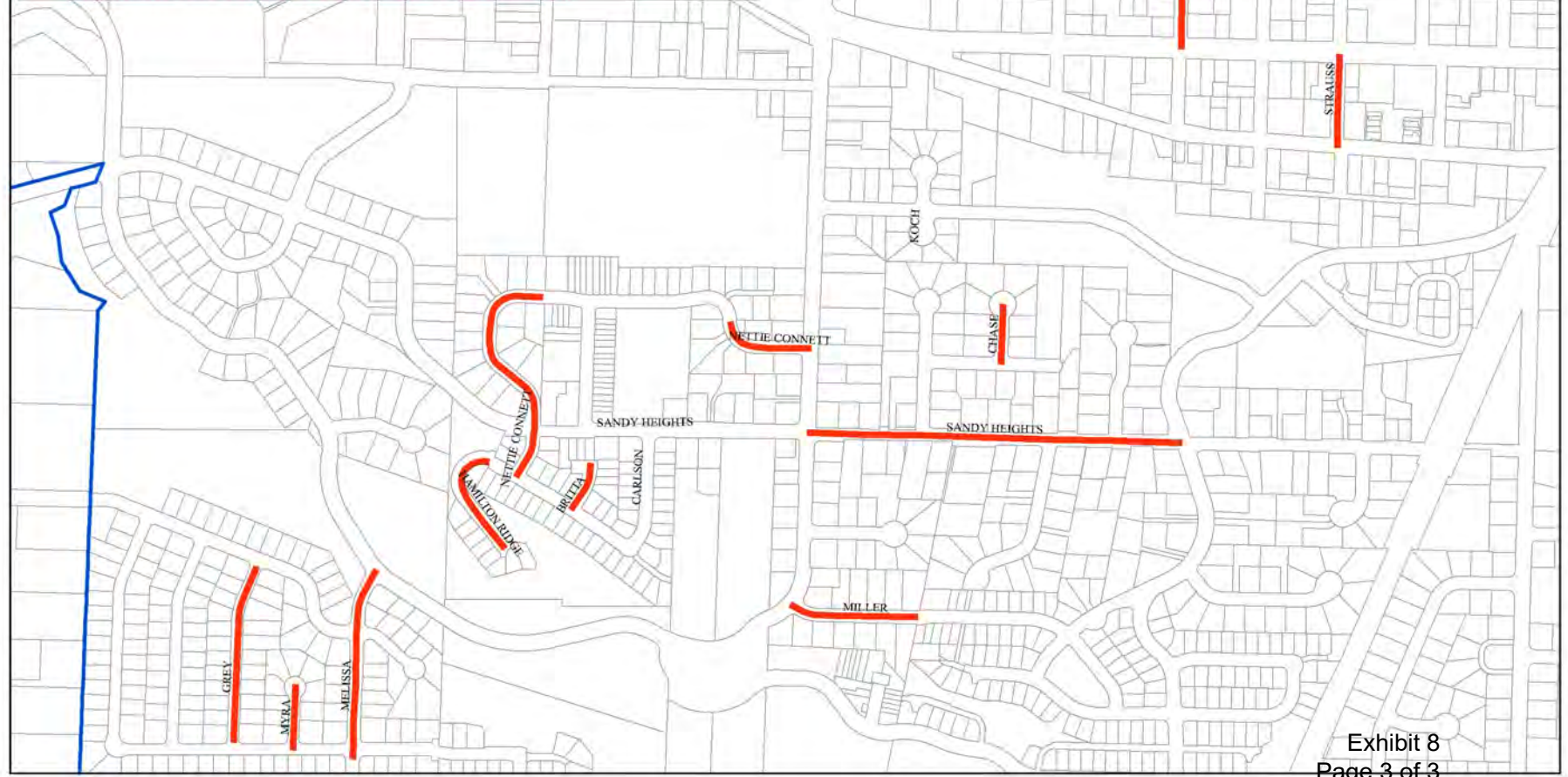
| STREET NAME | FROM | TO |
|----------------------|------------------------------|-----------------------------|
| HOOD ST | BEERS AVE | SCALES AVE |
| SCALES AVE | PROCTOR BLVD | PARK ST |
| STRAUSS AVE | PIONEER ST | PROCTOR BLVD |
| HAMILTON RIDGE DR | 99 FT W OF NETTIE CONNETT DR | 330 FT E N.C.(END OF CURVE) |
| HAMILTON RIDGE DR | 330 FT PAST NETTIE CONNETT | DEAD END |
| NETTIE CONNETT DR | SANDY HEIGHTS ST | 100'WEST OF BALKEN AVE |
| NETTIE CONNETT DR | HAMILTON RIDGE | SANDY HEIGHTS ST |
| NETTIE CONNETT DR | 38090 TRIMBLE LN | BLUFF RD |
| BRITTA CT | HAMILTON RIDGE | DEAD END |
| CHASE CT | BICKFORD ST | CUL-DE-SAC |
| MILLER RD | BLUFF RD | BARLOW RIDGE SUB |
| GREY AVE | RACHAEL DR | SOLSO DR |
| MYRA CT | RACHAEL DR | CUL-DE-SAC |
| HOOD ST *** | BLUFF RD | BEERS AVE |
| SANDY HEIGHTS ST *** | BLUFF RD | TUPPER RD |
| MELISSA AVE *** | DEAD END S OF RACHAEL DR | DUBARKO DR |

NOTE: HIGHLIGHTED STREETS ABOVE HAVE A WORK HOUR LIMITATION FROM 9/3/2019 - NO WORK TO BE PERFORMED BEFORE 8:30AM AND STREETS TO BE OPEN TO TRAFFIC BY 2:30PM (AND 1:30PM ON WEDNESDAYS)

**2019 Slurry Sealing
(September 6th)**

— September 6th

□ City Limits



(13) A city or county may deny an application for residential development based on a lack of school capacity if:

- (a) The issue is raised by the school district;
- (b) The lack of school capacity is based on a school facility plan formally adopted under this section; and
- (c) The city or county has considered options to address school capacity. [1993 c.550 §2; 1995 c.508 §1; 2001 c.876 §1; 2007 c.579 §1]

Memorandum From City Attorney's Office



MEMORANDUM

TO: Sandy Planning Commission
FROM: David Doughman, City Attorney's Office
SUBJECT: Bailey Meadows Subdivision
DATE: January 30, 2020



This memorandum responds to some of the legal issues discussed at the January 23, 2020 hearing before the Sandy Planning Commission (the "PC"). The focus is on arguments the applicant has made regarding the applicability of certain criteria in Title 17 of the Sandy Municipal Code (the "SMC" or "Code").

The applicant asserted that three statutes limit or prohibit the applicability of certain Code criteria. Those statutes are ORS 197.195, ORS 197.307(4) and ORS 197.522.

ORS 197.195 applies to "limited land use decisions," which are defined as follows:

"Limited land use decision":

(a) Means a final decision or determination made by a local government pertaining to a site within an urban growth boundary that concerns:

(A) The approval or denial of a tentative subdivision or partition plan, as described in ORS 92.040 (1).

(B) The approval or denial of an application based on discretionary standards designed to regulate the physical characteristics of a use permitted outright, including but not limited to site review and design review.¹

Subdivisions are a type of limited land use decision. ORS 197.195(1) requires limited land use decisions to be "consistent with applicable provisions of city or county comprehensive plans and land use regulations." However, the statute also requires applicable comprehensive plan standards to be incorporated into a code or into ordinances that implement a comprehensive plan. Under this statute, plan standards that are not incorporated may not be used as a basis for a decision on a limited land use application.

¹ ORS 197.015(12)

ORS 197.307(4) is commonly referred to as the “needed housing” statute, although recent legislative changes broaden its applicability to *all types* of housing applications.² It states that “a local government may adopt and apply only clear and objective standards, conditions and procedures regulating the development of housing, including needed housing.” As Kelly O’Neill correctly explained at the hearing, “needed housing” is broadly defined to include a wide variety of housing, not only “affordable” or “low-income” housing. It refers to housing that a city determines is needed to meet a 20-year demand for housing for a variety of incomes. Cities determine this need through a “housing need projection” in accordance with OAR Chapter 660, division 8. The term is specifically defined at ORS 197.303(1) as follows:

(1) As used in ORS 197.286 to 197.314, “needed housing” means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary at price ranges and rent levels that are affordable to households within the county with a variety of incomes, including but not limited to households with low incomes, very low incomes and extremely low incomes, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a. “Needed housing” includes the following housing types:

- (a) Attached and detached single-family housing and multiple family housing for both owner and renter occupancy;
- (b) Government assisted housing;
- (c) Mobile home or manufactured dwelling parks as provided in ORS 197.475 to 197.490;
- (d) Manufactured homes on individual lots planned and zoned for single-family residential use that are in addition to lots within designated manufactured dwelling subdivisions; and
- (e) Housing for farmworkers.

ORS 197.522 also relates to “needed housing” and subdivision applications. Subsections (2) through (4) of the statute read as follows:

(2) A local government shall approve an application for a permit, authorization or other approval necessary for the subdivision or partitioning of, or construction on, any land for needed housing that is consistent with the comprehensive plan and applicable land use regulations.

(3) If an application is inconsistent with the comprehensive plan and applicable land use regulations, the local government, prior to making a final decision on the application, shall allow the applicant to offer an amendment or to propose conditions of approval that would make the application consistent with the plan and applicable regulations. If an applicant seeks to amend the application or propose conditions of approval:

- (a) A county may extend the time limitation under ORS 215.427 for final action by the governing body of a county on an application for needed housing and may set forth a new time limitation for final action on the consideration of future amendments or proposals.

² See *Warren v. Washington County*, __ Or LUBA __ (LUBA No. 2018-089), *aff’d* 296 Or App 595, 439 P3d 581 (2019) (ORS 197.307(4) applies to all applications for housing, regardless of whether application concerns “needed housing” or whether development will occur on “buildable land”). The blank spaces that accompany the LUBA citation is intentional – LUBA has not assigned a report volume number to this case yet.

(b) A city may extend the time limitation under ORS 227.178 for final action by the governing body of a city on an application for needed housing and may set forth a new time limitation for final action on the consideration of future amendments or proposals.

(4) A local government shall deny an application that is inconsistent with the comprehensive plan and applicable land use regulations and that cannot be made consistent through amendments to the application or the imposition of reasonable conditions of approval.

Based on these statutes, the applicant asserts the city cannot apply certain Code criteria or certain standards in the city's transportation system plan ("TSP"), including:

- SMC 17.100.60(E)(3) ("proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy");
- SMC 17.100.60(E)(4) ([a]dequate public facilities are available or can be provided to serve the proposed subdivision"); and
- A standard in Chapter 3 of the TSP, which states that local streets "have a typical capacity between 800 and 1,000 ADT."³

The Land Use Board of Appeals ("LUBA") once quipped that "few tasks are *less* clear or *more* subjective than attempting to determine whether a particular land use approval criterion is clear and objective."⁴ Nevertheless, LUBA and the courts will generally find standards that require "subjective, value-laden analyses that are designed to balance or mitigate impacts of the development" to violate ORS 197.307(4).⁵ Examples have included:

- A criterion allowing a decision maker to impose conditions "if it is deemed necessary to mitigate any potential negative impact caused by the development".
- A criterion that requiring development to have a "minimal adverse impact on the livability, value and appropriate development" of other properties in a neighborhood.
- A standard requiring development to "minimize" possible conflicts between pedestrians and vehicles, "where necessary for traffic circulation."

I am not certain the above-referenced city standards are "clear and objective" for the purposes of ORS 197.307(4). Arguably, they do not trigger a "value-laden" analysis that requires the city to balance or mitigate impacts on the property or surrounding properties. On the other hand, like so many land use criteria, they contain words or phrases that are susceptible to different interpretations (e.g. "consistent with," "adequate," and "a typical capacity"). Based on recent legislation that seeks to increase the supply of housing,⁶ a conservative approach is to assume they would not be considered clear and objective.

³ "ADT" stands for average daily trips.

⁴ *Rogue Valley Association of Realtors v. City of Ashland*, 35 Or LUBA 139, 155 (1998) (emphasis in original).

⁵ *Id.* at 158.

⁶ Including HB 2001, which was discussed at the last hearing and was the subject of a recent PC work session, and the change to ORS 197.307(4), which subjects all housing applications to the "clear and objective" requirement, regardless of whether they qualify as "needed housing."

With respect to whether the city's ADT standard is incorporated into the Code, a recent LUBA case is informative. In a 2019 case, *Oster v. City of Silverton*,⁷ LUBA considered Silverton's denial of a subdivision application. The city denied the application after determining it did not comply with standards in Silverton's TSP related to traffic and "level-of-service" requirements for streets. Silverton found that its code incorporated the level-of-service standards through code provisions requiring compliance with all "applicable ordinances and regulations" and compliance with the city's design standards for streets.

LUBA disagreed and held that those code provisions did not state the "specific policies, action items, or performance standards" in the TSP that serve as approval criteria for limited land use decisions.⁸ LUBA ultimately reversed the city's denial, ordered approval of the application and awarded attorney fees to the applicant.⁹ SMC 18.84.50 specifically ties level-of-service standards in Sandy's TSP to applications for development, but the Code does not expressly refer to the TSP's ADT standards. Therefore, under *Oster*, the ADT standards in Sandy's TSP may not be adequately incorporated into the Code.

If the city were to find, for example, that public facilities are inadequate to serve the subdivision pursuant to SMC 17.100.60(E)(4), and deny the application, there is risk that the denial would be overturned and could result in LUBA ordering approval of the application. That would mean there would be no opportunity for a second access into the subdivision at this time, and presumably for the foreseeable future.

This possibility has resulted in the recommendation before the PC. It avoids the uncertainty, time and cost that accompany the litigation that is likely to follow if the city were to deny the application and it preserves the possibility that a second access would be provided while the subdivision is being built and that over two acres of parkland would be dedicated to the city.

⁷ Or LUBA __ (LUBA No. 2018-103). As above with the *Warren* case, LUBA has not assigned this case to a reporting volume yet.

⁸ A TSP is typically an element of a comprehensive plan, as was the case for Silverton and is the case for Sandy. ORS 197.195 seemingly prohibits local governments from directly applying comprehensive plan policies to applications that will result in limited land use decisions, requiring instead the adequate incorporation of applicable plan policies into a code. However, after giving an applicant the opportunity to propose conditions of approval, ORS 197.522 expressly requires a local government "to deny an application that is inconsistent *with the comprehensive plan* and applicable land use regulations and that cannot be made consistent through amendments to the application or the imposition of reasonable conditions of approval." In other words, a conflict appears to exist between ORS 197.522 and ORS 197.195 as to the applicability of comprehensive plan provisions to limited land use decisions. LUBA did not directly address ORS 197.522 in *Oster*, and I am not aware of another case that addresses it since the statute was substantially rewritten in 2015.

⁹ ORS 197.835(10)(b) requires LUBA to award attorney fees to an applicant if LUBA reverses a decision and orders the local government to approve an application.

OPEN RECORD PERIOD #2 FOR BAILEY MEADOWS

FILE NO. 19-023 SUB/VAR/TREE
JANUARY 31, 2020 - February 6, 2020 AT 5:00 P.M.



**PUBLIC TESTIMONY -
Open Record Period #2 (January 31, 2020 -
February 6, 2020 at 5:00 p.m.)**





Exhibit AAAAAA

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Baily Meadows testimony

2 messages

Emily Meharg <emeharg@ci.sandy.or.us>

Mon, Feb 3, 2020 at 1:23 PM

To: "Kelly O'Neill Jr." <koneill@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

----- Forwarded message -----

From: **Makoto Lane** <makotolane@yahoo.com>

Date: Mon, Feb 3, 2020 at 12:59 PM

Subject: Baily Meadows testimony

To: emeharg@cityofsandy.com <emeharg@cityofsandy.com>

Dear Planning Commissioners,

Baily Meadows has from the very beginning been a bad actor by threatening lawsuits against the city and its residents. They have continually proven themselves as predatory developers by consistently threatening litigation against Sandy. At community meetings and planning commission meetings they preface their presentations with this threat of litigation against our community.

I really hope that the loop holes they keep referring to and basing all their demands to develop without restriction and without conditions is being addressed and closed by the planning department, planning commission and city council. Cody might be the first developer to utilize these loopholes to exploit and extort the city of Sandy for his financial gain but he will not be the last.

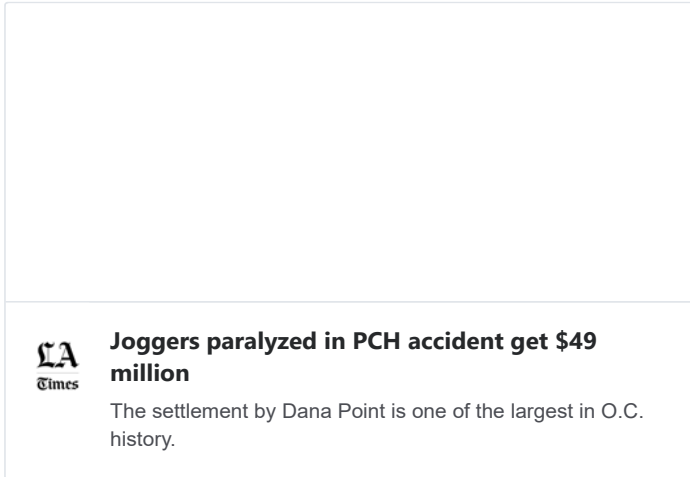
I urge you to call his bluff and hold off on any decisions until these loopholes are dealt with and closed. They can't sue the city for projected profit from undeveloped land they don't even own. At best they might sue for the amount spent on the Baily Meadows project which pails in comparison to their demanded infrastructure subsidies from Sandy, to pay for all of the 211 Hwy traffic intersection and road up to their subdivision. Make them pay for their own infrastructure and road. Do not make Sandy residence subsidize the developers bank accounts. This sets an expensive precedence.

There's also the issue of Sandy's liability per TSP road capacity compliance. Melissa Ave. is already over capacity by 200 car trips per day at approximately 1,200. If the city of Sandy approves more out of compliance traffic on a road which has been deemed over- capacity the city can be held liable as it has knowingly contributed to creating dangerous road conditions. There is no blanket of protection from liability the city can hide behind when it has knowingly created a dangerous road conditions. Attached is a very relevant example of the extreme liability a municipality takes on when they create dangerous road conditions for pedestrians. [Joggers paralyzed in PCH accident get \\$49 million](#)



Joggers paralyzed in PCH accident get \$49 million

The settlement by Dana Point is one of the largest in O.C. history.



Joggers paralyzed in PCH accident get \$49 million

The settlement by Dana Point is one of the largest in O.C. history.

There's also the issue of pedestrian access from Baily Meadows to the proposed park and Gunderson rd., 211 Hwy intersection to which this article is also relevant. Sandy City planner Kelly's proposal for Sandy to pay for a 24 ft. wide motor vehicle road from the intersection to the subdivision lacks pedestrian accommodation let alone ADA compliance.

According to Sandy City planner Kelly O'niell TSP stipulates "Through roads". I ask that you weigh the impacts and possibility of liability when determining which TSP regulation to break. I conservatively suggest keeping Melissa closed as the alternative has the possibility to be much worse with a much higher cost in safety, liability and possibly life.

If you have decided Melissa Ave. is turned into an arterial thoroughfare access point to the 211 Hwy please require conditional annual traffic studies to make sure there's adherence to the stated impact of approximately 233 additional car trips per day. If Melissa goes over the predicted amount require a condition that Melissa Ave will be returned to its former ending point of Rachael dr.

It is easy to predict how residents who reside around Sandy High School will access the 211 Hwy. Looking at the map of Sandy the Shortest fastest route to the 211 Hwy. for Bluff Rd. residents will be through Melissa Ave.

Makoto Lane
37828 Rachael Dr.
(808)631-1866

Kelly O'Neill Jr. <koneill@ci.sandy.or.us>

Mon, Feb 3, 2020 at 2:43 PM

To: "Robinson, Michael C." <MRobinson@schwabe.com>, Cody Bjugan <cody@investpdx.com>

Cc: David Doughman <David@gov-law.com>, Emily Meharg <emeharg@ci.sandy.or.us>, Marisol Martinez <mmartinez@ci.sandy.or.us>

Testimony for open records period #2.

[Quoted text hidden]

--

Kelly O'Neill Jr.
Development Services Director

City of Sandy
Development Services Department
[39250 Pioneer Blvd](#)
[Sandy, OR 97055](#)
(503) 489-2163
koneill@ci.sandy.or.us

BBBBBB

Dear Kelly and Planning Commission:

Feb. 6, 2020

We will not even bother trying to point out all the inaccurate and incomplete rationale that Mr. Robinson stated – where he continues to state the definition of needed housing is:

“needed housing” means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary..

Thereby truncating the rest of the sentence in the ORS defined term!

*..at price ranges and rent levels that are affordable to households within the county with a variety of incomes, **including** but not limited to households with low incomes, very low incomes and extremely low incomes, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a.*

To use his definition, then everything is needed including more half a million dollar homes! We legally question that the intent of needed and affordable housing is to meet that income level. We would also agree with Kelly, that “needed housing” can include housing for all types of income levels but first the development **MUST INCLUDE** (at least 1) housing for low, very low, and extremely low incomes before the other criteria apply.

We will first point out that there is a clear conflict of interest on the Planning Commission, that is not abated or mitigated by declaration of conflict and withdrawal. We would like to say that Planning Commissioner Mobley is assumed to be a fine, honest, hardworking, scrupulous businessman. However, when a planning commissioner routinely must withdraw from the City’s Planning Commission because of a conflict of interest, and in the case of Bailey Meadows, stepping down from the commissions dais and sitting next to the developer, it definitely has the appearance of a major conflict of interest. He is providing data and findings to the City and Planning Commission. His participation on the Planning Commission not only is tainted, as he surely has standing with his fellow members, but his part-time participation on the planning commission denies the ability of other Sandy residents to participate on the Planning Commission. He must withdraw from Bailey Meadows and many other City planning applications as he serves as their traffic engineer. Again, we do not wish to imply anything personally negative, but it does not pass the smell test. It has the appearances to City residents sitting in the audience weighing in on a proposed development and watching a planning commissioner step down and sit next to the developer to argue the developer’s position, as having the appearance of undue influence. We would hope that the City, Planning Commission and City Council take immediate action to correct this untoward appearance.

Responding to David Doughman’s last paragraph on page 1,

However, the statute also requires applicable comprehensive plan standards to be incorporated into a code or into ordinances that implement a comprehensive plan. Under this statute, plan standards that are not incorporated may not be used as a basis for a decision on a limited land use application.

To summarize and reiterate our testimony, the TSP, including the ADT standards, were incorporated into the code by ordinance (see TSP references, ordinance reference, etc. in earlier testimony.)

The stated reference that ORS 197.304 applies to all housing regardless of it being under needed housing as defined, implies that any “unreasonable cost” or interpretation that code language or City Plans for Transportation, Parks, etc. are not “clear and objective” in their opinion and therefore subject to avoidance, seriously puts every city in Oregon and every development without applicable rules and regulations for development. Many requirements for sanitation, safety, convenience, recreation, etc. are costly. However, these developers have obviously been able to implement Sandy’s regulations, code, TSP, Park and Trails Master Plan, etc. and still develop and still make money, hence Sandy being in the top five most fastest growing towns in Oregon. If the developer intends to take the City or its residents to LUBA because he feels our existing Code, Comp Plan, TSP, etc. are not “clear and objective” or stick him with “unreasonable cost or delay” then please let him. Our planning process has served all previous development proposals to meet the need for responsible growth. We would encourage them to bring it on and we are reaching out to LCDC, the Oregonian, our state legislatures, other City planning departments, and any other stakeholders to make this a statewide issue that puts every other City at risk.

The interpretation that our standards for traffic outlined in the TSP and the City Code that are based on standard engineering practice are not clear and objective is seriously flawed. We do not have “clear and objective code standards for when a 4” pipe is needed, rather than a 6” pipe. But there is clear and objective standards for providing the infrastructure to meet safe, standard engineering provisions. If our code must now say that a new street must be built when there are 805 cars on it rather than the capacity for local streets is 800 to 1000, then every plan every city has, must be tossed and rewritten with precise, exact, trigger points. I do not think that will serve developers well. I think they will then say that those trigger points (having a single number) are subjective and value laden. I think most plans intend to have a range of adequate conditions rather than one specific number. It is good for both City and developer to have a little flexibility. But if that is what it takes to be clear and objective, and I don’t think LUBA is of the same mind, then we must start this effort post haste!

The City code and Comp Plan adopted and incorporate the TSP. So for the City Code to require that development be “consistent with” standards and plans in the TSP is very clear and objective. The TSP outlines the standard capacity for the different streets and the location of arterials and collectors needed to be built to allow local streets to function as local streets (with standard engineering practice defined capacities of 800-1000 ADT). These standards are what have allowed us to develop neighborhoods like Sandy Bluff with the needed arterials of Jewelberry and Bell Street as opposed to dumping all of it on to the local Green Mountain street.

The examples in Mr. Doughman’s list are not even applicable here. He implies that the City is imposing conditions to mitigate any potential negative impact, when in fact, the City is applying clear and objective requirements that the development must have a water, sewer, and road/traffic system that meets the standard engineering practices as outlined and defined in the TSP and other City plans. The cost of these assets that directly serve the development should under City code, be paid for by the developer. To change infrastructure terms but use the same argument, if the developer insisted they did not need to build as large a sewer or water pipe as the City engineers determined was necessary, and the effect of that was to create backed up sewer pipes, or inadequate water flow, that is a clearly predictable negative impact. There are guidelines for pipe size based on population/units served and as long as the proposal is “consistent with” those engineering standards, the City approves it. The

transportation system is no different. Yes, 800 to 1000 ADT on a local street is a range, however, 2400 is clearly beyond standard acceptable range for a local street. That is not a subjective finding.

I would remind the City's lawyer that the State is seeking to develop more affordable housing, not 100 more homes costing almost a half million dollars. I would also state for the City Council's benefit, that the City's lawyer should (have been) be working with Sandy planners and other City's lawyers to quickly clarify, update, specify, pick nits, close loop holes, in our City code and City Plans to lock down the ability for us to require developers to pay for their development including the infrastructure needed to serve that development - no subjectivity, wiggle room, or interpretations allowed. I believe that most Oregonians accept growth as inevitable. It can obviously affect quality of life to have more people here, but to stick current residents with huge development needed road construction bills, while they build 100 half million dollar homes and skate, is unbelievable. We residents will be loud and widespread in our frustration with this developer's attempt to stick Sandy residents with a huge development needed road construction bill, while he collects all the home and lot sales profits.

Kathleen Walker and Nicholas Glen neighbors

2/7/2020

City of Sandy Mail - Fwd: Bailey meadows rebuttal



Exhibit CCCCCC

Marisol Martinez <mmartinez@ci.sandy.or.us>

Fwd: Bailey meadows rebuttal

Emily Meharg <emeharg@ci.sandy.or.us>
To: Marisol Martinez <mmartinez@ci.sandy.or.us>

Thu, Feb 6, 2020 at 4:59 PM

----- Forwarded message -----

From: **emilina moon** <emilina moon@gmail.com>
Date: Thu, Feb 6, 2020 at 4:58 PM
Subject: Bailey meadows rebuttal
To: <emeharg@cityofsandy.com>, <koneill@cityofsandy.com>

Good evening,

Once again, I apologize for my delayed response. At this time, I would like to refute the claims made by Mr. Mobley in his rebuttal letter. He mentions that Melissa Ave was maintained in September 2019. While this is true, I challenge all Planning Commission members including Mr. Mobley himself to travel Melissa Ave and see the terrible slurry seal that was applied. It was applied in sections in order to allow access to the neighborhood leaving it terribly bumpy and uneven...for that matter, in worse condition as before. While doing so, I challenge the planning commission to check out the grade of the road.

Secondly, I disagree with Mr. Robinson's letter regarding schools and would like to inform Mr. Robinson and remind my neighbors that the school district plans to put a bond on the ballot because our schools are incredibly over capacity and in disrepair. While the school district hasn't put anything on this record themselves it is a over growth problem to our infrastructure that should not be ignored.

Thank you,

Emily Sheldon

Sent from my T-Mobile 4G LTE Device

APPLICANT SUBMITTAL -

Open Record Period #2



February 6, 2020

Michael C. Robinson

Admitted in Oregon

T: 503-796-3756

C: 503-407-2578

mrobinson@schwabe.com

VIA E-MAIL

Mr. Jerry Crosby, Chair
City of Sandy Planning Commission
Sandy City Hall
39250 Pioneer Boulevard
Sandy, OR 97055

RE: City of Sandy File No. 19-203 SUB/VAR/TREE; Application by Allied Homes & Development (the "Applicant") for Approval of Bailey Meadows Tentative Subdivision Plan Application; Applicant's second open record period submittal

Dear Chair Crosby and Members of the Sandy Planning Commission:

This office represents the Applicant. This letter is the Applicant's submittal for the second open record period submittal ending on Thursday, February 6, 2020 at 5:00 p.m.

1. Revised conditions of approval.

The Sandy Planning Department (the "Planning Department") submitted revised conditions of approval to the Planning Commission (the "Planning Commission") (**Planning Commission Exhibit AAAAA**). The Applicant has reviewed the revised conditions of approval and agrees with those conditions of approval with one exception. The Applicant asks that the Planning Commission, should it choose to approve this Application, add the following condition of approval:

"In the event a Development Agreement is not entered into between the City and the Applicant, the Applicant is not obligated to construct Gunderson Road even in the event the Urban Growth Boundary amendment is approved."

The Applicant respectfully requests that the Planning Commission consider and add this condition because it is necessary to assure the Applicant that the cost of Gunderson Road is fairly shared with the City.

2. The proposed Development Agreement is not a statutory Development Agreement.

One of the letters submitted to the Planning Commission argued that the proposed development agreement fails to comply with ORS 94.504-94.528. However, ORS 94.504-94.528 governs only statutory land use Development Agreements. The proposed Development Agreement between the Applicant and the City is a non-statutory Development Agreement, which the City has home-rule authority to enter into. Thus, the provisions of ORS 94.504-94.528

Mr. Jerry Crosby, Chair
February 6, 2020
Page 2

are not applicable to the proposed Development Agreement. In any event, the Development Agreement is not an approval criterion for the Planning Commission to consider.

3. Needed Housing is not limited to affordable housing.

Several persons argued that the Needed Housing statutes apply only to affordable housing. This interpretation of the Needed Housing statutes are incorrect. The City Attorney's January 30, 2020 legal memorandum correctly explains the Needed Housing statutes. The use of the word "including" in ORS 197.303(1) means that affording housing is just one of the housing types, not the only housing type.

If the Planning Commission is concerned about the Needed Housing statutes' applicability, the Applicant submits the following documents demonstrating that, as required by ORS 197.303(1) for Needed Housing, it is housing "that is determined to meet the needs shown for housing within the County with a variety of incomes. . ." **Exhibit 1** to this letter is Sandy Comprehensive Plan (the "Plan") Goal 10, "Housing." Housing Policy 1 provides:

"Assure an adequate supply of developable land for low, medium, and high density housing to meet the twenty-year population projections."

Housing Policy 2 provides:

"Encourage the private sector to provide adequate housing choices, including affordable housing types."

The Plan indicates a desire to provide for property zoned housing meeting the City's obligation for a twenty-year housing supply and those zones should provide for "adequate housing choices" including affordable housing types. **Exhibit 2** is the "City of Sandy Urban Growth Boundary Expansion Analysis, Final Report," dated February 2017. The finding for Goal 10, "Housing," includes the finding that the 2015 acknowledged Urbanization Report "concluded the existing UGB did not contain sufficient residential land to meet the City's housing needs to 2034." Further, the finding states: "...the City changed approximately twenty-two acres of low density residential land into another zoning designation to meet an identified need and added approximately 318 acres of low density residential land. To meet the identified medium density residential need, the City changed the zoning designation on approximately twenty-two acres of land zoned in other designation meeting medium density residential. These changes satisfy the City's housing needs through 2034."

Finally, **Exhibit 3** is Ordinance No. 2015-01, "An Ordinance adopting an updated Urbanization Study to address the requirements of Goals 9, 10, and 14 of the Sandy Comprehensive Plan." The Ordinance contains Exhibit B which is the finding supporting the Ordinance. Exhibit B includes several findings on Goal 10, "Housing," including: "Goal 10 generally requires the City to provide an adequate number of housing units containing a mix of housing types and densities at price ranges and rent levels commensurate with financial capabilities with present and future residents of Sandy."

Mr. Jerry Crosby, Chair
February 6, 2020
Page 3

The Planning Commission can note that Statewide Planning Goal 10, “Housing,” repeats the requirements of the Needed Housing statutes (**Exhibit 4**).

Finally, the Exhibit B findings state:

“The Study finds that the City will require 575.7 net acres for housing during that time period. As such, the Study finds a deficit of land available in the UGB to meet the City’s residential needs to 2034. In order to meet the demand the Study identifies, the City will need an additional 234.4 net acres of residentially designated land.”

The Planning Commission can find that the City expanded its UGB to include the property that is the subject of this Application and eventually annexed the property. The City took these actions in order to meet its twenty-year housing supply which includes an obligation under Goal 10 to satisfy Needed Housing.

For these reasons, the City can find that this Application is subject to the Needed Housing statutes.

4. Oregon case law supports the Applicant’s argument regarding Limited Land Use applications and Needed Housing.

The Applicant has submitted evidence demonstrating that the Application is both a Limited Land Use application and a Needed Housing application. As explained in the Applicant’s first open record period submittal and its oral testimony at the January 23, 2020 initial evidentiary hearing, those two statutes collectively prohibit the City from applying the Transportation System Plan (the “TSP”) policies that are not expressly incorporated into the Sandy Development Code (the “SDC”), the City’s acknowledged land use regulations, and prohibit application of subjective terms in the SDC. As explained in the Applicant’s first open record period submittal, the TSP that some witnesses relied upon to set a limit on vehicle trips on Melissa Avenue is not incorporated into the City’s land use regulations and, even if it were, it uses subjective language.

The City Attorney’s legal memorandum (**Planning Commission Exhibit ZZZZZ**) accurately states relevant Oregon law. Both the Oregon Court of Appeals and the Oregon Land Use Board of Appeals have reversed or remanded local government decisions that improperly apply unincorporated provisions of a Plan, including TSPs, and subjective language to applications like this Application.

As the Applicant stated in its oral testimony and its first open record period submittal, while the Applicant recognizes its rights, it is working with the City to expand the UGB to provide for Gunderson Road to be extended to Oregon Highway 211. To that end, the Applicant hopes that most, if not all, of its neighbors, will understand if this Application is approved, will not appeal the decision to the Sandy City Council and will support the UGB amendment. This is the best outcome for everyone because it provides the road that is anticipated in the City’s TSP

and provides a second way in and out of the subdivision so that Melissa Avenue is not the only vehicular access to the subdivision.

5. Other issues raised in the first open record period.

A. Traffic issues.

a. Traffic reports.

Without repeating the argument and evidence previously submitted by the Applicant, the Applicant reminds the Planning Commission that the Applicant submitted a qualified traffic study demonstrating that the relevant SDC standards are met, the City's two peer-review studies did not dispute the Applicant's traffic study, there is no contrary traffic report and the Staff Report found the relevant SCD standards to be satisfied.

b. Through traffic.

SDC 17.84.50.C provides that "local streets shall be designed to discourage through traffic." This standard applies to street design and the recommended condition of approval for a stop sign is a design which will discourage through traffic. Additionally, SDC 17.84.50.C defines "through traffic" as "... the traffic traveling through an area that does not have a local origin or destination." This provision is not mandatory because it defines the language calling for through traffic to be discouraged, not prohibited. Second, the vehicle trips are those originating and ending in the two subdivisions. Finally, the words "discourage" and "designed" are subjective.

c. Traffic safety.

This subjective term is not a relevant clear and objective SDC approval standard.

d. TSP Chapter 1.

TSP Chapter 1 is not incorporated into SDC 17.100.60.E.3, one of the six approval standards for a tentative subdivision plan.

B. Goal Post Rule as applied to HB 2001.

ORS 227.178(3) is known as the "Goal Post Rule." The statute provides that the approval criteria for a Limited Land Use application are those in effect on the date that an application is submitted. HB 2001, a statute cited in testimony to the Planning Commission, was not effective on the date that this Application was submitted, so it does not apply to this Application.

Mr. Jerry Crosby, Chair
February 6, 2020
Page 5

C. Parks.

The choice between park land dedication and a fee-in-lieu payment in SDC 17.86.40 is subjective (it uses the phrase “at the City’s discretion”) and may not be applied to this Application. To the extent that the diagram in SDC 17.86.20 is relevant, Planning Director O’Neill told the Planning Commission on January 23, 2020 that the diagram “needed work” and inferred that it was subject.

6. Conclusion.

The Applicant fully appreciates the neighbors’ questions about how this new subdivision will affect them. The Applicant pledges do everything it can to minimize the disruption that change brings. But the property that will be the site for the new homes and their families in this new subdivision has long been planned for this residential use and is in the City because the land was needed to meet the City’s housing needs. The Application meets the relevant approval criteria and the recommended conditions of approval are feasible to be achieved. The approval criteria are limited by the state laws that govern this kind of application.

The Applicant asks that the Planning Commission follow the Planning Department’s recommendation and approve the Application with the recommended conditions of approval.

Very truly yours,



Michael C. Robinson

MCR:jmhi
Enclosures

- cc: Mr. Cody Bjugan *(via email) (w/enclosures)*
Mr. Monty Hurley *(via email) (w/enclosures)*
Mr. Chris Goodell *(via email) (w/enclosures)*
Ms. Marie Holladay *(via email) (w/enclosures)*
Mr. Rand Waltz *(via email) (w/enclosures)*
Mr. Daniel Stumpf *(via email) (w/enclosures)*
Mr. Todd Mobley *(via email) (w/enclosures)*
Ms. Emily Meharg *(via email) (w/enclosures)*
Mr. David Doughman *(via email) (w/enclosures)*

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Goal 10 Housing

This goal is to establish policies to provide for housing needs of the state.

- ① Assure an adequate supply of developable land for low, medium, and high density housing to meet the 20-year population projections.
- ② Encourage the private sector to provide adequate housing choices, including affordable housing types.
3. Encourage innovations in construction, funding, regulation, and siting of housing in order to provide well designed and energy efficient housing.
4. Cooperate and coordinate with the Clackamas County Housing Authority and with the FHA in their efforts to construct low income housing.
5. Make information available on current programs and techniques of construction and housing rehabilitation which will enhance the quality of housing in Sandy.
6. Provide for a balance between the growth in job opportunities and the growth in housing opportunities.

Residential Districts

7. Provide for distinct mixed use villages separate from the central core of the city. Villages are to be developed around a commercial center or other focal point.
8. Residential densities shall generally decrease with distance from village centers.
9. Assure that residential densities are appropriately related to site conditions, including slopes, potential hazards, and natural features.
10. Link housing density and location to reduce automobile travel by locating higher density housing near village centers, schools, and potential transit routes.



City of Sandy
**URBAN GROWTH BOUNDARY
EXPANSION ANALYSIS**

Prepared by the City of Sandy
Planning Department

Final Report

February 2017

*Adopted: February 6, 2017
Ordinances: 2017-01 and 2017-02*

Exhibit 2
Page 1 of 2

acknowledged EOA, the City has added approximately 38 acres of commercial land to its UGB and changed the zoning on approximately 18 acres to commercial zoning to satisfy its employment land needs through 2034. In addition, the Council relies on the study and findings contained in the Analysis to conclude that Goal 9 is satisfied.

10. Goal 10 – Housing. The 2015 acknowledged Urbanization Report included an analysis and update of the City’s comprehensive plan with respect to Goal 10 and concluded the existing UGB did not contain sufficient residential lands to meet the City’s housing needs to 2034. Specifically, the Urbanization Report contains a buildable lands inventory (“BLI”) and a housing needs projection (“HNP”), both of which follow the methodologies required by ORS 197.296, Goal 10 and OAR Chapter 660, division 8. Based on the acknowledged BLI and HNP, the City changed approximately 22 acres of low density residential land to another zoning designation to meet an identified need and added approximately 318 acres of low density residential land. To meet the identified medium density residential need, the City changed the zoning on approximately 22 acres of land zoned another designation to medium density residential. These changes satisfy the City’s housing needs through 2034. In addition, the Council relies on the study and findings contained in the Analysis to conclude that Goal 10 is satisfied.
11. Goal 11 – Public Facilities. The City’s Comprehensive Plan with respect to Goal 11, its public facility plan and its standards governing public facilities in its development code are not affected by the decision. The City’s comprehensive plan contains an acknowledged Goal 11 element that contains policies to ensure sufficient and adequate public services are available (or will be available as appropriate) to serve lands within the UGB. The Analysis prioritizes the serviceability of lands and discusses on a parcel-by-parcel basis which lands will be the easiest, least costly and least environmentally harmful to serve with public facilities. For these reasons and based upon the study and findings contained in the Analysis, the Council finds Goal 11 is satisfied.
12. Goal 12 – Transportation. For the lands that the City will bring into the UGB, the City’s Comprehensive Plan with respect to Goal 12, its transportation system plan and its standards governing transportation and transportation-related facilities are not affected by this decision. The City’s comprehensive plan has an acknowledged Goal 12 element that contains policies to ensure sufficient and adequate transportation facilities and services are available (or will be available as appropriate) to serve lands within the UGB. The City adopted a new transportation system plan in accordance with OAR Chapter 660, division 12 in December of 2011. That plan is now deemed acknowledged in accordance with state law. In addition, OAR 660-024-0020(1)(d) expressly does not require the City to conduct an analysis pursuant to the transportation planning rule (“TPR”) prior to adding lands to expand the UGB. This is because the lands that are being added to the UGB will retain their existing county zoning until the owners of the lands choose to annex into the City. At that time, the City will conduct a TPR analysis relative to those lands.

ORDINANCE NO. 2015-01

AN ORDINANCE ADOPTING AN UPDATED URBANIZATION STUDY TO ADDRESS THE REQUIREMENTS OF GOALS 9, 10, AND 14 OF THE SANDY COMPREHENSIVE PLAN.

WHEREAS, on February 18, 2009 the Sandy City Council adopted Ordinance No. 2008-11, an updated Urbanization Study for the city; and

WHEREAS, on April 25, 2013, the Clackamas County Board of Commissioners passed ZDO-242 adopting a coordinated population forecast for rural cities in Clackamas County containing an annual population growth rate higher for the city of Sandy than assumed in the previously adopted, 2009 Urbanization Study; and

WHEREAS, the Sandy City Council desires to update its Urbanization Study ("Study") for residential and employment lands to determine if there is sufficient land in the existing Urban Growth Boundary to accommodate projected growth for the next 20 years; and

WHEREAS, City of Sandy planning and public works staff in consultation with the Department of Land Conservation and Development (DLCD) developed an updated Study per applicable state rules for the planning period 2014-2034; and

WHEREAS, the City of Sandy sent the draft Study to the Department of Land Conservation and Development (DLCD) on October 15, 2014 in anticipation of public hearings before the Planning Commission and City Council; and

WHEREAS, the Planning Commission held a public hearing to review the Study on November 24, 2014 and forwarded a recommendation to the City Council to adopt the Study; and

WHEREAS, the City Council held a public hearing to review the Urbanization Study on February 2, 2015 and adopted the first reading of this Ordinance; and

WHEREAS, the City Council also adopted the second reading of this Ordinance on February 2, 2015.

NOW, THEREFORE, THE CITY OF SANDY DOES ORDAIN AS FOLLOWS:

Section 1. The Sandy Comprehensive Plan is hereby amended by adopting as a background document an updated Urbanization Study dated January 2015, attached as Exhibit A and incorporated herein by reference. The information and data contained in the Urbanization Study supersedes any that exists to the contrary in the Comprehensive Plan or its background documents including the most recent study adopted by Ordinance 2008-11 in 2009.


Section 2. These amendments to the Sandy Comprehensive Plan are supported by findings, attached hereto as Exhibit B and incorporated herein by reference.

**THIS ORDINANCE ADOPTED BY THE COMMON COUNCIL AND
APPROVED BY THE MAYOR THIS 2nd DAY OF FEBRUARY, 2015.**



William King
MAYOR

ATTEST:



Lisa Young
City Recorder

EXHIBIT B
ORDINANCE NO. 2015-01

1. Goal 1 – Citizen Involvement. The City held a public workshop and two public hearings prior to adopting the Urbanization Study. One public hearing was held on November 24, 2014 before the Planning Commission and another public hearing was held before the City Council on February 2, 2015. All workshops and public hearings were duly noticed in accordance with state law and the City’s development code. Goal 1 is satisfied.

2. Goal 2 – Land Use Planning. With respect to the Study and its related amendments, Goal 2 requires that the City’s decision be coordinated with other governmental entities and be supported by an adequate factual base. The Study and the updated population forecast it contains were adopted in coordination with Clackamas County pursuant to ORS 195.034 and OAR 660-024-0030(4). The Clackamas County Board of Commissioners adopted a coordinated population forecast on April 25, 2013 by passing Ordinance ZDO-242. The county’s projection is included as Appendix A to the Study.

The decision is supported by an adequate factual base as demonstrated in the record, the Study and these findings. An “adequate factual base” requires that substantial evidence exist in the entire record to support the decision – that is, evidence that reasonable persons would rely on in making day-to-day decisions. *1000 Friends of Oregon v. City of North Plains*, 27 Or LUBA 372 (1994). The evidence relied upon by the Council in making the decision was collected by city of Sandy staff, in accordance with procedures and practices formulated and endorsed by the Department of Land Conservation and Development (“DLCDC”). Goal 2 is satisfied.

3. Goal 3 – Agricultural Lands. Goal 3 is not applicable to the decision.

4. Goal 4 – Forest Lands. Goal 4 is not applicable to the decision.

5. Goal 5 – Natural Resources. Goal 5 is not applicable to the decision. The decision does not affect a Goal 5 resource under OAR 660-023-0250(3).

6. Goal 6 – Air Water and Land Quality. The City’s Comprehensive Plan with respect to Goal 6 and its development regulations governing land, air and water quality are not affected by the decision. Goal 6 is satisfied to the extent is it applicable to the decision.

7. Goal 7 – Natural Hazards. The City’s Comprehensive Plan with respect to Goal 7 and its development regulations governing natural hazard areas are not affected by the decision. Goal 7 is satisfied to the extent is it applicable to the decision.

8. Goal 8 – Recreational Needs. No resorts are contemplated or authorized by the decision. The City’s Comprehensive Plan with respect to Goal 8, its parks master plan

and its development regulations governing recreational needs (e.g. park dedication/fee in-lieu-of requirements, open space provisions, etc.) are not affected by the decision. Goal 8 is satisfied to the extent it is applicable to the decision.

9. Goal 9 – Economy. The Study includes an analysis and update of the City’s comprehensive plan with respect to Goal 9 and concludes the existing urban growth boundary does not contain sufficient employment lands to meet its employment needs to 2034. Specifically, the Study contains an economic opportunities analysis (“EOA”) that follows the methodology required by OAR 660-009-0015 and will replace the current EOA. The Council relies on the analysis and findings contained in the Study to conclude that Goal 9 is satisfied.

10. Goal 10 – Housing. In accordance with OAR Chapters 660, divisions 008 and 024, the Study includes an analysis and update of the City’s comprehensive plan with respect to Goal 10 and concludes the existing urban growth boundary does not contain sufficient residential lands to meet its housing needs and provide a variety of housing types to 2034.

The Study is extensive and speaks for itself with respect to compliance with Goal 10 and the Goal 10 rule. In the interest of brevity, the Council notes the following points with respect to the Study’s conformance with Goal 10 and the related administrative rule.

Goal 10 generally requires the City to provide an adequate number of housing units containing a mix of housing types and densities at price ranges and rent levels commensurate with financial capabilities of present and future residents of Sandy. In meeting this requirement, the Goal encourages the City to consider the current distribution of housing types within the City, to determine a reasonable vacancy rate, to identify expected housing demand at various price points and to permit a variety of densities and dwelling types.

The Study contains an updated buildable lands inventory classifying lots within the UGB as vacant, undevelopable, developed, and potentially redevelopable, etc. This process seeks to identify the existing buildable land supply within the UGB. The Study finds that Sandy has approximately 582.4 net acres¹ of unconstrained, vacant and redevelopable land within its existing UGB of which 341.3 net acres are in residential plan designations.

The Study also contains an updated housing needs projection. The projection follows DLCD’s methodology for projecting housing needs, as contained in the workbook entitled *Planning for Residential Development*. The projection forecasts housing demands between 2014 and 2034 and determines the housing types and densities needed to meet that demand. The Study finds that the City will require 575.7 net acres for housing during that time period. As such, the Study finds a deficit of land available in the UGB to meet the City’s residential needs to 2034. In order to meet the

¹ 341.3 net residential + 241.1 net employment.

demand the Study identifies, the City will need an additional 234.4 net acres of residentially designated land.

Based on the above discussion and the extensive analysis contained in the Study and the record, Goal 10 is satisfied.

11. Goal 11 – Public Facilities. The City’s Comprehensive Plan with respect to Goal 11, its public facility plan and its standards governing public facilities are not affected by the decision. The City’s comprehensive plan contains an acknowledged Goal 11 element that contains policies to ensure sufficient and adequate public services are available (or will be available as appropriate) to serve lands within the UGB. Assuming the City initiates a UGB expansion based upon the Study’s conclusion that additional lands must be added to the UGB in order to meet land needs to 2034, the City will ensure that public facilities will exist to serve those lands. As such, Goal 11 is satisfied.
12. Goal 12 – Transportation. The City’s Comprehensive Plan with respect to Goal 12, its transportation system plan and its standards governing transportation and transportation-related facilities are not affected by this decision. The City’s comprehensive plan contains an acknowledged Goal 12 element that contains policies to ensure sufficient and adequate transportation facilities and services are available (or will be available as appropriate) to serve lands within the UGB. Assuming the City initiates a UGB expansion based upon the Study’s conclusion that additional lands must be added to the UGB in order to meet land needs to 2034, the City will ensure that transportation facilities will exist to serve those lands. It should be noted that the TPR is triggered when a post acknowledgment amendment “significantly affects” a transportation facility. The City finds the Study does not meet the definition of a “significant effect” pursuant to OAR 660-012-0060(1)(a)-(c) because it will not: (1) change the functional classification of an existing or future facility; (2) change the standards implementing the functional classification system; or (3) result in any of the effects listed in 0060(1)(c)(A)-(C). In essence, the City will need to evaluate these criteria if it adds lands to the UGB to meet the needs the Study identifies. Therefore, Goal 12 is satisfied for the purposes of this decision.
13. Goal 13 – Energy Conservation. The City’s Comprehensive Plan with respect to Goal 13 and its standards governing energy conservation are not affected by the decision. Goal 13 is satisfied.
14. Goal 14 – Urbanization. The Study was prepared in strict conformance with the Goal 14 rule – OAR Chapter 660, division 24. The City undertook the Study in order to evaluate its UGB. The last time the City evaluated its UGB was in 2009. Although such an evaluation is not compelled by law, the City believes that as a matter of sound policy it is the appropriate time to review whether its existing UGB contains enough land to meet its residential and employment land needs for the next twenty years.

Oregon's Statewide Planning Goals & Guidelines

GOAL 10: HOUSING

OAR 660-015-0000(10)

To provide for the housing needs of citizens of the state.

Buildable lands for residential use shall be inventoried and plans shall encourage the availability of adequate numbers of needed housing units at price ranges and rent levels which are commensurate with the financial capabilities of Oregon households and allow for flexibility of housing location, type and density.

Buildable Lands -- refers to lands in urban and urbanizable areas that are suitable, available and necessary for residential use.

Government-Assisted Housing -- means housing that is financed in whole or part by either a federal or state housing agency or a local housing authority as defined in ORS 456.005 to 456.720, or housing that is occupied by a tenant or tenants who benefit from rent supplements or housing vouchers provided by either a federal or state housing agency or a local housing authority.

Household -- refers to one or more persons occupying a single housing unit.

Manufactured Homes -- means structures with a Department of Housing and Urban Development (HUD) label certifying that the structure is constructed in accordance with the National Manufactured Housing Construction and Safety Standards Act of 1974 (42 USC 5401 et seq.), as amended on August 22, 1981.

Needed Housing Units -- means housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels. On and after the beginning of the first periodic review of a local government's acknowledged comprehensive plan, "needed housing units" also includes government-assisted housing. For cities having populations larger than 2,500 people and counties having populations larger than 15,000 people, "needed housing units" also includes (but is not limited to) attached and detached single-family housing, multiple-family housing, and manufactured homes, whether occupied by owners or renters.

GUIDELINES

A. PLANNING

1. In addition to inventories of buildable lands, housing elements of a comprehensive plan should, at a minimum, include: (1) a comparison of the distribution of the existing population by income with the distribution of available housing units by cost; (2) a determination of vacancy rates, both overall and at varying rent ranges and cost levels; (3) a determination of expected housing demand at varying rent ranges and cost levels; (4) allowance for a variety of densities and types of residences in each community; and (5) an inventory of sound housing in urban areas including units capable of being rehabilitated.

2. Plans should be developed in a manner that insures the provision of appropriate types and amounts of land within urban growth boundaries. Such land should be necessary and suitable for housing that meets the housing needs of households of all income levels.

3. Plans should provide for the appropriate type, location and phasing of public facilities and services sufficient to support housing development in areas presently developed or undergoing development or redevelopment.

4. Plans providing for housing needs should consider as a major determinant the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.

B. IMPLEMENTATION

1. Plans should provide for a continuing review of housing need projections and should establish a process for accommodating needed revisions.

2. Plans should take into account the effects of utilizing financial incentives and resources to (a) stimulate the rehabilitation of substandard housing without regard to the financial capacity of the owner so long as benefits accrue to the occupants; and (b) bring into compliance with codes adopted to assure safe and sanitary housing the dwellings of individuals who cannot on their own afford to meet such codes.

3. Decisions on housing development proposals should be expedited when such proposals are in

accordance with zoning ordinances and with provisions of comprehensive plans.

4. Ordinances and incentives should be used to increase population densities in urban areas taking into consideration (1) key facilities, (2) the economic, environmental, social and energy consequences of the proposed densities and (3) the optimal use of existing urban land particularly in sections containing significant amounts of unsound substandard structures.

5. Additional methods and devices for achieving this goal should, after consideration of the impact on lower income households, include, but not be limited to: (1) tax incentives and disincentives; (2) building and construction code revision; (3) zoning and land use controls; (4) subsidies and loans; (5) fee and less-than-fee acquisition techniques; (6) enforcement of local health and safety codes; and (7) coordination of the development of urban facilities and services to disperse low income housing throughout the planning area.

6. Plans should provide for a detailed management program to assign respective implementation roles and responsibilities to those governmental bodies operating in the planning area and having interests in carrying out the goal.

Memorandum from City Attorney's Office -

Open Record Period #2





MEMORANDUM

TO: Sandy Planning Commission
FROM: David Doughman, City Attorney's Office
SUBJECT: Bailey Meadows – Open Record Period No. 2
DATE: February 6, 2020

[Handwritten signature]

This memo responds to some of the issues raised during the first open record period.

Development Agreement

The planning commission received testimony that the proposed development agreement must be approved before, or at the same time, the commission reviews the Bailey Meadows subdivision application in order to comply with ORS 94.504.

While a jurisdiction may approve a development agreement prior to considering a land use application, or during the review process, it is not required. ORS 94.504 is silent as to when a jurisdiction may approve one. These agreements often address the timing and financial responsibility for infrastructure improvements. The level of improvements that will be required generally depends upon a review of the proposal. In addition, if the proposal is not approved, then no improvements will be required. In the interest of clarity and efficiency, it is therefore common for jurisdictions to require one as a condition of approval.

With respect to compliance with ORS 94.504, the Oregon Court of Appeals has ruled that the statute is not the exclusive way for cities to enter into development agreements. In Povey v. City of Mosier, the court held that ORS 94.504 is one way for local governments to enter into development agreements, and that the statute is "intended to expand local governments' and developers' options, not limit them."

The agreement being considered in this instance is a "non-statutory" development agreement, which is the type of agreement the court in Povey authorized. It is not subject to ORS 94.504 and will not apply any provisions in the city's development code or other land use regulations. It will address when Gunderson Road needs to be built and how it will be financed. The city and

1 220 Or App 552, 188 P3d 321 (2008).

2 It will also address the specifics of when and how the developer will dedicate land for park purposes, if the city approves the applicant's proposed dedication.

the applicant continue to discuss these details. If the subdivision application is approved, the city council will ultimately consider a final draft of the agreement for approval.

Applicability of Transportation System Plan (“TSP”) and its Average Daily Trip (“ADT”) Standards

Testimony was submitted during the first open record period regarding Sandy’s TSP, the ADT standards within it and their applicability to the application. This is very confusing issue, one that some may describe as a “technicality.” It is no doubt highly technical from a legal point of view, but it is an important issue relative to this application and the arguments the applicant makes.

The issue is not whether the ADT standards are a part of the TSP (they are), or whether the TSP is part of the city’s comprehensive plan (it is), or whether the city properly adopted the TSP in 2011 (it did). Rather, the issue more nuanced and is reduced to the following two questions: (1) does the city’s development code (Title 17 of the Sandy Municipal Code) adequately incorporate the ADT standards from the TSP, which the applicant asserts is required under ORS 197.195; and (2) if they are adequately incorporated, is the ADT standard for local streets “clear and objective” for the purposes of ORS 197.307(4)?

Until recently, I would have felt fairly confident that the city’s development code adequately incorporated the ADT standards as applied to subdivision applications.³ However, the recent LUBA decision I discussed in the January 30 memo involving the City of Silverton makes me less confident. As I mentioned in that memo, in asserting that its code adequately incorporated relevant “level of service” standards from its TSP, Silverton relied on code provisions requiring compliance with all “applicable ordinances and regulations” and with design standards regarding streets.

LUBA found these code provisions to inadequately incorporate the level of service standards in Silverton’s TSP. LUBA held that the code must clearly incorporate “specific policies, action items, or performance standards” in the TSP in order to be approval criteria under ORS 197.195. While Sandy’s code incorporates the TSP’s “level of service” standards⁴ for streets, it does not appear to specifically incorporate the ADT standards. Ultimately, the Silverton case presents a risk that the city cannot apply its ADT standards unless its code expressly incorporates those standards.⁵

Needed Housing Statutes

The commission received testimony regarding ORS 197.307(4) to the effect that the homes likely to be built in Bailey Meadows will not be affordable to those with low incomes, and therefore they do not constitute “needed housing” for the purposes of ORS 197.307(4). I believe

³ See SMC 17.100.60(E)(3) and (5).

⁴ See SMC 17.100.100(B)(2). A “level of service” standard (or “LOS” standard) is another way to measure the performance of a road and is distinct from an ADT standard.

⁵ The January 30 memo also addresses whether the ADT standard for local streets is clear and objective based on it identifying a “typical” capacity between 800 and 1,000 ADT.

the memo I submitted in the first open record period adequately addresses this issue. To summarize, the plain terms of the definition includes more than just housing that those with low incomes can afford. It applies to housing for people “with a variety of incomes” which includes, but is not limited to, those with low incomes. Moreover, ORS 197.307(4) now applies to housing generally, with recent legislative amendments making no distinction between very expensive homes and units in a multifamily apartment building funded through the low income housing tax credit program, for example. Through changes to ORS 197.307(4), HB 2001, HB 2003 and other legislation, including legislation proposed for the current session, the intent of Oregon Legislature is to increase the supply of all types of housing in the state.

Parkland Issue

Another issue raised at the hearing and during the first open record period was whether homes that would be across from the land proposed to be dedicated for park purposes need to face the park. I do believe that if the city accepts the dedication, homes in the southeastern portion of the subdivision that would be ultimately across from the park property would need to have front doors facing the park. This can be addressed through a condition of approval.

BEH

Memorandum from Public Works Director -

Open Record Period #2



Exhibit FFFFFF

MEMORANDUM

TO: KELLY O'NEILL, PLANNING DIRECTOR
FROM: MIKE WALKER PUBLIC WORKS DIRECTOR 
RE: BAILEY MEADOWS – FILE 19-023 SUB
DATE: FEBRUARY 6, 2020

Kelly,

I have reviewed some of the proposed conditions of approval for the above-referenced application and have the following comments:

1. 4-way stop at Melissa Avenue and Rachael Drive – The current intersection is a “T” configuration where southbound traffic on Melissa stops at Rachael. If and when Melissa Ave. is extended south the stop control for traffic on Melissa would mirror the opposite leg of the intersection – northbound traffic on Melissa would stop at Rachael. Motorists are conditioned to stop at Rachael at the existing intersection so it would follow that mirroring the stop control at the proposed intersection would not introduce an unanticipated change for drivers.

The Manual on Uniform Traffic Control Devices (MUTCD) warrants for four-way stop control are listed below:

A. Traffic signals are warranted and urgently needed, and the multiway stop signs are an interim measure that can be installed quickly to control traffic while arrangements are being made for the signal installation.

B. A crash problem, as indicated by five or more reported accidents of a type susceptible to correction by a multiway stop installation in a 12-month period. Such accidents include right- and left-turn collisions as well as right-angle collisions.

C. Minimum traffic volumes. (a) The total vehicular volume entering the intersection from all approaches must average at least 500 vehicles per hour for any eight hours of an average day; and (b) the combined vehicular and pedestrian volume from the minor street or highway must average at least 200 units per hour for the same eight hours, with an average delay to minor street vehicular traffic of at least 30 seconds per vehicle during the maximum hour; but (c) when the 85- percentile approach speed of the major street traffic exceeds 40 miles per hour, the minimum vehicular volume warrant is 70 percent of the above requirements.

There is no plan for a signal at this intersection and it would not meet warrants for signalization even at full buildout of the proposed development.

There are no crashes in the ODOT database at this intersection for the 5 years prior to 2017 and none were listed in the TIA crash data analysis.

This intersection was not analyzed as part of the Traffic Impact Analysis (TIA) for the proposed development but it is safe to assume that traffic volumes do not and will not exceed 500 vehicles per hour and will not be roughly equal given that the east leg of the intersection serves only 24 dwellings while the other three legs of the intersection serve (or will serve) many more dwelling units.

Placing stop signs in locations where the warrants are not met, where they are intended to be used for traffic calming or speed control or where motorists would not expect there to be a stop sign tends to lead to drivers failing to stop at or ignoring stop signs.

A more appropriate condition of approval might be to require the applicant to perform a warrant analysis for four way stop control at this intersection. The City would open itself up to an unacceptable risk by placing a traffic control device without an engineering analysis. We would not convert this intersection to four-way stop control if it did not meet or exceed the necessary warrants unless the City Council with their ability to render decisions protected by discretionary immunity directed staff to do so.

2. Speed humps on Melissa – The existing slope on Melissa between Dubarko and Rachael ranges from 10% to 13.38%. The City's Neighborhood Traffic Management Program states that "speed humps may be installed on street sections with a grade equal to or less than 5%". For obvious reasons speed humps present a danger to motorists on steep streets, especially in snowy or icy weather.

Speed humps are only one of several traffic calming devices that may be used on neighborhood streets but are probably the device that most people are familiar with. Curb extensions and center medians can be used on streets with a grade greater than 5% and are effective at keeping 85th percentile speeds at or below 30 mph (the threshold for traffic calming devices on local streets). However, these devices can also impact on-street parking and driveway access for residents. For these reasons consultation with adjacent property owners, emergency service providers, school transportation, garbage service, etc. is necessary to develop and implement a successful traffic calming project

The City's Neighborhood Traffic Management Program is based on objective, fact-based criteria for evaluating speeds and vetting traffic calming solutions. If an evaluation was performed prior to development of the proposed subdivision it is unlikely the criteria would be met for a traffic calming project.

A condition of approval requiring the applicant to perform a traffic calming analysis on Melissa after a certain number of homes were occupied might be a better approach. Again, any proposed traffic calming project would still need to conform to the project vetting and development process and meet the criteria outlined in the Neighborhood Traffic Management Program.

3. The City, under section 12.02.070 of the Municipal Code issues permits for work in the public right-of-way. These permits typically include provisions for traffic control, pedestrian and vehicular access, staging of equipment and materials, hours of work, dust and erosion control, access to driveways, bonding and insurance, trench compaction and surface restoration and a warranty period. The City would require that one lane of traffic (controlled by flaggers) be kept open at all times on Melissa during the work.

The proposed sanitary sewer extension on Melissa would extend from the south end of Melissa about 310 feet to approximately the common property line between 18298 and 18256 Melissa Ave. Without the submission of detailed plans for the construction of this line it is hard to determine the exact nature of the impacts. Typically a trench for a sanitary sewer line this deep would be about four feet wide. The existing sewer is located in the center of Melissa and the new sewer line would be parallel to it between the center of the street and the east curb line.

All streets in the Nicholas Glen neighborhood are open to the public. The City does not have the ability to limit access to public streets by vehicles legally licensed to operate on public streets.

The City does own a 1 ft. deep by 50 ft. wide tract of land (known as an access control strip) at the south end of Melissa Ave. and has the ability to control access over this strip of land. This tract will automatically become public right-of-way upon the approval of a final plat in which another dedicated public street adjoins the tract. The City Attorney would be better able to determine what the City can and cannot do to limit or control access across this tract until it is extinguished by the extension of another public street adjoining it.

4. You had a question about funding sources for transportation. I have prepared a brief overview that follows:

Systems Development Charges are collected from new development upon issuance of a building permit. The Transportation SDC for a single-family dwelling is about \$3,230. The revenue from these charges can only be used for capacity-improving projects identified in the City's Transportation Capital Improvement Plan.

The City collects a \$.02/gallon tax on all motor vehicle fuel sold in the city limits. This tax raises between \$200K and \$300K annually. The first \$.01/gallon of this tax was approved by the voters and may only be used for street maintenance (overlays, surface treatments, etc.) the second \$.01/gallon was approved by ordinance and may be used for any street-related expense as determined by the City Council. To date the \$.02/gallon local fuel tax has always been used for street paving and surface treatments.

The City also receives a per capita allocation of State motor vehicle fuel tax based on population. Currently, this amount is about \$74.54 per person per year, or about \$700-\$800K per year. These funds may only be used for transportation-related expenses as outlined in ORS 366.790. These taxes provide the bulk of the revenue for materials, personnel and equipment related to street maintenance.

Once the City exceeded 5,000 persons, we began to receive a share of Federal gas taxes based on population. This currently amounts to a little more than \$130K annually. These funds may only be used on collector or arterial streets. We have 'banked' about \$720K in these funds in our account in Salem over the past few years. The Council has earmarked these funds for the City's share of the Hwy 26 Ten Eyck – Vista Loop Pedestrian Improvements Project.

Finally, the City expects to receive about \$214,000 annually from the new vehicle registration fee in Clackamas County. This revenue combined with additional state gas tax monies will be used for debt service on funds borrowed to construct the 362nd - Bell Street Extension Project.

No property taxes are used for transportation maintenance or improvements.

Please let me know if you have any questions or need more information.

Additional Information from City Staff



Exhibit GGGGGG

February 6, 2020

Modified Conditions of Approval for 19-023 SUB/VAR/TREE

FROM: Kelly O'Neill Jr., Development Services Director

A.3.: If the UGB application is approved, the applicant shall submit an analysis of the proposed Gunderson Road alignment at Highway 211 to properly connect with Cascadia Village Drive as identified in the TSP. The proposed alignment shall meet code standards such as tangency, or the applicant shall apply for a design exception.

C.2.: Work with the Fire Marshall to determine if the proposed plan meets Fire Code requirements, other than second access requirements which the Fire Marshall determined to be met. Per ODOT (Exhibit AA), the applicant shall provide turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT or the City, depending on which entity has jurisdiction over the intersection.

D.10. *second bullet point*: If the UGB application is approved, dedicate the right-of-way for Gunderson Road. If the UGB application is not approved, grant the City an easement to permit the eventual dedication of right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City's transportation system plan.

D.13.: If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring installation within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a two-year maintenance and warranty period.

E: If the UGB application is approved, Gunderson Road shall be constructed and accepted by the city prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval.

G.8.: The applicant shall comply with the parking standards in Chapter 17.98. Garages shall be at least 18 feet in depth to accommodate vehicle parking and the on-street parking spaces shall be at least 22 feet in length. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

G.22: As required by the Planning Commission, retention trees shall be detailed on a recorded tree protection covenant; thus, the retention trees shall be guaranteed or replaced in perpetuity. None of the trees required to be retained may be located on or outside of the property line of the subject property.

G.23.: Exposed soils shall be covered by mulch, sheeting, temporary seeding or other suitable material following grading or construction to maintain erosion control for a period of two years following the date of recording of the final plat associated with those improvements.

Exhibit HHHHHH



Staff Report

Meeting Date: January 23, 2020
From Kelly O'Neill, Development Services Director
SUBJECT: Bailey Meadows Subdivision

Background:

On December 17, 2019 the Sandy Planning Commission held a public hearing for the Bailey Meadows Subdivision. At that hearing the applicant asked for a continuance. The Planning Commission granted the continuance to January 23, 2020.

At tonight's meeting the Development Services Director will present a code analysis presentation for Bailey Meadows. The applicant will then make their presentation. Once the presentations are complete the public will have an opportunity to testify regarding the proposal.

The decision by the Planning Commission will become the final decision on this land use matter unless the applicant or someone from the public appeals the decision to City Council. If someone wishes to appeal the decision to City Council that party will have 12 days from the issuance of the decision.

The staff report for this meeting was originally published on January 15, 2020. On January 17, 2020 staff revised the staff report to include two additional exhibits and an additional condition in Section G. (page 32). All changes are in red.

Revised January 17, 2020 (revised items in red)
STAFF REPORT
PLANNING COMMISSION
TYPE III LAND DIVISION DECISION

DATE: January 17, 2020

FILE NO.: 19-023 SUB/TREE

PROJECT NAME: Bailey Meadows Subdivision

OWNER/APPLICANT: Allied Homes & Development

LEGAL DESCRIPTION: T2S R4E Section 23 Tax Lots 800, 801, 802, 803, 804

The above-referenced proposal was reviewed as a Type III Subdivision and Type II Tree Removal Permit. The following Findings of Fact are adopted supporting denial of the Tentative Plat in accordance with Chapter 17 of the Sandy Municipal Code.

EXHIBITS:

Applicant's Submittals

- A. Land Use Application Form
- B. Narrative
- C. Project Plan Set
 - Sheet P1-01: Cover Sheet with Site & Vicinity Maps & Legend
 - Sheet P1-02: Preliminary Existing Conditions Plan
 - Sheet P1-03: Preliminary Existing Conditions Plan
 - Sheet P1-04: Preliminary Subdivision Plat with Future Building Setbacks
 - Sheet P1-05: Preliminary Grading & Erosion & Sediment Control Plan
 - Sheet P1-06: Preliminary Grading & Erosion & Sediment Control Plan
 - Sheet P1-07: Preliminary Composite Utility Plan
 - Sheet P1-08: Preliminary Composite Utility Plan
 - Sheet P1-09: Preliminary Street Plan
 - Sheet P1-10: Preliminary Street Plan
 - Sheet P1-11: Preliminary Street Cross Sections & Profiles
 - Sheet P1-12: Preliminary Street Profiles
 - Sheet P1-13: Preliminary Street Profiles
 - Sheet P1-14: Preliminary Street Profiles
 - Sheet P1-15: Conceptual Future Street Plan
 - Sheet P1-16: Preliminary Tree Preservation & Removal Plan & Arborist Report
 - Sheet P1-17: Preliminary Tree Preservation & Removal Plan & Arborist Report
 - Sheet P1-18: Preliminary Tree Preservation & Removal Table & Arborist Report
 - Sheet P1-19: Preliminary Tree Preservation & Removal Table & Arborist Report
 - Sheet P1-20: Preliminary Demolition Plan
 - Sheet P1-21: Preliminary Demolition Plan

- Sheet P1-22: Preliminary Street Tree and Stormwater Screening Planting Plan
 - Sheet P1-23: Preliminary Landscape Notes and Details
 - Sheet P1-24: Preliminary Parking Plan
 - Sheet P1-25: Preliminary Emergency Vehicle Access Plan
 - Sheet P1-26: Preliminary Emergency Vehicle Access Plan
- D. Conceptual Connectivity Plan
- E. Preliminary Numbered Parking Plan
- F. Traffic Impact Analysis
- G. Preliminary Stormwater Report
- H. Flood & Slope Hazard (FSH) Analysis
- I. Geotechnical Engineering Report
- J. Letter from Michael Robinson (July 2, 2019)
- K. Mailing Labels
- L. Applicant Submittal Checklist
- M. Warranty Deed
- N. Clackamas County Assessor's Map
- O. Documentation of Plat Name Reservation
- P. Letter from Michael Robinson with Exhibits (August 20, 2019)
- Q. 120 Day Extension Letter (October 15, 2019)
- R. Letter from Michael Robinson (November 21, 2019)
- S. Updated Sheet P1-04 (Plan Dated November 15, 2019)
- T. Updated Sheet P1-15 (Plan Dated November 21, 2019)
- U. Updated Narrative (November 21, 2019)
- V. Gunderson Extension Exhibit from Todd Mobley (November 22, 2019)
- W. Letter from Michael Robinson with Exhibits (November 25, 2019)
- X. Trip Distribution with Gunderson Road Email from Todd Mobley (December 5, 2019)

Agency Comments Received Prior to November 2019 Updated Submittal

- Y. City Engineer (September 27, 2019)
- Z. PGE (September 18, 2019)
- AA. ODOT (October 4, 2019)
- BB. Parks and Trails Advisory Board (October 9, 2019)
- CC. ODOT Design Speed Email (November 19, 2019)

Public Comments Received Prior to November 2019 Updated Submittal

- DD. Paul and Jolette Owen, 37189 Rachael Drive (September 14, 2019)
- EE. Paul Savage, 37506 Rachael Drive (September 26, 2019)
- FF. Sarah Bettey, 18195 Melissa Avenue (September 26, 2019)
- GG. Tiffany Harris, Rachael Drive (September 27, 2019)
- HH. Todd Cooper, 18190 Melissa Avenue (September 27, 2019)
- II. Tom Newell, 18007 Rachael Drive (September 27, 2019)
- JJ. Cary Mallon, corner of Melissa Avenue and Rachael Drive (September 28, 2019)
- KK. Lonnie McVey, No address provided (September 28, 2019)
- LL. John and Carol Dick, 18255 Grey Avenue (September 29, 2019)
- MM. Marilyn and Treena Siewell, No address provided (October 1, 2019)
- NN. Marguerite Wadkins, 18291 Myra Court (October 1, 2019)

OO. Doris E. Rooney, 37214 Rachael Drive (October 1, 2019)
 PP. Susan Hebb, Reich Court and Dubarko Road (October 1, 2019)
 QQ. Dawn and Jordan Allen, Melissa Avenue (October 1, 2019)
 RR. Dave Meeker, 18198 Grey Avenue (October 1, 2019)
 SS. Carol Hassebroek, 39400 SE Trubel Road (October 1, 2019)
 TT. Karen Higgins, 37487 Rachael Drive (October 2, 2019)
 UU. The Molcany Family, Wewer Avenue (October 2, 2019)
 VV. Esther Naomi Quick, 18214 Grey Avenue (October 2, 2019)
 WW. Edith Newton, 18246 Grey Avenue (October 2, 2019)
 XX. Lori Graham, 37322 Rachael Drive (October 3, 2019)
 YY. Jeff Conder, 36345 Dubarko Road (October 3, 2019)
 ZZ. Belus and Juanita Schonek, 18102 Wewer Avenue (October 3, 2019)
 AAA. Danielle and Oliver Mullon, Myra Court (October 3, 2019)
 BBB. Corri Baldwin, 37524 Rachael Drive (October 3, 2019)
 CCC. Mike Schell, 37524 Rachael Drive (October 3, 2019)
 DDD. Ashley Parrish, 37356 Rachael Drive (October 3, 2019)
 EEE. Guimar and James DeVaere, 18176 Rachael Drive (October 3, 2019)
 FFF. Erin Findlay, 37616 Rachael Drive (October 3, 2019)
 GGG. Krista and Gabriel Stone, 18111 Rachael Drive (October 4, 2019)
 HHH. Faith Egli, 37708 Rachael Drive (October 4, 2019)
 III. Tim Sellin, 18256 Melissa Avenue (October 4, 2019)
 JJJ. Nicole Sellin, 18256 Melissa Avenue (October 4, 2019)
 KKK. Barbara Coutts, 37265 Solso Drive (October 4, 2019)
 LLL. Roberta (Shelly) Evett, 18192 Rachael Drive (October 4, 2019)
 MMM. Laura Kvamme, 37438 Rachael Drive (October 11, 2019)
 NNN. Kelli Acord, 36366 Industrial Way Ste B (October 18, 2019)
 OOO. Elizabeth A. (Libby) Burke, 37412 Rachael Drive (October 20, 2019)
 PPP. Brad Robison, 37412 Rachael Drive (October 20, 2019)
 QQQ. Laurie Gilbert, 18392 SE 370th Avenue (November 4, 2019)

Agency Comments Received After November 2019 Updated Submittal

RRR. ODOT (December 17, 2019)
 SSS. ODOT (January 15, 2020)
 TTT. Public Works Director (placeholder for comments)
 UUU. City Transportation Engineer (placeholder for comments)

Public Comments Received After November 2019 Updated Submittal

VVV. Sarah Bettey, 18195 Melissa Avenue (December 11, 2019)
 WWW. Les and Kathy Geren, 37721 SE Ponder Lane (December 12, 2019)
 XXX. Gigi Duncan, 18275 Rachael Drive (December 14, 2019)
 YYY. Tom Newell, 18007 Rachael Drive (December 17, 2019)
 ZZZ. Barnes Family, Rachael Drive (December 17, 2019)
 AAAA. Kathleen Walker, 15920 Bluff Road (December 17, 2019)

Documents Submitted at the December 17, 2019 Planning Commission Hearing

BBBB. Letter on behalf of the Parks and Trails Advisory Board

Additional Documents Submitted from the Applicant

- CCCC. Continuance Request and second 120 Day Extension Letter (December 17, 2019)
- DDDD. Addendum to Traffic Impact Analysis for UGB Expansion
- EEEE. Land Use Application – File No. 20-002 UGB (January 7, 2020)
- FFFF. Land Use Application – File No. 20-001 ANN/CPA/ZC (January 7, 2020)
- GGGG. Bailey Meadow letter response to Curran-Mcleod (January 13, 2019)

Staff Report from December 17, 2019 Planning Commission Hearing

- HHHH. Staff Report from December 17, 2019

Additional Public Comments

- III. Les and Kathy Geren, 37721 Ponder Lane (January 16, 2020)

FINDINGS OF FACT

General

1. Allied Homes & Development submitted an application to subdivide 23.42 acres into a 100-lot residential subdivision. The 100 proposed lots vary in size from 7,500 to 8,659 square feet. The proposal also includes a 22,521 square foot stormwater detention tract. The proposed development includes removal of trees to accommodate the extension and/or construction of rights-of-way. There are no existing structures on the subject property. The application as originally submitted proposed to rely solely on using Melissa Avenue in the Nicolas Glen subdivision to access the 100 lots in this subdivision.
2. The city received the application on July 5, 2019 and notified the applicant that it was incomplete. The applicant responded with a letter and additional submittal items that the city received on August 22, 2019. Under state law, the application was deemed complete on August 22, 2019 because the applicant provided some information in response to the incompleteness notice and stated that it would provide no additional information.
3. The subject site consists of five lots with a total area of approximately 23.42 acres. The site is located north of Highway 211, south of Rachael Drive, and west of Ponder Lane.
4. The parcel has a Plan Map designation of Low Density Residential and Zoning Map designation of SFR, Single Family Residential.
5. According to the applicant, the 100 proposed lots will add approximately 944 vehicle trips each weekday to Melissa Avenue. In discussions with the applicant, both during the pre-application stage and after the application was submitted, staff expressed concerns about having only one access into Bailey Meadows via Melissa Avenue.
6. One challenge in providing a second access into the proposed subdivision is the location of the subject property relative to the city's urban growth boundary ("UGB"). The city has a road identified in its transportation system plan ("TSP") that would serve as a second way to access Bailey Meadows. That road ("Gunderson Road") could connect the southern portion of the

subdivision with Highway 211, as the TSP generally envisions. However, the connection from the subject property to Highway 211 would occur outside of the city's UGB. State law would only allow Gunderson Road to be built if it were either: (a) in the city's UGB; or (b) Clackamas County approved an "exception" in accordance with state law that would allow the road to be built on rural land outside the UGB.

7. Initially, during the pre-application period, the applicant considered filing an exception application with Clackamas County to extend Gunderson Road. However, senior planning staff at the county were not supportive of an exception. The applicant elaborated on the exception in more detail on page 3 of its August 20, 2019 letter to city staff (Exhibit P). After concluding that an exception would likely not be approved, the applicant submitted the Bailey Meadows land use application to City staff and proposed relying solely on Melissa Avenue for access to the subdivision. As discussed further in Exhibit P, the applicant asserts that state law prohibits the city from denying the application for only proposing one access point from Melissa Avenue.
8. After the application was deemed complete, the applicant chose to hold a neighborhood meeting regarding the proposed subdivision, which occurred on September 18, 2019 at the Sandy library. Subsequent to that meeting, on September 26, the applicant, its representatives and its attorney met with city staff and the city attorney to discuss issues related to the application. The parties discussed the impacts to Melissa Avenue and the residents of Nicolas Glen if a second access was not provided. At the conclusion of that meeting, the applicant agreed to explore a UGB expansion that would, if approved, permit the construction of Gunderson Road and provide a second access into and out of the proposed subdivision.
9. Ideally, a UGB expansion and the specifics of how Gunderson Road could be built and financed would occur prior to considering the subdivision application. However, this approach does not work for the applicant. Instead, the applicant is proposing that the city impose a condition of approval on its subdivision application that would require the applicant to seek, in a subsequent application process, an expansion of the UGB to allow the applicant to construct Gunderson Road, subject to certain contingencies. The applicant summarizes this proposal in a November 25, 2019 letter to the city (Exhibit W).
10. The specific details of the second access intersecting with Highway 211 are still being defined by the City of Sandy, the Oregon Department of Transportation ("ODOT"), and the applicant. The city, the county, the Oregon Department of Land Conservation and Development ("DLCD") and ODOT have discussed the concept of a possible UGB expansion to accommodate a Gunderson Road connection. While the county had some procedural questions, these agencies have not expressed opposition to the concept and DLCD understood the justification for it. The land to be added to the UGB, and upon which Gunderson Road would be built, is under the control of the applicant. The amount of land added to the UGB would essentially be limited to the right-of-way necessary to accommodate constructing Gunderson Road from the subdivision to Highway 211 in accordance with the city's right-of-way standards for a minor arterial road. The basis for adding the land to the UGB would be to satisfy an unmet need for a transportation facility and it would not justify any other type of development (e.g. additional housing or commercial development). On January 7, the applicant submitted a UGB expansion application to the city to accommodate Gunderson Road. The city would need to hold at least two hearings on the

proposed UGB expansion – one before the planning commission and one before the city council. If approved, the county would also need to hold hearings to amend its comprehensive plan map to account for the change to Sandy’s UGB. The applicant has also submitted a concurrent application to Clackamas County, which would hold its hearings in March if the application to the city is approved.

11. The Planning Commission hearing was originally scheduled to be held on October 28, 2019. The applicant agreed to postpone the original hearing to a later date to consider a second access into the proposed subdivision. The original 120-day deadline was December 20, 2019. On October 15, 2019 the City of Sandy received a notice from the applicant’s attorney granting an extension of the 120-day clock to February 8, 2020 (Exhibit Q). On December 17, 2019 the City of Sandy received a notice from the applicant’s attorney requesting to continue the initial evidentiary hearing and granting an extension of the 120-day clock to March 31, 2020 (Exhibit CCCC).
12. Notification of the proposal was originally mailed to property owners within 500 feet of the subject property and to affected agencies on September 12, 2019 regarding the October 28, 2019 public hearing. On October 16, 2019 a notice was mailed to property owners within 500 feet of the subject property stating that the October 28, 2019 meeting was cancelled. On November 27, 2019 notification of the revised proposal was mailed to property owners within 500 feet of the subject property and a legal notice was published in the Sandy Post on December 4, 2019 regarding the rescheduled public hearing on December 17, 2019.
13. Agency comments were initially received from the City Engineer, PGE, the Parks and Trails Advisory Board, and ODOT. On November 21, 2019, the applicant submitted updated materials to city staff (Exhibits R-U). On November 25, 2019, the applicant through its legal counsel clarified its intention to seek a UGB expansion to allow a Gunderson Road connection, subject to certain conditions (Exhibit W). On December 5, 2019, the applicant’s traffic consultant submitted a memo (Exhibit X) that outlines anticipated changes in trip distributions from the subdivision if Gunderson Road were built and connected to Highway 211. ODOT submitted a revised comment on January 15, 2020.
14. Forty written comments were received prior to the November 2019 as listed in Exhibits DD. through QQQ. Six additional written comments were received, Exhibits VVV. through AAAA., between publication of the December 17, 2019 staff report on December 10, 2019 and the start of the public hearing on December 17, 2019 at 7:00 PM.
15. One additional public comment was received between the December 17, 2019 public hearing and the publication of this staff report. The public comment is Exhibit IIII. This public comment speaks to Ponder Lane access and a seasonal spring along Ponder Lane.
16. The Planning Commission heard an abbreviated version of the request from staff and the applicant at a public hearing on December 17, 2019. At the hearing, the Planning Commission heard public testimony and granted the applicant their requested continuance. The Planning Commission granted the continuance to January 23, 2020.
17. The following individuals spoke at the December 17, 2019 public hearing:

Applicant and Applicant Representatives:

- Michael Robinson

Public:

- Tony Profit
- Makoto Lane
- Richard Sheldon
- Cary Mallon
- Kathleen Walker
- Gigi Duncan
- Erin Findlay
- Don Robertson
- Tim Sellin
- Marie DeBatty
- Mike Schell
- Laura Kvamme
- Kelli Acord
- Carol Cohen
- Mark Miller
- Robert Fisher
- Brad Robison
- Les Geren
- Calvin McKiness

17.30 – Zoning Districts

18. The area proposed for Gunderson Road (tax lot 701) is not analyzed for density as the land is outside the UGB and is not permitted to include buildable lots.
19. Section 17.30.20 contains requirements for residential density calculations. The total gross acreage for the entire property inside the existing UGB is 23.42 acres. The proposal contains 5.21 acres of area dedicated for public right-of-way and 0.55 acres dedicated for public tracts (Tracts A and B) for the property inside the existing UGB. After removal of the right-of-way and public tracts the net site area for the subject property is reduced to 17.66 acres of net site area (NSA). The subject property does not contain any restricted development areas. Based on required density, the SFR land requires a minimum of 53 dwelling units (17.66 NSA x 3). The maximum allowed dwelling units is 102 (17.66 NSA x 5.8). The proposed 100 dwelling units are within the allowable density range and therefore meet the density requirement.

17.34 – SFR Single Family Residential Zoning District

20. The applicant proposes 100 single family detached dwellings in conformance with minimum and maximum density requirements, as detailed above in the analysis for Chapter 17.30.
21. Section 17.34.10 lists single family detached dwellings as a permitted use. The proposed subdivision includes 100 lots for single family detached dwellings. **All homes shall provide building design features in compliance with the standards in Section 17.90.150.**

22. The proposed lots range in size from 7,500 square feet to 9,706 square feet. **All homes shall meet the development standards of Section 17.34.30.**
23. Section 17.34.40 contains minimum requirements for development. All lots will be required to connect to City services. The applicant is also required to extend utilities to the furthest extent of the subject property.

17.80 – Additional Setbacks on Collector and Arterial Streets

29. Section 17.80.10 specifies additional setbacks for structures constructed adjacent to collector and arterial streets. The applicant is proposing to construct Gunderson Road from the southern boundary of the site to an intersection with Highway 211, but not construct the portion of Gunderson Road along Lots 55-59. Gunderson Road is classified as a minor arterial and therefore requires all lots along its right-of-way to meet the requirements of Chapter 17.80. Based on the applicant's updated proposal (Exhibit W), five of the proposed lots (Lots 55-59) will contain frontage on Gunderson Road. **All structures shall maintain a minimum 20-foot setback from the Gunderson Road public right-of-way.** The Preliminary Plat (Exhibit C, Sheet P1-04) depicts building envelopes at 20 feet from the Gunderson Road right-of-way.

17.82 – Special Setbacks on Transit Streets

30. Section 17.82.20 contains standards for building orientation on transit streets. Gunderson Road is a designated transit street. While the portion of Gunderson Road along Lots 55-59 may not have public improvements completed in conjunction with Bailey Meadows, Gunderson Road will eventually be extended along the southern edge of Lots 55-59. This is consistent with the TSP, which details Gunderson Road along the southern edge of the subject property. This is also consistent with the applicant's updated proposal (Exhibit W), which shows Lots 55-59 will ultimately have frontage on Gunderson Road. Staff asked the applicant whether they wanted to apply for a Special Variance to the requirements of Section 17.82.20 to allow the front door for the houses on lots along Gunderson Road to face the internal street network instead of Gunderson Road, which is a designated transit street. The applicant stated they did not want to apply for the variance. **The applicant shall update the Plan Set to detail the front door of the houses on Lots 55-59 to face Gunderson Road. The primary entrance shall connect directly to Gunderson Road via a pedestrian route per Section 17.82.20.**

17.84 – Improvements Required with Development

31. Section 17.84.20 contains requirements for the timing of improvements. Submission of preliminary street and utility plans during the land use review process is solely for compliance with the data requirements of Section 17.100.60 (D). **Public improvement plans are subject to a separate review and approval process. Preliminary plat approval does not connote approval of public improvement construction plans.** The applicant is proposing a phasing plan with this application. The applicant is proposing three phases and the submitted narrative (Exhibit B) states that improvements are planned to be phased with the approved plans.
32. Section 17.84.30 requires sidewalks along all public streets. Section 17.84.30(B) requires pedestrian and bicyclist facilities to minimize travel distance between residential areas, planned developments and parks. Sidewalks abutting the proposed lots shall be constructed in association with development of the lots. **The applicant shall construct sidewalks along Tract A both on**

Ponder Lane and Street B, prior to final plat approval. The sidewalks on local streets shall be five feet in width and separated by a five foot wide planter strip (or 6 foot wide swale) in areas not transverse by driveways. The applicant is not proposing to construct any portion of Gunderson Road on the subject property. Based on the November 2019 updated submittal, the applicant is proposing that the portion of Gunderson Road along the southern property line would be entirely located on the property to the south rather than split across the property line. The City Engineer (Exhibit Y) submitted the following comment based on the original submittal: “Melissa Avenue is classified in the City of Sandy Transportation System Plan (TSP), figure 5, as a local street and is proposed to be the only access to this development. Currently, the street surface is in bad condition. This site is generating an additional 944 trips while the combined AADT generated from this site and the existing Nicholas Glen No. 2 is 2,490 trips. The traffic volumes increase is deemed to deteriorate the existing street cross section further and potentially cause a complete failure. The TSP alludes to a traffic capacity on local streets between 800 and 1,000 ADT. The projected capacity exceeds the preferred capacity limitations. We are also concerned that the increase in traffic volumes through one access is detrimental to the overall life and safety in case an evacuation is needed. A review by the Fire Department is needed to confirm whether an additional emergency access is needed or not. However, we recommend as a minimum a temporary/ emergency access to Hwy 211.” Additional access for emergency vehicles would exist if the applicant extends Gunderson Road as proposed in the updated November 2019 submittal.

33. With the applicant’s updated submittal in November 2019, the applicant is proposing a pedestrian tract (Tract B) to connect the proposed subdivision to future development to the west. **The applicant shall construct the pedestrian tract (Tract B) improvements prior to final plat approval. Pedestrian scale lighting connected to the street light circuit shall be provided in the pedestrian easement. The Tract B walkway shall be conveyed to the City on the Final Plat. The walkway within the tract shall be constructed of concrete at 8 feet in width with a 7 foot wide area for trees and landscaping. The applicant shall install bollards at the east end of the tract to restrict vehicles from accessing the tract.**
34. Section 17.84.30(C) states that where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80. The City’s current TSP maps were created with the former UGB boundaries (pre-June 2017) and did not include the subject property that was brought into the revised UGB boundaries. Therefore, there are no trail linkages identified in the TSP for this property.
35. Section 17.84.40 contains standards for public transit and school bus transit. The Transit Director did not comment on the application. Transit amenities are not required.
36. Section 17.84.50 contains standards for street improvements and traffic evaluations. The initial Traffic Impact Analysis (Exhibit F) was completed by Lancaster Engineering and is dated June 20, 2019. The traffic assumptions are based on the 10th Edition Trip Generation handbook. The analysis is based on the construction of 100 single-family homes. The trip rates indicate that upon full occupancy the subdivision will generate about 74 trips during the morning peak hour and 99

trips during the evening peak hour, with a weekday total of 944 trips. The study looked at four intersections: SE 362nd Drive at Dubarko Road, Ruben Lane at Dubarko Road, Dubarko Road at Melissa Avenue, and Dubarko Road at Bluff Road. The study found that all study intersections are operating acceptably per City of Sandy performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development. The Traffic Impact analysis concludes that no significant safety issues or trends are evident at the study intersections, traffic signal warrants were not met at the study intersections under all analysis scenarios and left-turn warrants are not estimated to be met under any analysis scenario. The study also did not look at the intersection of Melissa Avenue and Rachael Drive. Based on the applicant's updated November 2019 submittal and the proposal to extend Gunderson, the applicant submitted a revised traffic analysis with its UGB expansion application. The revised analysis finds that with the addition of Gunderson Road, it would capture 40 percent of new trips from Bailey Meadows and 30 percent of existing trips from Melissa Avenue. According to the revised traffic analysis, the addition of Gunderson Road would result in a total daily volume of 1378 trips for Melissa Avenue. As of the date of this report, the updated traffic analysis is being reviewed by the city's consulting traffic engineer.

The City Engineer (Exhibit Y) reviewed the original Traffic Impact Analysis and noted the following: "The study doesn't identify any concerns as a result of this development." Although the TIA itself didn't identify concerns, the City Engineer cited concerns regarding further deterioration of Melissa Avenue, as well as the detrimental effect that increased traffic volumes through one access would have on overall life and safety.

37. Section 17.84.50(B) contains the spacing standards for new arterial streets. The proposed subdivision boundaries do not include any new arterial or collector streets on the subject property; however, the applicant is proposing to construct a portion of Gunderson Road on the property to the south. Gunderson Road is defined as a minor arterial in the transportation system plan.
38. Section 17.84.50(C) requires local streets to be designed to discourage through traffic and requires cul-de-sacs to not exceed 400 feet in length nor serve more than 20 dwelling units. The proposal includes a knuckle but does not include any cul-de-sacs.
39. Section 17.84.50(D) requires development sites to provide access from a public street improved to City standards. The proposed street network and improvements generally comply with City standards. There are eight local streets inside the proposed subdivision requiring the improvements listed below.
40. **Ponder Lane north/south**: Ponder Lane north/south requires half-street improvements including 14 feet of asphalt, concrete curbs, 5-foot wide sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. **The applicant shall install bollards along the east terminus of Street B, Ponder Lane east/west, Street C, and Street D. The applicant shall also install 'no parking' signs along the full length of Ponder Lane north/south at a spacing as determined during construction plan review.**

41. Ponder Lane east/west: Ponder Lane east/west requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Ponder Lane east/west ending before the development site boundary. **The applicant shall extend the street improvements on Ponder Lane east/west to the east and west line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**

42. Street A: Street A requires full-street construction to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. Staff requested the applicant remove the proposed knuckle and extend Street A to the west to allow for future street connection. Rather than extend the entirety of Street A to the property to the west, the applicant is proposing to install a pedestrian tract (Tract B) between Lots 10 and 11 (Exhibit S). Staff is satisfied with this proposed improvement, which will improve the future bicycle and pedestrian connectivity of the area. **The applicant shall construct the pedestrian tract (Tract B) improvements prior to final plat approval.** The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street A ending before the development site boundary. Section 17.84.50(E) requires extension of street improvements “to the edge of adjacent properties.” **The applicant shall extend the street improvements on Street A to the east property line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**

43. Melissa Avenue: Melissa Avenue requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strip, street trees, ADA ramps, and public utilities. **The applicant shall install the required local street improvements north of the property boundary to connect to the existing Melissa Avenue stub.** Based on feedback from the residents in the Nichols Glen neighborhood there is concern with accidents at the intersection of Melissa Avenue and Rachael Drive. A stop sign already exists at the intersection of Melissa Avenue and Rachael Drive for southbound traffic on Melissa Avenue. Upon further analysis, staff finds that an additional stop sign could help reduce potential conflicts. A stop sign should also be installed for northbound travel on Melissa Avenue. **The applicant shall install a stop sign at the intersection of Melissa Avenue and Rachael Drive for northbound traffic.**

44. Street B: Street B requires full-street improvements to local standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street B ending before the development site boundary. **The applicant shall extend the street improvements on Street B to the east and west lines of the development site and obtain slope easements or construct retaining walls as necessary to comply with this section of the development code.**

45. Avenue 1: Avenue 1 requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities.
46. Avenue 2: Avenue 2 requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Avenue 2 ending before the development site boundary. **The applicant shall extend the street improvements on Avenue 2 to connect with Gunderson Road on the property to the south.**
47. Street C: Street C requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street C ending before the development site boundary. **The applicant shall extend the street improvements on Street C to the east and west line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**
48. Street D: Street D requires full-street improvements to local street standards including concrete curbs, 5-foot wide concrete sidewalks, street lighting, 5-foot wide planter strips, street trees, ADA ramps, and public utilities. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) shows the street improvements on Street D ending before the development site boundary. **The applicant shall extend the street improvements on Street D to the east and west line of the development site and shall obtain slope easements or construct retaining walls as necessary to comply with this section of the Development Code.**
49. Gunderson Road: Subject to a UGB approval, the applicant will dedicate right-of-way to accommodate the eventual construction of Gunderson Road to a minor arterial standard, consistent with page 4, Exhibit W. Dedication of right-of-way to the City of Sandy for Gunderson Road shall include the intersection connection to Highway 211. **The applicant shall construct Gunderson Road to contain two travel lanes with at least 24 feet of paved width.** Additional Gunderson improvements (for example, a wider paved width, bicycle lanes, street trees, etc.) could occur in accordance with a development agreement the city and the applicant will execute. No public utilities are required to be installed in the Gunderson Road right-of-way at this time. **The applicant shall submit an analysis of their proposed Gunderson Road alignment that confirms that if Gunderson Road intersects with Highway 211 at the location proposed by the applicant, it can still connect to Cascadia Village Drive as identified in the TSP while meeting code standards such as tangency.**
50. Highway 211: Highway 211 will need improvements at the intersection with Gunderson Road. **The improvements to Highway 211 shall meet the requirements of ODOT -or- alternatively AASHTO standards if the highway is transferred to the City of Sandy.** The city and ODOT are currently discussing a transfer of jurisdiction of Highway 211 from ODOT to the City of Sandy. The portion that ODOT would transfer would include the Gunderson Road intersection.

51. Section 17.84.50(E) states that to provide for orderly development of adjacent properties, public streets installed concurrent with development of a site shall be extended through the site to the edge of the adjacent property(ies). The applicant is not proposing any permanent dead-end streets but proposes that Street A, Street B, Ponder Lane, Street C, and Street D be temporary dead-end streets with construction of this subdivision until such a time as these streets are extended onto the adjoining properties to the west, east, and south. **The applicant shall plat a vehicle non-access reserve (VNAR) strip at the east and west ends of Streets B, C, and D, the west ends of Gunderson Road and the east/west portion of Ponder Lane, and the east end of Street A.** The applicant is proposing fire turn-arounds and an emergency access that connects to Highway 211 via Ponder Lane. **The applicant shall work with the Fire Marshal to determine if the proposed plan meets Fire Code.** Per ODOT (Exhibit AA), **the applicant shall provide emergency vehicle turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT.**
52. Section 17.84.50(F) requires that public street improvements may be required through a development site to provide for the logical extension of an existing street network. The proposal includes the extension of Melissa Avenue from the Nicholas Glen subdivision. The submitted Conceptual Connectivity Plan (Exhibit D) details how the proposed street network could tie into the Bornstedt Village Plan.
53. Section 17.84.50(G) states that with the exception of extensions of existing streets, no street names shall be used that will duplicate or be confused with names of existing streets. The applicant has not proposed any new street names. **The City of Sandy reserves the right to name streets.**
54. Section 17.84.50(H) contains standards for public street locations, grades, alignment, and widths. Per the City Engineer (Exhibit Y), **the developer's engineer shall provide a profile design for a minimum of 200 feet for all future extensions of stubbed streets past the project boundary to ensure future grades can be met.**
55. Section 17.84.60 contains standards for public facility extensions. The applicant's Preliminary Street and Utility Plan (Exhibit C, Sheet 5) depicts the location and type of proposed public utilities including water, sanitary sewer, and stormwater. **All public utility installations shall conform to the City's facilities master plans. Staff recommends the applicant revise the utility plan to include broadband fiber locations as detailed by the SandyNet Manager and as required by 17.84.60(A).** Per the City Engineer (Exhibit Y), **all public sanitary sewer and waterline mains shall be a minimum of 8 inches in diameter and all stormwater drains shall be a minimum of 12 inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties. No building permits will be issued until all public utilities including sanitary sewer are available to serve the development. The applicant shall pay plan review, inspection, and permit fees as determined by the Public Works Director.** The utility improvements proposal and requirements for the Bailey Meadows subdivision are further detailed in Sections 17.100.230, 17.100.240, and 17.100.250 below. Except for the stormwater treatment and detention facility identified in Exhibit W, no city utilities will be required in the right-of-way of Gunderson Road.

56. Section 17.84.80 contains specifications for franchise utility installations. Private utility services will be submitted for review and approval by service providers and City staff in association with construction plans, and all utility lines will be extended to the perimeter of the site. **All franchise utilities shall be installed underground and in conformance with City standards.** PGE submitted a comment (Exhibit Z) stating they did not find any conflicts related to the project but that there's a PGE project located on SE Ponder Lane. Per PGE's request, **the applicant shall call the PGE Service Coordinators at (503) 323-6700 when the developer is ready to start the project.**
57. Section 17.84.90 contains requirements regarding land for public purposes. The applicant proposes a 22,521 square foot public stormwater detention pond (Tract A) and 1,460 square feet for a pedestrian access tract to the west (Tract B). The applicant is also proposing a second stormwater detention pond (Tract C) on Tax Lot 701 to the south of the Bailey Meadows. This second stormwater detention pond on Tax Lot 701 is for the collection and treatment of stormwater from Gunderson Road and Highway 211. **The applicant shall grant the stormwater pond (currently noted as Tract C) by easement.**
58. **The plat shall detail the following easements:**
- **An eight-foot wide public utility easement (PUE) along the frontage of all proposed lots;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 26-29;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 37-38 and 41-42;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 38-39 and 40-41;**
 - **A 15-foot private sanitary sewer easement along the common lot lines of Lots 48-51;**
 - **A 15-foot private storm drainage easement along the common lot lines of Lots 47-48 and 51-52;**
 - **A vehicle non-access reserve (VNAR) strip in the following locations:**
 - **East end of Street A**
 - **West end of Street B**
 - **West end of Ponder Lane (east/west portion of right-of-way)**
 - **West end of Street C**
 - **West end of Street D**
59. Section 17.84.100 contains requirements for mail delivery facilities. The applicant will need to coordinate with the United States Postal Service (USPS) to locate mail facilities and these will be approved by the City and USPS. **Mail delivery facilities shall be provided by the applicant in conformance with 17.84.100 and the standards of the USPS. The applicant shall submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and USPS for review and approval prior to installation of mailboxes.**

60. All public utility installations shall conform to the city's facilities master plans. **No building permits will be issued until all public utilities including sanitary sewer are available to serve the subdivision and the Final Plat has been recorded.** Public utilities must be installed to meet City standards. **Development of this subdivision will require payment of system development charges in accordance with applicable city ordinances.**

17.86 – Parkland and Open Space

61. Section 17.86.10 contains the minimum parkland dedication requirements. The applicant proposes 100 single-family detached dwellings with this subdivision request. Based upon the calculations adopted by the City and specified within Section 17.86.10, the required dedication area is 1.29 acres of public parkland (100 proposed units x 3 persons per unit x .0043=1.29 acres to be dedicated).
62. Section 17.86.40 contains factors for the City to evaluate whether to require parkland dedication based on this formula or collect a fee in lieu of dedication. This section specifies that it is entirely at the city's discretion to accept payment of a fee in lieu of the land dedication or require the dedication. Based on the calculations specified in Section 17.86.10, the applicant is responsible for dedicating 1.29 acres of public parkland based on 100 dwelling units. No parkland is specifically identified on the subject property in the Parks Master Plan; however, a community park is identified just north of the subject property. The conceptual location of the community park is in an already-built subdivision, Nicolas Glen, that was constructed without an active park, but did include dedication of some open space along the Tickle Creek Trail. The Parks Master Plan identifies conceptual locations for parks; thus, a community park should still be located somewhere in the general vicinity of where it is conceptually located in the Parks Master Plan. The Parks and Trails Advisory Board recommended dedication of parkland rather than collecting a fee-in-lieu. In early 2019 the City Council had an opportunity to review the option of requiring parkland or accepting a fee in-lieu for the Bailey Meadows property. City Council decided that accepting a fee in-lieu was satisfactory.
63. **The applicant shall pay a fee in lieu for the required parkland dedication per the adopted Fee Resolution.** Per Resolution 2013-14, the required fee in lieu amount is \$241,000 per acre if the entire amount is paid prior to final plat approval. Therefore, **based on the current Fee Resolution, the applicant is required to pay a fee in lieu of dedication for a total of \$310,890 (1.29 acres of land to be dedicated x \$241,000).** Alternatively, Ordinance 2013-03 allows the applicant to pay a minimum of 50 percent of the fee to receive final plat approval with the remaining balance to be paid as a proportionate amount with each building permit. If a portion of the fee is deferred, Resolution 2013-14 specifies a per acre fee of \$265,000. **Currently, the Fee Resolution requires payment of \$341,850 if a portion of the fee is deferred, a minimum of 50 percent (\$170,925) paid prior to final plat approval and the remaining 50 percent (\$170,925) divided between the 100 lots (\$1,709.25/lot).**
64. An alternative to dedication of parkland in the Bailey Meadows subdivision could be a dedication of parkland on the property to the south of Bailey Meadows that is being proposed for the extension of Gunderson Road. In fact, in its January 7 UGB expansion application, the applicant included approximately 2.4 acres of TL 701 to be dedicated to the city as parkland. The applicant

was subsequently asked to evaluate the proposed dedication relative to the standards in Section 17.86.20. As of the date of this report, the city has not received an evaluation from the applicant. **If the applicant dedicates parkland to the south of Bailey Meadows instead of paying the fee in-lieu the applicant and City Manager, on behalf of City Council, shall negotiate the terms of the parkland dedication.**

65. Section 17.86.50 contains standards for open space dedication. The applicant is not proposing any dedication of open space.

17.92 – Landscaping and Screening

66. Section 17.92.10 contains general provisions for landscaping. Per Section 17.92.10 (C), trees over 25-inches circumference measured at a height of 4-½ feet above grade are considered significant and should be preserved to the greatest extent practicable and integrated into the design of a development. A 25-inch circumference tree measured at 4-½ feet above grade has roughly an eight-inch diameter at breast height (DBH). Based on the Planning Commission interpretation from May 15, 2019, Subsection 17.92.10(C) does not apply to residential subdivisions. Tree protection fencing and tree retention will be discussed in more detail under Chapter 17.102 in this document. **Per Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing.**
67. Section 17.92.30 specifies that street trees shall be chosen from the City-approved list. As required by Section 17.92.30, the development of the subdivision requires medium trees spaced 30 feet on center along street frontages. The submitted Street Tree Plan (Exhibit C, Sheet P1-22) identifies street trees along all of the proposed streets. The proposed plan details 115 street trees placed 50 feet on center. **The applicant shall update the Street Tree Plan to detail street trees placed 30 feet on center.**

The applicant is proposing to mass grade the buildable portion of the site. This will remove top soil and heavily compact the soil. In order to maximize the success of the required street trees, **the applicant shall aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction or shall aerate the soil at the individual home construction phase. The applicant shall call for an inspection with the City after aerating the soil and before planting the street trees.**

If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade and shall be planted per the City of Sandy standard planting detail. Trees shall be planted, staked, and the planter strip shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy. Tree ties shall be loosely tied twine or other soft, elastic material and shall be removed after one growing season (or a maximum of 1 year).

68. Section 17.92.40 requires that all landscaping shall be irrigated, either with a manual or automatic system. **As required by Section 17.92.140, the developer and lot owners shall be**

required to maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.

69. Section 17.92.50 specifies the types and sizes of plant materials that are required when planting new landscaping. Street trees are typically required to be a minimum caliper of 1.5-inches measured 6 inches from grade. **All street trees shall be a minimum of 1.5-inches in caliper measured 6 inches above the ground and shall be planted per the City of Sandy standard planting detail.** The applicant proposes eight (8) distinct street tree species with one (1) tree species per street/block face. Staff would like to see more diversity in street tree species in general and within each block. **The applicant shall update the plan set to detail a minimum of two (2) different tree species per block face for staff review and approval.**
70. Section 17.92.60 requires revegetation in all areas that are not landscaped or remain as natural areas. The applicant did not submit any plans for re-vegetation of areas damaged through grading/construction, although most of the areas affected by grading will be improved. **The applicant shall maintain all unlandscaped and/or revegetated areas for a period of two (2) years following the date of recording of the final plat associated with those improvements.**
71. Section 17.92.130 contains standards for a performance bond. The applicant has the option to defer the installation of street trees and/or landscaping for weather-related reasons. Staff recommends the applicant utilize this option rather than install trees and landscaping during the dry summer months. Staff recommends a three-year maintenance and warranty period for street trees based on the standard establishment period of a tree. **If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring installation within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a three-year maintenance and warranty period.**

17.98 – Parking, Loading, and Access Requirements

72. Section 17.98.20 requires two off-street parking spaces per single family detached dwelling unit. The 100 dwelling units proposed in this subdivision requires 200 off-street parking spaces. Each lot will have a driveway and based on lot width the ability to construct a double car garage.
73. Section 17.98.50 has specifications for parking area setbacks. Garages are required to be at least 22 feet setback from the front property line to meet setback requirements in the SFR zoning district. The Preliminary Plat (Exhibit C, Sheet P1-04) details a typical 22 foot garage setback.
74. Section 17.98.60 has specifications for parking lot design and size of parking spaces. **The applicant shall comply with the parking standards in Section 17.98.60.** The parking areas in front of the proposed garages for all lots need to be at least 10 feet in width by 20 feet in length. Driveways for single family homes are required to be at least 10 feet wide as detailed in Section 17.98.100 below. **The garages shall be adequate depth to park a vehicle and the on-street parking spaces shall be at least 22 feet in length.**

75. Section 17.98.80 specifies access requirements to arterial and collector streets. The applicant proposes Gunderson Road to the south of the Bailey Meadows property. Gunderson Road is defined as a minor arterial in the Transportation System Plan and will not include any proposed driveways to any of the proposed lots in Bailey Meadows.
76. Section 17.98.100 has specifications for driveways. The minimum driveway width for a single-family dwelling is 10 feet. The Public Works driveway approach standard detail specifies a maximum of 24 feet wide for a residential driveway approach. The Preliminary Numbered Parking Plan (Exhibit E) details driveway curb cuts for all lots. The Parking Plan also details temporary emergency vehicle and franchise waste hauler turnaround locations, which also include driveway curb cuts. This results in numerous extra curb cuts. With the exception of Lot 8, it appears that all driveways are detailed at approximately 24 feet in width, but the proposed driveway spacing lacks linear space for street trees. Staff previously recommended that the applicant extend Street A to the west property boundary, which would eliminate the knuckle and the need to combine driveways on Lots 9 and 10, and the driveway on Lot 8 would no longer be on a curve. Rather than extend Street A to the west property boundary, the applicant is proposing to install a pedestrian tract (Tract B) between Lots 10 and 11. **The applicant shall update the plan set to detail all driveways at a maximum of 24 feet wide. The applicant shall combine driveways for Lots 9 and 10 into a shared driveway or reduce the width of the driveways for Lots 9 and 10 to accommodate street trees and other right-of-way amenities.** The applicant is not proposing any shared driveways; however, many of the proposed driveways on adjacent lots are located directly adjacent to each other. In order to increase on-street parking, maximize street tree planting, and reduce pedestrian conflict, **the applicant shall submit one of the following two options for staff review and approval:**
- a. **Submit a revised plan detailing shared driveways that that do not exceed 24 feet wide with crossover easements; or,**
 - b. **Submit a detailed driveway spacing plan that conserves frontage and maximizes area for street trees and on-street parking.**
77. Section 17.98.130 requires that all parking and vehicular maneuvering areas shall be paved with asphalt or concrete. As required by Section 17.98.130, **all parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.**
78. Section 17.98.140 contains requirements for drainage. Other sections of this order detail the stormwater requirements.
79. Section 17.98.200 contains requirements for providing on-street parking spaces for new residential development. The Preliminary Numbered Parking Plan (Exhibit E) identifies a total of 122 on-street parking spaces with at least one (1) on-street parking space within 200 feet of each of the 100 lots. No parking courts are proposed. The location of fire hydrants will be reviewed by the Sandy Fire Department in more detail with Construction Plans. **The applicant shall revise the Parking Analysis if required fire hydrants affect on-street parking spaces.**

17.100 – Land Division

80. Submittal of preliminary utility plans is solely to satisfy the requirements of Section 17.100.60. **Preliminary plat approval does not connote utility or public improvement plan approval**

which will be reviewed and approved separately upon submittal of public improvement construction plans.

81. Section 17.100.60(E) contains submittal requirements and criteria for approving residential subdivisions. Section 17.100.60(E)(1) requires subdivisions to be consistent with the density, setback, and dimensional standards of the base zoning district, unless modified by a Planned Development approval. The applicant requests subdivision approval for a subdivision that is in compliance with most of the applicable development standards. The application for the subdivision is being processed through a Type III procedure. The proposal is consistent with density and other dimensional standards of the base zoning district.
82. Section 17.100.60(E)(2) requires subdivisions to be consistent with the design standards set forth in this chapter. Consistency with design standards in this chapter are discussed under each subsection below. Conditions of approval can be adopted where necessary to bring the proposal into compliance with applicable standards.
83. Section 17.100.60(E)(3) requires the proposed street pattern is connected and consistent with the Comprehensive Plan or official street plan for the City of Sandy. The proposed street pattern is generally consistent with the Comprehensive Plan and the city's standards. The exception is the fact that the subdivision as originally proposed would rely solely on Melissa Avenue for access. The applicant asserts that it is legally entitled to rely solely on Melissa Avenue based on provisions of state law that apply to applications for housing. Staff consulted with the city attorney, who advised that the Land Use Board of Appeals and appellate courts have increasingly scrutinized standards applied to housing to determine whether they are "clear and objective." Staff will defer to the applicant's legal counsel and the city attorney to provide more information on these issues at the hearing. However, instead of arguing over and potentially litigating these issues, the applicant and the city have focused on trying to provide a second access to the subdivision. This resulted in the applicant's revised November 2019 submittal which proposed Gunderson Road and the applicant applying for a UGB expansion earlier this month. With the inclusion of Gunderson Road and subject to a condition of approval, the street pattern will be consistent with the TSP. Therefore, the proposed subdivision meets Approval Criteria 3 of Section 17.100.60(E).
84. Section 17.100.60(E)(4) requires that adequate public facilities are available or can be provided to serve the proposed subdivision. All public utilities including water, sewer and stormwater are available or will be constructed by the applicant to serve the Bailey Meadows Subdivision. The original submission did not include Gunderson Road. As discussed above, the applicant is now proposing a solution that would provide Gunderson Road and, as conditioned, will be consistent with the TSP. Therefore, the proposed subdivision meets Approval Criteria 4 of Section 17.100.60(E).
85. Section 17.100.60(E)(5) requires all proposed improvements to meet City standards through the completion of conditions as listed within this final order and as detailed within these findings. The detailed review of proposed improvements is contained in this report. Staff has identified a few aspects of the proposed subdivision improvements requiring additional information or

modification by the applicant, but conditions of approval can be adopted to bring the proposal into compliance with City standards.

86. Section 17.100.60(E)(6) strives to ensure that a phasing plan, if requested, can be carried out in a manner that meets the objectives of the above criteria and provides necessary public improvements for each phase as it develops. The applicant is proposing to construct the 100 lot subdivision in three (3) phases. The application includes phase one with 71 lots, phase two with 8 lots, and phase three with 21 lots. The phasing plan is somewhat confusing, and staff has not determined the reasoning for the proposed placement of the phase lines. The applicant's narrative simply states, "As shown on the Preliminary Subdivision Plat in the Preliminary plans, the subdivision is planned to be completed in three phases and provide necessary public improvements concurrently with each phase. Additionally, the planned offsite extension of Gunderson Road is intended to occur in Phase 1 of the project, though the future minor arterial road is not within the Phase 1 boundary (as the improvements are offsite). The above requirements are satisfied and support the City's approval of this Subdivision". The importance of Gunderson Road is well established in this staff report and through public testimony. **If the UGB application is approved, Gunderson Road shall be constructed and accepted by the City prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval.**
87. Conditions of approval regarding phasing can be adopted to bring the proposal into compliance with City standards.
88. **The Final Plat shall be recorded as detailed in Section 17.100.60 (I).**
89. Section 17.100.70 specifies that all land divisions shall be in conformance with the requirements of the applicable base zoning district. The applicant did not request any variances; however, the submitted plans indicate the applicant would like a variance to Section 17.82.20 to have the front door for the houses along Gunderson Road face the interior local street network instead of Gunderson Road, which is designated as a transit street. During the completeness check, staff requested that the applicant clarify whether or not they wanted to apply for a variance. The applicant said they did not, thus **houses constructed along Gunderson Road will be required to face Gunderson Road.** Based on the updated proposal (Exhibit W), this would include Lots 55-59. The tentative plat shall otherwise be designed to comply with all standards of the City of Sandy Development Code, Transportation System Plan, Facilities Master Plans and Sandy Municipal Code.
90. Section 17.100.100(A) requires the pattern of streets established through land divisions should be connected to provide safe multimodal options, create a logical pattern of circulation, and spread traffic over many streets. The proposed development is moderately conducive to walking and biking while accommodating motor vehicles. The applicant is proposing a knuckle rather than extending Street A to the west property boundary. Staff recommended the applicant extend Street A to the west property boundary. The applicant is proposing to construct a pedestrian walkway instead. The walkway (Tract B) will be located between Lots 10 and 11 and will provide bicycle

- and pedestrian connectivity to the west in the future. The addition of Gunderson Road will provide additional bicycle options, albeit Highway 211 is not conducive to bicycling at this time.
91. Section 17.100.100(B) contains requirements for preparing transportation impact studies. The submitted Traffic Impact Analysis (Exhibit F) was completed by Lancaster Engineering and is dated June 20, 2019. The traffic analysis is discussed in Section 17.84.50 of this document.
 92. Section 17.100.100(C) requires that all streets follow topographic and arrangement specifications. Considering the site's topography, the proposed street layout is acceptable given the topography and residential use of this site, and the topography and use of adjacent properties.
 93. Section 17.100.100(D) specifies that street layout shall generally use a rectangular grid pattern. The applicant proposes a rectangular pattern of streets with one knuckle at the intersection of Street A and Avenue I. Future development to the south, east, and west will be required to align with the proposed intersections in order to maintain a rectangular grid pattern and maximize pedestrian, bicycle, and vehicular connectivity. Staff recommended the applicant extend Street A to the west property boundary. The applicant is proposing a pedestrian tract (Tract B) instead, which will improve future bicycle and pedestrian connectivity to the west. Staff is satisfied with this proposed improvement, which will improve the future bicycle and pedestrian connectivity of the area.
 94. Section 17.100.100(E) requires that future street plans assure access for future development and promote a logical, connected pattern of streets. The proposed local street plan has been designed to facilitate the traffic needs of this development while ensuring there are no intersection conflicts with future development. Per the City Engineer (Exhibit Y), **the applicant shall provide a profile design for a minimum of 200 feet for all future street extensions beyond the project boundary to ensure future street grades can be met.**
 95. Sections 17.100.100(F) contain specifications for street connections and exemptions for when typical connections are not possible. The proposed design extends Melissa Avenue south into the site. All proposed streets will allow connection with future development to the south and east, with the exception of Street A, which ends in a knuckle. Staff recommended the applicant extend Street A extending to the west property boundary. The applicant is proposing to install a pedestrian tract (Tract B) instead. The applicant submitted a Conceptual Connectivity Plan (Exhibit D) that shows how the proposed streets can connect to the streets to the east in compliance with the Bornstedt Village Plan.
 96. Section 17.100.110 specifies street standards and roadway functional classifications. Section 17.100.110(E) contains standards for local street spacing at 8-10 local streets per mile. All proposed streets in the subdivision are local streets, including the extension of the existing Melissa Avenue into the site. The TSP details Gunderson Road, a minor arterial, along the south property boundary. The applicant is proposing to install Gunderson Road as an off-site improvement to intersect with Highway 211.
 97. Section 17.100.120(B) requires that residential blocks for local streets not exceed 400 feet in length, unless physical conditions justify larger blocks. The applicant is not proposing any blocks

greater than 400 feet. The applicant is proposing a knuckle where Street A and Avenue 1 intersect. Staff recommended the applicant extend Street A to the west property boundary. The applicant is proposing to install a pedestrian tract instead.

98. Section 17.100.120(D) requires blocks over 600 feet in length to provide a pedestrian and bicycle accessway. None of the proposed blocks exceed 600 feet in length.
99. Section 17.100.130 contains specifications for proposed easements. The Preliminary Utility Plan (Exhibit C, Sheet P1-07) details an 8 foot wide public utility easement along all street frontages. The plat shall detail all proposed easements as detailed in Section 17.84.90 above.
100. Section 17.100.180 contains requirements for the creation of new intersections. The proposed intersections are all right angles and meet the required minimum spacing standard of 150 feet as required in Section 17.84.50(C)(2).
101. Section 17.100.210 specifies that the applicant is financially responsible for the installation of a lighting system. Chapter 15.30 contains the City of Sandy's Dark Sky Ordinance. The applicant will need to install street lights along all street frontages wherever street lighting is determined insufficient. **The locations of the street light fixtures shall be reviewed in detail with construction plans.**
102. Section 17.100.220 contains requirements for lot arrangement, lot dimensions, and other lot specifications. The Single Family Residential (SFR) zoning district requires lots at least 7,500 square feet in area. The proposed lots range in size from 7,500 square feet to 8,659 square feet. All homes are required to comply with setback standards and maximum building height limitations as required in Chapter 17.34. No lots are proposed to be accessed from a major or minor arterial. All lots are required to comply with clear vision requirements at all intersections.
103. Section 17.100.230 contains specifications for water lines and fire hydrants. The specific details of water facilities will be reviewed with construction plans. The utility plan submitted by the applicant shows a connection to the existing 8-inch water main at the intersection of Melissa Avenue and Rachael Drive and a possible connection to the existing 8-inch water line at the intersection of Arletha Court and Hwy 211. **The applicant shall demonstrate that adequate fire and domestic flow will be available by completing these connections.** Per the City Engineer (Exhibit Y), **all new waterlines shall be a minimum of 8-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.** The applicant's proposed Utility Plan (Exhibit C, Sheet P1-07) depicts new hydrants. **The location of fire hydrants shall be reviewed by the Sandy Fire Department in more detail with construction plans.**
104. Section 17.100.240 specifies requirements for sanitary sewer lines. The specific details of sanitary sewer facilities will be reviewed with construction plans. Per the City Engineer (Exhibit Y), **all new public sanitary sewer lines shall be a minimum of 8-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.** In order to achieve the necessary depth to drain the development site the proposed utility plan shows an 8-inch sanitary sewer line extended north to the existing sewer

line in Melissa Avenue approximately 200 feet from the intersection of Rachel Drive and Melissa Avenue.

105. Section 17.100.250 contains specifications for surface drainage and stormwater systems. The applicant proposes a 22,521 square foot public stormwater detention pond (Tract A) to be dedicated to the City of Sandy. Detained and treated discharge from the detention pond is proposed to be discharged to the adjacent property to the west, which is outside of the UGB. Per the Public Works Director (Exhibit O), **the applicant shall demonstrate that the proposed subdivision does not exceed pre-development site runoff discharges to this same point and provide information on the dimensions and slope of the existing drainage way. The detention pond shall meet the requirements of the 2016 City of Portland Stormwater Management Manual (SWMM) for landscaping, Section 2.4.1, and escape route, Section 2.30. All new public storm drains shall be a minimum of 12-inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.** The City Engineer (Exhibit Y) states the submitted preliminary stormwater calculations meet the water quality and water quantity criteria as stated in the City of Sandy Municipal Code Chapter 13.18 Standards and the City of Portland current Stormwater Management Manual (SWMM) Standards that were adopted by reference into the Sandy Development Code. Per the City Engineer, **the applicant shall submit a detailed final stormwater report stamped by a licensed professional to the City for review and approval with the final construction plans.**
106. Section 17.100.260 states that all subdivisions shall be required to install underground utilities. **The applicant shall install utilities underground with individual service to each lot.**
107. Section 17.100.270 specifies that sidewalks shall be installed on both sides of a public street. The applicant proposes constructing sidewalks along all public street frontages, with the exception of the Ponder Lane north/south. **As defined in the analysis of Chapter 17.84 of this staff report the applicant shall install sidewalks and planter strips on the west side of Ponder Lane.**
108. Section 17.100.280 requires that when appropriate, bicycle routes shall be extended within the proposed subdivision. The applicant does not propose any specific bicycle routes. Gunderson Road is classified as a minor arterial, which is prescribed to include bicycle lanes in both directions. However, Gunderson Road will not be built to its full profile at this time and bicycle lanes will most likely not be constructed in Gunderson Road in conjunction with development of the Bailey Meadows subdivision.
109. Section 17.100.290 specifies that where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved. As required by Section 17.92.30, the development of the subdivision requires installation of trees along all street frontages. Street trees are discussed in Section 17.92.30 of this document.
110. Section 17.100.300 contains requirements for erosion control for new land divisions. **The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the**

subdivision. All erosion control and grading shall comply with Section 15.44 of the Municipal Code and as detailed below. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit. The applicant shall submit confirmation from DEQ if a 1200-C Permit will not be required.

111. Install all improvements detailed in Section 17.100.310 as required. **The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.**
112. Entry monument signs shall be located entirely outside the public right-of-way and clear vision areas as required by Section 17.74.30. **If entry signs are desired the applicant shall submit a detailed plan with a sign permit.**

17.102 – Urban Forestry

113. Section 17.102.20 contains information on the applicability of Urban Forestry regulations. The subject property contains 23.42 acres and therefore compliance with this chapter is required. The subject property is currently a field, with very few trees. The applicant is not proposing any tree removal, with the exception of four (4) trees in the Melissa Avenue right-of-way and one (1) tree in the Ponder Lane right-of-way. With construction of Gunderson Road as recommended by staff, additional trees will need to be removed from the Gunderson Road right-of-way. Tree removal as required by the city or public utility for the installation or maintenance or repair of roads, utilities, or other structures is exempt from the requirements of Chapter 17.102 per Section 17.102.20(B.1). **The applicant shall not remove any trees 11-inches DBH or greater from the subject property or the property to the south where the off-site Gunderson Road extension will be constructed (if the UGB application is approved) that are located outside of the rights-of-way without applying for a tree removal permit and obtaining approval for tree removal.**
114. Section 17.102.50 contains tree retention and protection requirements. The subject property is 23.42 acres, which requires a minimum of 70 retention trees that are 11-inches or greater DBH and in good health. The applicant inventoried 192 total trees. Per the submitted Tree Preservation & Removal Plan (Exhibit C, Sheets P1-16-19), 19 of the inventoried trees are on the subject property. All of the 19 trees on the subject property are 11-inches or greater DBH; 17 are in good health, and 2 are in fair health. In order to meet the tree retention standard, the applicant cannot remove any of the 19 trees from the subject property. The applicant is proposing to preserve all 19 trees on the subject property. The properties directly north, south, east, and west of the subject site contain many existing trees, some of which are located close to the shared property line and have canopies that extend onto the subject property. The submitted Tree Preservation & Removal Plan (Exhibit C, Sheets P1-16-19) inventoried 173 trees offsite. Of the 173, five (5) trees are proposed to be removed in conjunction with future street construction of Melissa Avenue and Ponder Lane; the remaining 168 are proposed to be preserved. With dedication of Gunderson Road along the south edge of the property along Lots 55-59, additional trees will need to be eventually removed when the street is constructed. This could result in removal of three (3) trees on the subject property (Trees # 15164, 15236, and 15274). This would result in 16 trees being

retained on the subject property. The Tree Preservation & Removal Plan details the optimal tree root zone at 1 foot per 1 inch DBH for all trees inventoried, including those on adjacent properties. **The applicant shall install tree protection fencing to protect all 16 trees on the subject property as well as the 154 trees proposed for retention on adjacent properties. The applicant shall retain an arborist on site to monitor any construction activity within the root protection zones of the trees on adjacent properties that have root protection zones that would be impacted by construction of Gunderson Road.** The applicant did not submit a tree inventory and removal plan for the off-site portion of Gunderson Road.

Section 17.102.50(B.1) requires tree protection fencing be placed no less than 10 horizontal feet from the outside edge of the trunk. Per the Pacific Northwest International Society of Arboriculture (ISA), the ISA defines the critical root zone (CRZ) as “an area equal to a 1-foot radius from the base of the tree’s trunk for each 1 inch of the tree’s diameter at 4.5 feet above grade (referred to as diameter at breast height).” Often the drip-line is used to estimate a tree’s CRZ; however, it should be noted that a tree’s roots typically extend well beyond its drip-line. In addition, trees continue to grow, and roots continue to extend. Thus, a proactive approach to tree protection would take into consideration the fact that the tree and its root zone will continue to grow. The submitted Tree Preservation & Removal Plan (Exhibit C, Sheets P1-16-19) details the optimal tree root zone at 1 foot per 1 inch DBH. **The applicant shall install tree protection fencing a minimum distance of 1 foot per 1 inch DBH, as indicated by the project arborist and recommended by the ISA. Tree protection fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade. The tree protection fencing shall be 6 foot tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated. No construction activity shall occur within the tree protection zone, including, but not limited to, dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures prior to any tree removal, grading, or other construction activity on the site.**

OTHER CONSIDERATIONS FOR TREES:

To ensure protection of the required retention trees, the applicant shall record a tree protection covenant specifying protection of the 16 trees on the subject property and limiting removal without submittal of an Arborist’s Report and City approval. This document shall include a sketch identifying the required retention trees and a 1 foot per 1 inch DBH radius critical root zone around each tree. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans; plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.

15.30 – Dark Sky

115. Chapter 15.30 contains the City of Sandy’s Dark Sky Ordinance. The applicant will need to install street lights along all street frontages wherever street lighting is determined necessary.

The locations of these fixtures shall be reviewed in detail with construction plans. Full cut-

off lighting shall be required. Lights shall not exceed 4,125 Kelvins or 591 nanometers in order to minimize negative impacts on wildlife and human health.

15.44 – Erosion Control

116. The applicant submitted a Geotechnical Engineering Report (Exhibit I) prepared by GeoPacific Engineering, Inc., dated June 18, 2019. The City Engineer (Exhibit Y) reviewed the Geotechnical Engineering Report and recommends that **the applicant shall retain appropriate professional geotechnical services for observation of construction of earthwork and grading activities. The grading setbacks, drainage, and terracing shall comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report. When the grading is completed, the applicant shall submit a final report by the Geotechnical Engineer to the City stating that adequate inspections and testing have been performed on the lots and all of the work is in compliance with the above noted report and the OSSC. Site grading should not in any way impede, impound or inundate the adjoining properties.**
117. **All the work within the public right-of-way and within the paved area should comply with American Public Works Association (APWA) and City requirements as amended. The applicant shall submit a grading and erosion control permit and request an inspection of installed devices prior to any additional grading onsite. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. All erosion control and grading shall comply with Section 15.44 of the Municipal Code. The proposed subdivision is greater than one acre which typically requires approval of a DEQ 1200-C Permit. The applicant shall submit confirmation from DEQ if a 1200-C Permit will not be required.**
118. Section 15.44.50 contains requirements for maintenance of a site including re-vegetation of all graded areas. **The applicant’s Erosion Control Plan shall be designed in accordance with the standards of Section 15.44.50.**
119. Recent development at both Zion Meadows subdivision and the remodel of the Pioneer Building (former Sandy High School) have sparked unintended rodent issues in the surrounding neighborhoods. Prior to development of the site, **the applicant shall have a licensed pest control agent evaluate the site to determine if pest eradication is needed.**

DECISION

Staff recommends the Planning Commission approve the Bailey Meadows subdivision with the conditions as outlined below.

CONDITIONS OF APPROVAL

- A. Prior to submitting construction plans, including grading and erosion control permits, the applicant shall update the plan set and associated documents based on the conditions of**

approval determined by the Planning Commission and shall submit a full set of the updated plans to Planning Division staff for review and approval.

1. Submit a revised Preliminary Plat featuring the following:
 - An eight-foot wide public utility easement (PUE) along the frontage of all proposed lots;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 26-29;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 37-38 and 41-42;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 38-39 and 40-41;
 - A 15-foot private sanitary sewer easement along the common lot lines of Lots 48-51;
 - A 15-foot private storm drainage easement along the common lot lines of Lots 47-48 and 51-52;
 - A vehicle non-access reserve (VNAR) strip in the following locations:
 - East end of Street A
 - West end of Street B
 - West end of Ponder Lane (east/west portion of right-of-way)
 - West end of Street C
 - West end of Street D
2. Submit a revised Tree Plan featuring the following modifications:
 - If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.
 - Detail a minimum of two (2) different tree species per block face for staff review and approval.
3. If the UGB application is approved, submit an analysis of the proposed Gunderson Road alignment that confirms that if Gunderson Road intersects with Highway 211 at the location proposed by the applicant, it can still connect to Cascadia Village Drive as identified in the TSP while meeting code standards such as tangency.
4. Submit a revised Plan Set featuring the following:
 - Revise the Plan Set to detail the front door of the houses on Lots 55-59 facing Gunderson Road.
 - Extend the street improvements on Ponder Lane east/west to the east and west line of the development site and obtain slope easements or construct retaining walls as necessary.
 - Extend the street improvements on Street A to the east property line of the development site and obtain slope easements or construct retaining walls as necessary.
 - Extend the street improvements on Street B to the east and west lines of the development site and obtain slope easements or construct retaining walls as necessary.

- If the UGB application is approved, extend the street improvements on Avenue 2 to connect with Gunderson Road on the property to the south.
 - Extend the street improvements on Street C to the east and west line of the development site and obtain slope easements or construct retaining walls as necessary.
 - Extend the street improvements on Street D to the east and west line of the development site and obtain slope easements or construct retaining walls as necessary.
5. Revise the plan set to detail all driveways at a maximum of 24 feet wide. Combine driveways for Lots 9 and 10 into a shared driveway or reduce the width of the driveways for Lots 9 and 10 to accommodate street trees and other right-of-way amenities. Submit one of the following two options for staff review and approval:
 - Submit a revised plan detailing shared driveways that do not exceed 24 feet wide with crossover easements; or,
 - Submit a detailed driveway spacing plan that conserves frontage and maximizes area for street trees and on-street parking.
 6. Call the PGE Service Coordinators at 503-323-6700 when the developer is ready to start the project.
 7. If the plans change in a way that affects the number of street trees (e.g., driveway locations), the applicant shall submit an updated street tree plan for staff review and approval.

B. Prior to earthwork, grading, or excavation, the applicant shall complete the following and receive necessary approvals as described:

1. The applicant shall obtain a grading and erosion control permit in conformance with Chapter 15.44. The grading and erosion control plan shall include a re-vegetation plan for all areas disturbed during construction of the subdivision. *(Submit 2 copies to Planning/Building Department.)*
2. Submit proof of receipt of a Department of Environmental Quality 1200-C permit or submit confirmation from DEQ if a 1200-C Permit will not be required. *(Submit to Planning/Building Department.)*
3. Any existing domestic or irrigation wells on site shall be located, identified, capped, disconnected or abandoned in conformance with OAR 690-220-0030. A copy of the Oregon Water Resources Department (OWRD) abandonment certificate shall be submitted to the City Planning Division. Any on-site sewage disposal system shall be abandoned in conformance with Clackamas County Water Environmental Services (WES) regulations and a copy of the septic tank removal certificate shall be submitted to the City Planning Division.
4. Install tree protection fencing to protect all 16 trees on the subject property as well as the 154 trees proposed for retention on adjacent properties. Retain an arborist on site to monitor any construction activity within the root protection zones of the trees on adjacent properties that have root protection zones that would be impacted by construction of Gunderson Road. Install tree protection fencing a minimum distance of 1 foot per 1 inch DBH, as indicated by the

project arborist and recommended by the ISA. Tree protection fencing shall be a minimum of six feet tall supported with metal posts placed no farther than ten feet apart installed flush with the initial undisturbed grade. The tree protection fencing shall be 6 foot tall chain link or no-jump horse fencing and the applicant shall affix a laminated sign (minimum 8.5 inches by 11 inches) to the tree protection fencing indicating that the area behind the fence is a tree retention area and that the fence shall not be removed or relocated. No construction activity shall occur within the tree protection zone, including, but not limited to, dumping or storage of materials such as building supplies, soil, waste items, equipment, or parked vehicles. The applicant shall request an inspection of tree protection measures prior to any tree removal, grading, or other construction activity on the site.

5. Request an inspection of erosion control measures and tree protection measures as specified in Section 17.102.50(C). Receive an approval of erosion control measures and tree protection measures prior to construction activities or issuance of the grading and erosion control permit.
6. Submit confirmation from a licensed pest control agent that the site was reviewed to determine if pest eradication is needed.

C. Prior to all construction activities, except grading and/or excavation, the applicant shall submit the following additional information as part of construction plans and complete items during construction as identified below: (*Submit to Public Works unless otherwise noted*)

1. The location of fire hydrants will be reviewed by the Sandy Fire Department in more detail with construction plans. Revise the Parking Analysis if required fire hydrants affect on-street parking spaces.
2. Work with the Fire Marshal to determine if the proposed plan meets Fire Code. Per ODOT (Exhibit AA), the applicant shall provide emergency vehicle turning templates for the Highway 211/Ponder Lane intersection. Improvements to the intersection will be required if determined necessary by ODOT.
3. Submit a profile design for a minimum of 200 feet for all future street extensions beyond the project boundary to ensure future street grades can be met.
4. Specify the locations of street lights on all streets being improved within and adjacent to the subdivision. Full cut-off lighting shall be required that does not exceed 4,125 Kelvins.
5. Submit a detailed final stormwater report stamped by a licensed professional to the City for review and approval with the final construction plans.
6. Demonstrate that the proposed subdivision does not exceed pre-development site runoff discharges to this same point and provide information on the dimensions and slope of the existing drainage way. The detention pond shall meet the requirements of the 2016 City of Portland Stormwater Management Manual (SWMM) for landscaping, Section 2.4.1, and escape route, Section 2.30.

7. Submit a mail delivery plan, featuring grouped lockable mail facilities, to the City and the USPS for review and approval prior to installation of mailboxes. Mail delivery facilities shall be provided by the applicant in conformance with Section 17.84.100 and the standards of the USPS.
8. Revise the utility plan to include broadband fiber locations as detailed by the SandyNet Manager.

D. Prior to Final Plat approval, the applicant shall complete the following tasks or provide assurance for their future completion:

1. Submit two paper copies of the tentative final plat for review with the associated plat review fee.
2. When the grading is completed, the applicant shall submit a final report by the Geotechnical Engineer to the City stating that adequate inspections and testing have been performed on all lots (Lots 1-32) and all of the work is in compliance with the above noted report and OSSC.
3. Construct all public improvements including streets and utilities, install street lights, and street signage. Complete street improvements for all streets within the subdivision as defined in this staff report, and for Gunderson Road and Highway 211 per the Development Agreement. The improvements shall include installation of sidewalks and planter strips on the west side of Ponder Lane.
4. Construct sidewalks along Tract A both on Ponder Lane and Street B, prior to final plat approval.
5. Construct the pedestrian tract (Tract B) improvements with pedestrian scale lighting connected to the street light circuit. The Tract B walkway shall be conveyed to the City on the Final Plat. The walkway within the tract shall be constructed of concrete at 8 feet in width with a 7 foot wide area for trees and landscaping. Install bollards at the east end of the tract to restrict vehicles from accessing the tract.
6. Install bollards along the east terminus of Street B, Ponder Lane east/west, Street C, and Street D. Also, install 'no parking' signs along the full length of Ponder Lane north/south at a spacing as determined during construction plan review.
7. Install the required local street improvements north of the property boundary to connect to the existing Melissa Avenue stub.
8. Install a stop sign at the intersection of Melissa Avenue and Rachael Drive for northbound traffic.
9. Install street lights as identified on the construction plans. The locations of street light fixtures shall be reviewed in detail with construction plans.
10. Dedicate the following to the City (by deed using the City's standard form):

- Tract A and Tract B.
 - Gunderson Road.
 - If the UGB application is approved, the stormwater pond for Gunderson Road and Highway 211 (currently noted as Tract C).
11. Record a tree protection covenant specifying protection of the 16 trees on the subject property and limiting removal without submittal of an Arborist's Report and City approval. This document shall include a sketch identifying the required retention trees and a 1 foot per 1 inch DBH radius critical root zone around each tree. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans; plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.
 12. Pay \$310,890 for the parks fee in lieu of dedication, -or- pay a total of \$341,850 if a portion of the fee is deferred (a minimum of 50 percent (\$170,925) paid prior to final plat approval with the remaining 50 percent (\$170,925) divided between the 100 lots, paid with each building permit). If the applicant dedicates parkland to the south of Bailey Meadows instead of paying the fee in-lieu the applicant and City Manager, on behalf of City Council, shall negotiate the terms of the parkland dedication.
 13. If the applicant chooses to postpone street tree and/or landscaping installation, the applicant shall post a performance bond equal to 120 percent of the cost of the street trees/landscaping, assuring installation within 6 months. The cost of the street trees shall be based on the average of three estimates from three landscaping contractors; the estimates shall include as separate items all materials, labor, and other costs of the required action, including a three-year maintenance and warranty period.
 14. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction, or shall aerate the soil at the individual home construction phase. The applicant shall call for an inspection with the City after aerating the soil and before planting the street trees.
 15. Pay plan review, inspection, and permit fees as determined by the Public Works Director.
 16. Pay addressing fees at \$40 for the subdivision plus \$5 per lot, or as otherwise identified in the most updated fee schedule.
 17. Submit a true and exact reproducible copy (Mylar) of the Final Plat for final review and signature.
 18. Submit a copy of the following once recorded:
 - Mylar version of the Final Plat.
 - Tree protection covenant including a map identifying the location of the retention trees.
 - Deeds identifying dedications to the City.

E. Gunderson Road shall be constructed and accepted by the city prior to issuance of the 30th certificate of occupancy for a housing unit in the subdivision. The applicant shall submit a revised phasing plan for Director review and approval.

F. All conditions in Section A., B., C., and D. shall be satisfied prior to submittal of building permits. The following list includes conditions related to individual home construction:

1. All homes shall provide building design features in conformance with the standards of Section 17.90.150.
2. All homes shall meet the development standards of Section 17.34.30.
3. All structures shall maintain a minimum 20-foot setback from the Gunderson Road public right-of-way.
4. The front door of the houses on Lots 55-59 shall face Gunderson Road and include a connection directly to Gunderson Road via a pedestrian route per Section 17.82.20.
5. Street trees shall be installed approximately 30 feet on center in conjunction with issuance of building permits. Street trees are required to be a minimum caliper of 1.5-inches measured 6 inches from grade. Trees shall be planted and staked per the City of Sandy standard planting detail; trees shall be tied to the stakes with loosely tied twine. Tree ties shall be removed within one year of installation. *However, if the applicant postpones street tree installation per Condition D.13 street trees do not need to be planted with individual home construction.*
6. Aerate the planter strips to a depth of 3 feet prior to planting street trees. The applicant shall either aerate the planter strip soil at the subdivision stage and install fencing around the planter strips to protect the soil from compaction, or shall aerate the soil at the individual home construction phase. The applicant shall call for an inspection with the City after aerating the soil and before planting the street trees.
7. All planter strips shall be graded and backfilled as necessary, and bark mulch, vegetation, or other approved material installed prior to occupancy.
8. All trees marked for retention shall be retained and protected during construction regardless of desired or proposed building plans. Plans for future houses on the proposed lots within the subdivision shall be modified to not encroach on retention trees and associated tree protection fencing.
9. Development of this subdivision will require payment of system development charges in accordance with applicable City ordinances.

G. General Conditions of Approval:

1. On January 7, the applicant submitted an application to the City to expand the City's UGB in order to: (1) allow the applicant to dedicate right-of-way and construct Gunderson Road from the south boundary of the subject property to Oregon Highway 211; and (2) to dedicate

approximately 2.3 acres of parkland within TL 701. If the UGB application is approved and is ultimately deemed acknowledged:

- a. The applicant shall dedicate right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City's transportation system plan, as shown in Exhibit W (page 4), subject to the terms of a non-statutory Development Agreement to be entered into between the applicant and the City (the "Development Agreement").
- b. The applicant shall construct Gunderson Road with a paved width of at least 24 feet to allow for two lanes of travel, as shown in Exhibit W (page 4), subject to the terms of the Development Agreement.

If the UGB application is not approved by either the City or Clackamas County, or an approval is finally reversed on appeal, the Applicant shall be allowed to proceed with an approval of the tentative subdivision application provided that it:

- a. Received final approval of the tentative subdivision application in the event of an appeal;
- b. Prior to final plat approval, pays the City a fee-in-lieu of parkland dedication of \$310,890 (1.29 acres of land to be dedicated x \$241,000) in accordance with SMC Chapter 17.86 and Resolution 2013-14;
- c. Prior to final plat approval, grants the City an easement to permit the eventual dedication of right-of-way sufficient to allow Gunderson Road to meet the minor arterial standard in the City's transportation system plan; and
- d. All other conditions of approval in this decision are satisfied.

If the UGB application is approved and is appealed, the applicant will intervene in the appeal and exercise good faith and its best efforts in defending the approval.

2. The Final Plat shall be recorded as detailed in Section 17.100.60.
3. Public improvement plans are subject to a separate review and approval process. Preliminary Plat approval does not connote approval of public improvement construction plans, which will be reviewed and approved separately upon submittal of public improvement construction plans.
4. The improvements to Highway 211 shall meet the requirements of ODOT -or- alternatively AASHTO standards if the highway is transferred to the City of Sandy.
5. No building permits will be issued until all public utilities including sanitary sewer and water service are available to serve the development.
6. The City reserves the right to name all streets.
7. If entry signs are desired, the applicant shall submit a detailed plan showing the location of such signage and a sign permit application.
8. The applicant shall comply with the parking standards in Chapter 17.98. Garages shall be adequate depth to park a vehicle and the on-street parking spaces shall be at least 22 feet in length. All parking, driveway and maneuvering areas shall be constructed of asphalt, concrete, or other approved material.

9. All work within the public right-of-way and within the paved area shall comply with the American Public Works Association (APWA) and City requirements as amended.
10. All ADA ramps shall be designed, inspected by the design engineer, and constructed by the contractor to meet the most current PROWAG requirements.
11. All on-site earthwork activities including any retaining wall construction shall follow the current requirements of the current edition of the Oregon Structural Specialty Code (OSSC). If the proposal includes a retaining wall, the applicant shall submit additional details on the proposed retaining wall for staff review and approval.
12. Trees shall not be removed from the subject property or the property to the south where the off-site Gunderson Road extension will be constructed that are located outside of the rights-of-way without applying for a tree removal permit and obtaining approval for tree removal.
13. All franchise utilities shall be installed underground and in conformance with City standards with individual service to each lot.
14. The applicant shall be responsible for the installation of all improvements detailed in Section 17.100.310, including fiber facilities. SandyNet requires the developer to work with the City to ensure that broadband infrastructure meets the design standards and adopted procedures as described in Section 17.84.70.
15. All public utility installations shall conform to the City's facilities master plans.
16. Site grading shall not in any way impede, impound, or inundate the surface drainage flow from the adjoining properties.
17. The applicant shall retain appropriate professional geotechnical services for observation of construction of earthwork and grading activities. The grading setbacks, drainage, and terracing shall comply with the Oregon Structural Specialty Code (OSSC) requirements and the geotechnical report recommendations and conclusions as indicated in the report.
18. Water line sizes shall be based upon the Water Facilities Master Plan and shall be sized to accommodate domestic fire protection flows on the site.
19. All public sanitary sewer and waterline mains shall be a minimum of 8 inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.
20. All stormwater drains shall be a minimum of 12 inches in diameter and shall be extended to the plat boundaries where practical to provide future connections to adjoining properties.
21. As required by Section 17.92.10(L), all landscaping shall be continually maintained, including necessary watering, weeding, pruning, and replacing. As required by Section 17.92.140, the

developer shall maintain all vegetation planted in the development for two (2) years from the date of completion, and shall replace any dead or dying plants during that period.

22. As required by the Planning Commission, retention trees shall be detailed on a recorded tree protection covenant; thus, the retention trees shall be guaranteed or replaced in perpetuity.
23. Maintain all unlandscaped and/or revegetated areas for a period of two years following the date of recording of the final plat associated with those improvements.
24. Successors-in-interest of the applicant shall comply with site development requirements prior to the issuance of building permits.
25. All improvements listed in Section 17.100.300 shall be provided by the applicant including drainage facilities, monumentation, mail facilities, sanitary sewers, storm sewer, sidewalks, street lights, street signs, street trees, streets, traffic signs, underground communication lines including telephone and cable, underground power lines, water lines and fire hydrants.
26. Comply with all standards required by Section 17.84 of the Sandy Development Code. Public and franchise improvements shall be installed or financially guaranteed in accordance with Chapter 17 of the Sandy Municipal Code prior to temporary or final occupancy of structures. Water lines and fire hydrants shall be installed in accordance with City standards. All sanitary sewer lines shall be installed in accordance with City standards.
27. Comply with all other conditions or regulations imposed by the Sandy Fire District or state and federal agencies. Compliance is made a part of this approval and any violations of these conditions and/or regulations may result in the review of this approval and/or revocation of approval.

Exhibit IIIII



MINUTES
Planning Commission Meeting
Tuesday, December 17, 2019 City Hall-
Council Chambers, 39250 Pioneer Blvd.,
Sandy, Oregon 97055 7:00 PM

COMMISSIONERS PRESENT: Ron Lesowski, Commissioner, Hollis MacLean-Wenzel, Commissioner, Jerry Crosby, Commissioner, John Logan, Commissioner, Chris Mayton, Commissioner, and Todd Mobley, Commissioner

COMMISSIONERS ABSENT: Don Carlton, Commissioner

STAFF PRESENT: Kelly O'Neill, Development Services Director and Emily Meharg, Associate Planner, City Attorney David Doughman

MEDIA PRESENT:

1. **Roll Call**
2. **Requests From the Floor - Citizen Communication on Non- Agenda Items**
None
3. **OLD BUSINESS**
None
4. **NEW BUSINESS**
 - 4.1. **Bailey Meadows Subdivision (19-023 SUB/VAR/TREE):**

Chairman Crosby introduced staff, the Commission, and explained the public hearing process to the audience.

Chairman Crosby opened the public hearing on File No. 19-023 SUB/VAR/TREE at 7:04 p.m. Crosby called for any abstentions, conflicts of interest, ex-parte contact, challenges to the jurisdiction of the Planning Commission, or any challenges to any individual member of the Planning Commission. No challenges were made, and no declarations were made by the Planning Commissioners. Crosby explained that the decision tonight is only a recommendation to City Council.

Commissioner Mobley recused himself as the applicant's transportation engineer.

Commission Logan asked a question about ex-parte contact. Attorney Doughman provided advice on ex-parte contact.

Staff Report:

Development Services Director Kelly O'Neill Jr. summarized the staff report and addressed the background, factual information, and presented a brief slide show. Attorney Doughman provided additional information regarding the procedure, a summary of where the review is at and what he finds are the next steps.

The Commission decided they will grant the continuance. The Commission discussed that holding a meeting on January 27, 2020 will be difficult as several of the Commissioners are unavailable.

Applicant Testimony:

Mike Robinson
1211 SW 5th Ave, Suite 1900
Portland, OR 97204

Mr. Robinson provided a brief background of where the applicant and city are at in the process. The applicant volunteered to apply for a UGB expansion to include Gunderson Road, and has met with several state agencies and City staff. The applicant has requested an extension to work on the UGB expansion application and for staff to work on the code analysis for the subdivision.

Proponent Testimony:

None

Opponent Testimony:

Anthony (Tony) Profitt
18306 Grey Avenue
Sandy, OR 97055

Mr. Profitt stated that this subdivision is going to add traffic to the Nicolas Glen subdivision and is concerned with traffic that will impact children. Stated he does not believe that Gunderson Road will be the primary road into the subdivision. Wants to work cooperatively. When he moved into Nicolas Glen he knew the property to the south of Nicolas Glen would be eventually developed. Melissa Avenue gets icy and unsafe in the winter.

Makoto Lane
37828 Rachel Drive
Sandy, OR 97055

Mr. Lane opposes vehicular traffic into Nicolas Glen and would rather Bailey Meadows only connect to HWY 211. He does not want the safety of children put at risk. Stated the developer does not own the land and that the landowner will only develop the land if they obtain development entitlements.

Richard Sheldon
37522 Rachel Drive
Sandy, OR 97055

Mr. Sheldon spoke about safety issues in the existing subdivision. Wants a park in the Bailey Meadows subdivision. The developer at the September public meeting stated they would explore a UGB expansion. Noticed a crash analysis in the packet and noticed that the intersection of Dubarko Road and HWY 211 was not analyzed. Mentioned safety issues with icy roads in Nicolas Glen. He also referenced a letter from Curran-McLeod and stated some of the findings from the letter. He also brought up concerns over the "if approved" language, which he believes gives the developer an out. He wants the secondary access to be a required condition. The applicant does not have the community's interest at mind and is completing the subdivision only for profit. Requests that the record not be closed.

Cary Mallon
37537 Rachel Drive
Sandy, OR 97055

Mr. Mallon stated that Melissa Avenue is not adequate for the proposed subdivision. This property was doomed 20 years ago when Melissa Avenue was designed so narrow and not for additional growth to the south.

Kathleen Walker
15920 Bluff Road
Sandy, OR 97055

Ms. Walker appreciates the public comment period is being extended and is confused why there is not a full staff report yet. Believes the developer has good intentions, but that we need clear transportation connections and a park and believes that can be completed with the developer still making money. The developer makes a lot of arguments that City code does not apply, quotes standards not being clear and objective, and quotes needed housing as a basis. She believes needed housing is only related to needed affordable housing. Buildable lands inventory does not supersede parkland dedication. The existing development code is very clear that parkland dedication can be

required by the City of Sandy. Ms. Walker detailed the parkland dedication requirements and how they should relate to this subdivision proposal. Accepting the fee in-lieu is not fiscally prudent. The additional road access is necessary. The city should not consider horse trading or other negotiations.

Gigi Duncan
18275 Rachael Drive
Sandy, OR 97055

Ms. Duncan said that houses that exceed 400 thousand dollars are not affordable and not needed housing. Agrees with Ms. Walker that parkland should be dedicated. Believes that if the developer uses Melissa Avenue it will be unsafe for children and other people living in the existing subdivision. Believes the condition should be that if Gunderson Road is not extended the subdivision should be denied. Would like to see all Planning Commissioners participate in the January hearing. Sandy is a great place to live, it is safe, and there are a lot of families. Melissa Avenue was not designed to accommodate a bunch of traffic.

Erin Findlay
37616 Rachel Drive
Sandy, OR 97055

Ms. Findlay said she wants the record to remain open. From the start of the process with the proposed subdivision the main concern has been safety. One access into the subdivision is appalling. Would like parkland to be dedicated. There is good intention in the City code and hopes that money is not dictating all of the decisions. Fence lines are not determined yet and is concerned that issues need to be clarified before the subdivision proceeds.

Don Robertson
38412 Juniper Street
Sandy, OR 97055

Mr. Robertson stated he is speaking on behalf of the Sandy Parks and Trails Advisory Board. He read Section 17.86.10 of the Sandy Development Code. Referenced the 1997 Parks Master Plan and other master plan references from a letter he is submitting into the record. It is the city's discretion, not the developer's discretion on whether parkland is dedicated, or parks fee in-lieu is paid. The feasibility of the parkland dedication is very possible as the land is flat, and no major waterways or wetlands exist.

Tim Sellin
18256 Melissa Avenue
Sandy, OR 97055

Mr. Sellin has concerns with the construction phase for Bailey Meadows and how that will impact existing residents on Melissa Avenue. He believes there has to be 3.4 acres of parkland dedicated. Would like to see a gate at the end of Melissa Avenue going into the proposed subdivision that could be opened during emergencies.

Maria DeBatty
37176 Rachael Drive
Sandy, OR 97055

Ms. DeBatty is concerned with construction traffic, closure of Melissa Avenue, and the potential utility trench. She has talked with the Fire Marshall and Fire Chief extensively about emergency access and fire concerns. There is a trailer blocking the emergency fire exit in Nicolas Glen and overgrown vegetation in the emergency lane. The Nicolas Glen neighborhood is upset and does not have adequate details on the proposal. It seems a lot of issues have not been resolved and the developer keeps adding other information. Thinks the whole thing is ridiculous.

Mike Schell
37524 Rachel Drive
Sandy, OR 97055

Mr. Schell stated that parkland dedication should be considered. Public safety is a huge concern and asked the Planning Commission to strongly consider how this subdivision will impact the existing neighborhood. People need a place to play.

Laura Kvamme
37438 Rachel Drive
Sandy, OR 97055

Ms. Kvamme stated that the amount of traffic being proposed is concerning. It seems that people in the new subdivision will use Melissa Avenue as a shortcut to Fred Meyer and other shopping areas. Degradation of Melissa Avenue is a huge concern and believes that Melissa Avenue has issues with ice. Wants to make sure that the subdivision is conditioned to install Gunderson Road at the start of construction, prior to Melissa Avenue being torn up.

Kelli Acord
38897 Cascadia Drive
Sandy, OR 97055

Ms. Acord stated she represents Student Transportation of America. She said that the existing situation is already problematic as the existing streets are

narrow. The roads are not large enough to accommodate large pickups parked on the streets and buses driving down the streets. This is the first-time hearing about Gunderson Road being proposed. Stated that staff is always free to talk with Student Transportation of America.

Carol Cohen
37537 Rachel Drive
Sandy, OR 97055

Ms. Cohen stated it's amazing how this has brought the community together. Parkland dedication is very important and doesn't think the developer should be allowed to just write a check. Safety is a huge issue especially with how steep and icy Melissa Avenue gets.

Mark Miller
37777 Ponder Land
Sandy, OR 97055

Mr. Miller has a wetland or spring that forms and runs into the proposed development. Also, there is an issue with stormwater leaving HWY 211 and entering the subject property. Noted that both could cause issues for the future construction of Gunderson Road. Has questions and concerns with the proposed stormwater location. AKS has been surveying the site and causing issues on HWY 211.

Neutral Testimony

Robert Fisher
38100 Sandy Heights Street
Sandy, OR 97055

Mr. Fisher stated we need to look at this issue rationally and come to a positive solution for everyone. Proceed with caution. Has concerns with Gunderson Road intersecting with HWY 211.

Brad Robison
37412 Rachel Drive
Sandy, OR 97055

Mr. Robison stated the codes and rules have been designed so that if impacts happen to the community as a whole those impacts are often overlooked and cannot be analyzed. Also stated he is pursuing a claim of adverse possession on a property line dispute with the Bailey Meadows property.

Les Geren
37721 Ponder Lane

Sandy, OR 97055

Mr. Geren uses Ponder Lane for large deliveries. Wants to assure that Ponder Lane is left open or an alternative route accommodates large vehicles.

Calvin Mckinnis

37551 HWY 211

Sandy, OR 97055

Mr. Mckinnis farms a lot of acreage around the subject area and drives tractors on HWY 211. He is in favor of anything that will improve HWY 211. Concerned about children playing in the woods and creek, destroying fences and letting cattle off his property.

Staff Recap:

Mr. O'Neill stated that there was a lot of good testimony some of which will be addressed by staff at the January meeting. Staff will deliberate further at the January meeting once the full code analysis has been complete, the applicant completes their presentation, and the public has a chance to testify again. Mr. Doughman explained ex-parte contact with Commissioners in greater detail. Mr. O'Neill stated that city staff is always available to talk and that ex-parte rules do not apply to city staff.

Commissioners Crosby and Maclean-Wenzel thanked the public and stated the earlier you send comments to the Commissioners the better.

Applicant Rebuttal:

Mr. Robinson stated he is happy everyone came to the hearing and reserves their additional testimony for the January meeting.

Discussion:

The Planning Commission decided to continue the hearing to January 23, 2020.

Motion: Motion to continue the public hearing to January 23, 2020 at 6:30.

Moved By: Commissioner Logan

Seconded By: Commissioner Maclean-Wenzel

Yes votes: Lesowski, Maclean-Wenzel, Crosby, Logan, and Mayton

No votes: None

The motion passed at 9:03 PM

5. Items from Commission and Staff

Mr. O'Neill explained the Council decisions from the December 16, 2019 City Council meeting, talked about upcoming meetings, the new associate planner being hired,

Emily Meharg's promotion to senior planner, and a few logistical items.

6. Adjourn

Motion: To adjourn

Moved By: Commissioner Maclean- Wenzel

Seconded By: Commissioner Mayton

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed.

Chairman Crosby adjourned the meeting at 9:19 p.m.



Chair, Jerry Crosby



Planning Director, Kelly O'Neill Jr

Exhibit JJJJJ



MINUTES
Planning Commission Meeting
Thursday, January 23, 2020 City Hall- Council
Chambers, 39250 Pioneer Blvd., Sandy,
Oregon 97055 6:30 PM

COMMISSIONERS PRESENT: Don Carlton, Commissioner, Ron Lesowski, Commissioner, Hollis MacLean-Wenzel, Commissioner, Jerry Crosby, Commissioner, John Logan, Commissioner, Chris Mayton, Commissioner, and Todd Mobley, Commissioner

COMMISSIONERS ABSENT:

STAFF PRESENT: Kelly O'Neill, Development Services Director and Emily Meharg, Associate Planner, David Doughman, City Attorney

MEDIA PRESENT:

1. Roll Call

2. Select Chair and Vice Chair

Motion: To select Commissioner Crosby as the chair for 2020.

Moved By: Commissioner Carlton

Seconded By: Commissioner MacLean-Wenzel

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed.

To select vice chair for 2020.

5 voted for Commissioner Carlton (Carlton, Lesowski, Crosby, Logan, and Mayton)

2 voted for Commissioner MacLean-Wenzel (MacLean-Wenzel and Mobley)

Motion: To select Commissioner Carlton as the vice chair for 2020.

Moved By: Commissioner Logan

Seconded By: Commissioner Mayton

Yes votes: All Ayes

No votes: None

Abstention: None

The motion passed.

3. Approval of Minutes

3.1. Approval of Minutes - December 3, 2019

Motion: To approve minutes for December 3, 2019

Moved By: Commissioner Carlton

Seconded By: Commissioner Logan

Yes votes: All Ayes

No votes: None

Abstentions: None

The motion passed.

3.2. Approval of Minutes - December 17, 2019

Motion: To approve minutes for December 17, 2019

Moved By: Commissioner Mayton

Seconded By: Commissioner MacLean-Wenzel

Yes votes: Lesowski, MacLean-Wenzel, Crosby, Logan, and Mayton

No votes: None

Abstentions: Mobley and Carlton

The motion passed.

4. Requests From the Floor - Citizen Communication on Non- Agenda Items

None

5. OLD BUSINESS

5.1. 19-023 SUB/VAR/TREE Bailey Meadows Subdivision

Staff Report - 0217

Chairman Crosby opened the public hearing on File No. 19-023 SUB/VAR/TREE at 6:46 p.m. Crosby called for any abstentions, conflicts of interest, ex-parte contact, challenges to the jurisdiction of the Planning Commission, or any challenges to any individual member of the Planning Commission. No challenges were made, and no declarations were made by the Planning Commissioners.

Commissioner Mobley recused himself as the applicant's transportation engineer.

Commissioner Carlton stated that he viewed the December 17 Planning Commission hearing video and reviewed the packet since he was not at the

December 17 hearing.

City Attorney Doughman explained the applicant's request to have the record remain open. They are treating tonight's hearing as the first evidentiary hearing. After tonight's meeting, there will be a 7-day period where anyone can submit testimony into the record. This will be followed by a second 7-day period for anyone to submit testimony in response to anything submitted in the first 7 days (new issues cannot be raised). Usually there's a third 7-day period solely for the applicant but, given the time frame, the applicant is waiving the right to final argument. The Planning Commission will reconvene on February 11, 2020 to deliberate amongst themselves with staff, but no additional public or applicant testimony will be heard.

Staff Report:

Since the publication of the report, there are 4 new exhibits that were provided to Planning Commission. Development Services Director Kelly O'Neil Jr. summarized the staff report and addressed the background, factual information, and presented a brief slide show.

Attorney Doughman provided additional information regarding PC's ability to change conditions.

Applicant Testimony:

Mike Robinson
1211 SW 5th Ave, Suite 1900
Portland, OR 97204

Attorney Robinson introduced the applicant's team and provided a brief background of the applicant's request. He stated they are looking for solutions through the UGB expansion to provide parkland and Gunderson Road. Robinson addressed the neighbors stating the applicant understands the concerns and commits to doing their best to minimize disruption and to get the UGB expansion to occur for parkland and Gunderson Road. Robinson cited Oregon statutes related to needed housing. Robinson also explained the application is a limited land use application, so the applicant only needs to adhere to what's in the code, not the TSP. For needed housing, cities can only apply clear and objective criteria. Robinson responded to issues raised in the previous hearing, many of which are subjective or are not in the subdivision approval criteria. Robinson explained that the traffic analysis was reviewed by multiple professionals and found to be sound. Robinson made a formal request that the Planning Commission close the public hearing but keep the record open for the two 7-day periods as explained by Attorney Doughman. The applicant will extend the 120-clock by 14 days.

Chris Goodell
AKS Engineering and Forestry
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Goodell talked about specifics of the subdivision, including circulation and infrastructure. Mr. Goodell presented a brief slideshow.

Proponent Testimony:

None

Opponent Testimony:

Makoto Lane
37828 Rachael Drive
Sandy, OR 97055

Concerned about traffic. Applicant's attorney alluded to litigation against the City, which is not indicative of a good neighbor. The traffic study appears to be partial to the developer. If a kid gets hit on Melissa Avenue, do the parents sue the City because they allowed it? 30th house tied to Gunderson Road doesn't work because developer will just continue to develop beyond that. Applicant needs to get UGB expansion approved and construct Gunderson Road before any houses are constructed. Mr. Lane does not want motor vehicle access to Melissa Avenue and doesn't understand why the TSP can be ignored.

Erin Findlay
37616 Rachael Drive
Sandy, OR 97055

In support of UGB expansion. Safety is the number one priority. Requests a 4 way stop at Melissa Avenue and Rachael Drive. Wants to know participation in UGB expansion at County level.

Kathleen Walker
15920 Bluff Road
Sandy, OR 97055

Thanked the applicant for working with City, ODOT, and Clackamas County. 900 pages is a lot to review. Concerned about the applicant's plan being in so many pieces, which makes it difficult to see how everything's connected and what the actual proposal is. Gunderson Road and the UGB expansion need to get done or the subdivision should not be approved. Parkland should also be conditioned for approval. Applicant's submittal only includes half a road for Gunderson Road; it's not clear what they are actually proposing. There should

be bike lanes and curb and sidewalk on at least one side of Gunderson Road.

Carol Cohen
37537 Rachael Drive
Sandy, OR 97055

900 pages is a lot to review. Is Gunderson Road going to happen? Lots of confusion. Parkland should be dedicated prior to occupancy. Gunderson Road should be completed before building permits are issued to provide access for construction vehicles.

Kelly Whitlock
17975 422nd Avenue
Sandy, OR 97055

Who pays for the park and who pays for Gunderson Road?

Gigi Duncan
18275 Rachael Drive
Sandy, OR 97055

City has a vision and a higher responsibility. We've learned from Nicolas Glen that one street in and out of a subdivision doesn't work and that there should have been a park. Bailey Meadows is not affordable housing. Safety should be the ultimate litmus test. House Bill 2001 - Oregon working on up-zoning to create denser, greener, and more affordable housing.

Laura Kvamme
37438 Rachael Drive
Sandy, OR 97055

Melissa Avenue already carries too much traffic. Curious about elevation that parallels Rachael Drive and how drainage will work. Can't allow any new development; already exceeding capacity on Melissa Avenue. How will student buses navigate? Wants to see a clear plan.

Brad Robison
37412 Rachael Drive
Sandy, OR 97055

Just because you can do something doesn't mean you should. Afraid that if Gunderson Road doesn't go through, the applicant will still be able to build the subdivision. Subdivision needs to be thought out and impact on existing neighbors needs to be considered, not just profit.

Neutral Testimony

Makoto Lane
37828 Rachael Drive
Sandy, OR 97055

He stated he wants to advocate for keep the hearing open.

Staff Recap:

Development Services Director O'Neill stated that some items will be addressed later and the City Attorney will need to address ORS provisions. O'Neill clarified that needed housing is related to growth projected in a 20-year planning horizon, not affordable housing. O'Neill reiterated that the proposed lots meet the 7,500 square foot lot requirement in the applicable zoning district. A 4-way stop could be considered and evaluated. Gunderson Road is proposed at a 24-foot-wide asphalt section (two 12 foot travel lanes). The 30 house limit can be changed by the Planning Commission. Each house will pay SDCs for parks, which will eventually be used to develop the park. The City will be paying for a significant portion of Gunderson Road and the Highway 211 improvements. Staff can't support closing off Melissa Avenue to vehicles because that would go against the TSP and the development code. All Oregon cities will need to update their code to allow duplexes anywhere a single-family home is allowed.

City Attorney Doughman will put together a public memo to the Planning Commission that responds to some legal issues raised. There's an increasingly magnified focus on housing regulations, including clear and objective standards and needed housing. If the applicant is right and there are laws that entitle them to build a subdivision and take all access from Melissa Avenue, then the consequence could be a neighborhood with 100 new homes taking sole access from Melissa Avenue. The City is working to get a second access. Doughman stated there is risk in denying the application. The City would not be liable for exceeding ADT standard because it qualifies for discretionary immunity. The Planning Commission has a choice to continue the hearing in its entirety to February 11, 2020 or the Commission can close the hearing but keep the record open for written testimony. Doughman prefers closing the hearing and keeping the written record open.

Commissioner Carlton asked about the variance that would be required in relation to having houses face the park. Does that variance need to be addressed now? O'Neill stated the code diagram could be subjective, but the Planning Commission could pose a condition that the houses along the park must face the park. Doughman doesn't think the park has to be surrounded by streets and houses on all sides of the park. The Planning Commission can condition that if the UGB expansion occurs and the park is dedicated then the

houses would have to face the parkland.

Applicant Rebuttal:

Attorney Robinson stated they're glad the public came out and he didn't mean to threaten to sue the City. Their intent is to comply with the law and find a way to get this done. Robinson doesn't think the park would be subject to code standards because it's part of the UGB expansion. Robinson wants to keep the written record open. Needed housing is not just affordable housing. City traffic engineer Replinger's comments reach the same conclusion as the applicant's traffic engineer. Robinson cited Patterson vs. City of Bend case law stating the TSP doesn't have to be adhered to if specific standards are not in the municipal code. The applicant accepts condition G.1. The need for the 30th house is so there's enough generation of revenue to get Gunderson Road started. Gunderson Road will be 30 percent cheaper if they construct it than if the City does. The applicant is trying to get parkland as part of the UGB expansion. They will address drainage in a written response. They will try to provide more information on the Gunderson Road proposal.

O'Neill stated the Clackamas County staff person for UGB expansion is Glen Hamburg. O'Neill will testify on behalf of the applicant and neighbors in support of the UGB expansion for Gunderson Road and the parkland.

Discussion:

The Planning Commission decided to close the public hearing. Commissioner Crosby gave the Planning Commission members one final chance to ask the applicant questions as the hearing will be closed.

Motion: Motion to close the public hearing at 9:15 p.m.

Moved By: Commissioner Carlton

Seconded By: Commissioner Mayton

Yes votes: Carlton, Lesowski, Maclean-Wenzel, Crosby, Logan, and Mayton

No votes: None

Abstentions: None

The motion passed at 9:15 p.m.

Motion: Keep the public record open for 7 days (ends January 30, 2020 at 5 pm, anyone can submit written evidence), followed by a 7 day response period (ends February 6, 2020 at 5pm, responses to issues brought up during first 7 days, but no new issues). Applicant waives right of rebuttal.

Moved By: Commissioner Lesowski

Seconded By: Commissioner Maclean-Wenzel

Yes votes: All Ayes
No votes: None
Abstentions: None
The motion passed at 9:17 p.m.

6. Items from Commission and Staff

O'Neill went over upcoming meetings. The March date will be the 30th, not the 23rd. City Council goal setting was last week. They have a new planning goal related to economic development. New associate planner Shelley starts on February 10. Commissioner Crosby asked when a quorum is established, before or after recusal. City Attorney Doughman will need to look into it. Crosby requested a taller microphone for the public podium. Lesowski asked about a newspaper article that alluded to making adjustments to Sandy Style. O'Neill stated that staff will be evaluating small code modifications to Sandy Style in 2020. Mobley asked about the status of the TSP update. O'Neill stated he would provide a TSP update at a future meeting.

7. Adjourn

Motion: To adjourn
Moved By: Commissioner Lesowski
Seconded By: Commissioner Logan
Yes votes: All Ayes
No votes: None
Abstentions: None
The motion passed.

Chairman Crosby adjourned the meeting at 9:35 p.m.



Chair, Jerry Crosby

Planning Commission
January 23, 2020



Planning Director, Kelly O'Neill Jr

Draft



Staff Report

Meeting Date: February 11, 2020
From Kelly O'Neill, Development Services Director
SUBJECT: 20-002 UGB Expansion for Gunderson Road

Background:

The applicant, Allied Homes and Development, proposes to expand the Sandy Urban Growth Boundary by approximately 5.29 acres to meet a need for certain public facilities (a minor arterial road and parkland). The land is currently designated Urban Reserve. The portion of the property that is planned to be included within the amended UGB is limited to areas necessary for parkland and land to construct the Gunderson Road extension, including land for the roadway, associated storm drainage improvements, accompanying utilities, grading, etc. The areas being considered in the UGB expansion are detailed in Exhibit D as follows:

Area 1 - Parkland Area: 2.38 acres

Areas 2 and 6 - Permanent Slope Easement/Temporary Construction Easement Area: 30,970 square feet

Area 3 - Public Right-of-Way Dedication (for Gunderson Road): 1.02 acres

Area 4 - Public Utility Easement: 4,802 square feet

Area 5 - Stormwater Facility: 30,143 square feet

Area 7 - Highway (211) Area: 39,880 square feet

As explained by the applicant if you add the square footage and acreage, the sum is greater than 5.29 acres because Areas 2 and 4 overlap and are included within Area 1. The total acreage is the same when Areas 2 and 4 are removed from the equation.

If the proposed UGB expansion is approved the applicant will proceed with an annexation, comprehensive map amendment, and zoning map amendment for the property brought into the UGB.

Recommendation:

Staff recommends the Planning Commission open a public hearing to receive public testimony. Staff recommends the Planning Commission forward a recommendation of approval to City Council.

SUBJECT: File No. 20-002 UGB Expansion for Gunderson Road

AGENDA DATE: February 11, 2020

DEPARTMENT: Development Services Department

STAFF CONTACT: Kelly O'Neill Jr., Development Services Director

EXHIBITS:

Applicant's Submittals:

- A. Land Use Application
- B. Narrative
- C. Transportation Impact Analysis
- D. Legal Description and Maps

Agency Comments:

- E. City Transportation Engineer, Replinger & Associates (January 20, 2020)

Public Comments:

- F. Paul Savage, 37506 Rachael Drive (February 2, 2020)

I. BACKGROUND

A. PROCEEDING

Type IV UGB Expansion

B. FACTUAL INFORMATION

- 1. APPLICANT: Allied Homes & Development
- 2. OWNERS: Lawrence Pullen, Richard Pullen, and Sherrene TenEyck
- 3. PROJECT NAME: UGB Expansion for Gunderson Road and Parkland
- 4. LEGAL DESCRIPTION: T2S R4E Section 23 Tax Lot 701
- 5. PROPERTY LOCATION: North of Highway 211 and South of Ponder Lane
- 6. PROPOSED AREA: 5.29 acres
- 7. PROPOSAL: The applicant, Allied Homes and Development, proposes to expand the Sandy Urban Growth Boundary by approximately 5.29 acres to meet a need for certain

public facilities (a minor arterial road and parkland). The land is currently designated Urban Reserve.

8. CITY COMPREHENSIVE PLAN DESIGNATION: Low Density Residential
9. COUNTY COMPREHENSIVE PLAN DESIGNATION: Agriculture (AG)
10. COUNTY ZONING DISTRICT DESIGNATION: Exclusive Farm Use (EFU)
11. RESPONSE FROM GOVERNMENTAL AGENCIES, UTILITY PROVIDERS, CITY DEPARTMENTS AND THE GENERAL PUBLIC: City of Sandy Transportation Engineer

C. APPLICABLE CRITERIA: Sandy Development Code 17.12 Procedures for Decision Making; 17.18 Processing Applications; 17.22 Notices; Sandy Comprehensive Plan Goals and Policies and Oregon Statewide Planning Goals Nos. 1, 2, 6, 8, 11, 12, and 14; Clackamas County Comprehensive Plan Chapter 4; Oregon Administrative Rules Chapter 660, division 12; Oregon Administrative Rules Chapter 660, division 24.

D. BACKGROUND INFORMATION

The City of Sandy is also processing a land use application for the Bailey Meadows subdivision (File No. 19-023 SUB/VAR/TREE). The proposed subdivision is located near Highway 211 and Ponder Lane. The purpose of this UGB expansion is to accommodate Gunderson Road and parkland to the south of Bailey Meadows to fulfill anticipated conditions of approval from the Bailey Meadows land use application. The alignment for Gunderson Road is located on property (Tax Map 24E23 Tax Lot 701) that is located outside of Sandy's City limits and UGB. The subject property is currently designated Exclusive Farm Use (EFU) by Clackamas County, but is within the City of Sandy's Urban Reserve Area (URA). Under Oregon law, lands designated URA are "first priority" lands to be included in a UGB expansion. The portion of the property that is planned to be included within the amended UGB is limited to areas necessary for parkland and land to construct the Gunderson Road extension, including land for the roadway, associated storm drainage improvements, accompanying utilities, grading, etc. The areas being considered in the UGB expansion are detailed in Exhibit D as follows:

- Area 1 - Parkland Area: 2.38 acres
- Areas 2 and 6 - Permanent Slope Easement/Temporary Construction Easement Area: 30,970 square feet
- Area 3 - Public Right-of-Way Dedication (for Gunderson Road): 1.02 acres
- Area 4 - Public Utility Easement: 4,802 square feet
- Area 5 - Stormwater Facility: 30,143 square feet
- Area 7 - Highway (211) Area: 39,880 square feet

As explained by the applicant if you add the square footage and acreage, the sum is greater than 5.29 acres because Areas 2 and 4 overlap and are included within Area 1. The total acreage is the same when Areas 2 and 4 are removed from the equation.

If the proposed UGB expansion is approved the applicant will proceed with an annexation, comprehensive map amendment, and zoning map amendment for the property brought into the UGB.

E. PROCEDURAL CONSIDERATIONS

This request is being processed under a Type IV quasi-judicial review. Notification of the proposal was mailed to property owners within 500 feet of the subject property and to affected agencies on January 22, 2020. Notification of the proposal was sent to the Department of Land Conservation and Development (DLCDD) on January 9, 2020 and a legal notice was published in the Sandy Post on January 29, 2020. The Planning Commission will review the request at a public hearing on February 11, 2020 and forward a recommendation to the City Council for final decision on this request.

F. ADDITIONAL HEARING DATES

Pursuant to OAR 660-018-0021(2) and the Urban Growth Management Agreement (UGMA) between the City of Sandy and Clackamas County, this UGB amendment application is subject to a coordinated City-County effort. Here is additional information on meetings before the City Council, Clackamas County Planning Commission, and Clackamas County Board of Commissioners:

March 2, 2020 at 7:00 PM – City of Sandy City Council
City Hall Council Chambers (lower level of building)
39250 Pioneer Boulevard
Sandy, OR 97055

March 9, 2020 at 6:30 PM – Clackamas County Planning Commission
Clackamas County Development Services Building Auditorium (Room 115)
150 Beavercreek Road
Oregon City, OR 97045

March 18, 2020 at 9:30 AM – Clackamas County Board of Commissioners
Clackamas County Public Services Building BCC Hearing Room (4th Floor)
2051 Kaen Road
Oregon City, OR 97045

II. ANALYSIS OF CODE COMPLIANCE

ACRONYMS

Urban Growth Boundary = UGB

From DLCDD: “Each Oregon city is surrounded by an urban growth boundary (UGB); a line drawn on planning maps to designate where a city expects to grow over a 20-year period. This growth can occur with new houses, industrial facilities, businesses, or public facilities such as parks and utilities. Restrictions in areas outside of a UGB protect farm and forest resource land

and prohibit urban development. Generally speaking, it's where the city ends and the farms and forests begin.”

Urban Reserve Area = URA

From DLCD: “By designating urban reserves, the agriculture and forest industries, private landowners, and public and private service providers, are aware of future long-term (for the next 50 years) expansion locations of the UGB.”

Transportation System Plan = TSP

The TSP serves as the transportation element of the City of Sandy Comprehensive Land Use Plan, establishing a system of facilities and services to meet local transportation needs.

Traffic Impact Analysis = TIA

A TIA evaluates the adequacy of the existing transportation system to serve a proposed development, and the expected effects of the proposed development on the transportation system.

Department of Land Conservation & Development = DLCD

From DLCD: “DLCD works in partnership with local governments, and state and federal agencies, to address the land use needs of the public, communities, regions, and the state.”

Land Conservation and Development Commission = LCDC

From LCDC: “Oregon's Land Conservation and Development Commission (LCDC), assisted by the department (DLCD), adopts state land-use goals and implements rules, assures local plan compliance with the goals, coordinates state and local planning, and manages the coastal zone program.

Oregon Department of Transportation = ODOT

From ODOT: “Today, we develop programs related to Oregon’s system of highways, roads, and bridges; railways; public transportation services; transportation safety programs; driver and vehicle licensing; and motor carrier regulation.”

APPLICABLE CRITERIA

The UGB expansion is necessary to accommodate the extension of Gunderson Road as identified in the Sandy TSP and to accommodate parkland in the general vicinity of the Nicolas Glen subdivision as identified in the Sandy Parks Master Plan.

The proposal complies with applicable Statewide Planning Goals 1, 2, 6, 8, 11, 12 and 14 as reviewed below.

Goal 1: Citizen Involvement

The application will be processed according to Chapter 17.12 of the Sandy Development Code, which involves public notification, public hearings, and appeal procedures. The application is being reviewed through a Type IV process that requires two public hearings before the City of Sandy. A notice of the proposal was sent to DLCD on January 9, 2020.

The Planning Commission will review the application at a public hearing on February 11, 2020 and make a recommendation to City Council. City Council will hold a public hearing on March 2, 2020 to make a decision on the proposal. The public will have the opportunity to review and comment on the application at several meetings, therefore staff finds this application is consistent with Goal 1.

Goal 2: Land Use Planning

The City's Comprehensive Plan guides land uses within the City's Urban Growth Boundary. This application is processed by the City through a Type IV Quasi-Judicial process in accordance with the Development Code and Comprehensive Plan. The subject property is within the City's existing URA and will retain the present Clackamas County zoning designation until annexed into the City of Sandy. The proposed improvements on Tax Lot 701, including the planned transportation facility (Gunderson Road), stormwater facility for the transportation facility, and parkland are appropriate uses for the subject property. No private land uses are proposed on Tax Lot 701.

Goal 2 also requires the application to be coordinated with other affected units of government and requires an adequate factual base to support its approval. As discussed in this report, the City has notified other affected agencies of the application, including DLCD and ODOT. Clackamas County will also review the proposed expansion in accordance with its standards and state law.

Staff believes there is an adequate factual base in the record to support an approval of the application. An "adequate factual base" requires that substantial evidence exist in the entire record to support the decision – that is, evidence that reasonable persons would rely on in making day-to-day decisions. The City's TSP identifies Gunderson Road as a minor arterial that would accommodate growth in the area of the subject property, including providing a second access into the Bailey Meadows subdivision. The City's Parks Master Plan identifies a general need for a park in the surrounding area as well.

Therefore, staff finds this application is consistent with Goal 2.

Goal 6: Air, Land, and Water Resources

Goal 6 is implemented by Comprehensive Plan policies to protect air, land, and water resource quality. These policies rely on coordination with the Department of Environmental Quality (DEQ) for their implementation. Specific standards related to the project include requirements for addressing stormwater runoff, grading, and erosion control standards related to a minor public facility (i.e. Gunderson Road) and requirements related to site preparation for parkland development. Therefore, staff finds this application is consistent with Goal 6.

Goal 8: Recreational Needs

Goal 8 is implemented by Comprehensive Plan policies pertaining to parks, open space, and recreation facilities. The proposed location of the parkland on the subject property, Tax Lot 701, is outside the UGB. The UGB expansion will include parkland and satisfy the recreational needs of citizens in the vicinity of the Bailey Meadows subdivision. The planned

parkland dedication included in this application will benefit the residents of Sandy and provide parkland as identified in the Sandy Parks Master Plan. Therefore, staff finds this application is consistent with Goal 8.

Goal 11: Public Facilities and Services

The subject property is currently located outside the UGB and the City limits, but within the City's acknowledged URA. Since the purpose of the UGB expansion is to permit construction of a public road (Gunderson Road) and parkland the area being considered for urban expansion will not necessitate extension of mainlines for water or sanitary sewer. Laterals may be required to service the parkland in the future. The public road installation is required to include stormwater infrastructure. This application will not impact the City's ability to provide urban services. The UGB expansion will serve the transportation system in the area consistent with the Sandy TSP and the parks needs in the vicinity consistent with the Sandy Parks Master Plan. Therefore, staff finds this application is consistent with Goal 11.

Goal 12: Transportation

A portion of the subject property is planned to be used as a public transportation facility (Gunderson Road), connecting to the local transportation system north of the site and providing for future extension possibilities to the west. The submitted TIA (Exhibit C) and the comments from the City of Sandy Transportation Engineer (Exhibit E) contain additional information regarding traffic impacts. The City Transportation Engineer stated the following: "I find the TIA and Addendum meet City requirements. The TIA and Addendum demonstrate that the development can be accommodated with a north access using Melissa Avenue and a south access using a new extension of Gunderson Road with an intersection with Highway 211. I recommend approval of the subdivision with conditions that assure the dedication of all appropriate rights-of-way and the construction of the Gunderson Road extension and the intersection of Gunderson Road and Highway 211, with a left-turn lane on Highway 211." The street extension and connectivity improvements create a safe and convenient transportation system to the south of the Bailey Meadows subdivision. Therefore, staff finds this application is consistent with Goal 12.

Goal 14: Urbanization

Tax Lot 701 is located within the URA and is currently designated as Exclusive Farm Use (EFU). An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow creation of the public transportation and parkland facilities. It should be noted that the City has a "Parks and Open Space" zoning designation that would ultimately apply to the area proposed for a parkland dedication. The City does not have a zoning designation specific to public facilities such as transportation facilities. Therefore, the likely zoning for the Gunderson Road area would be Single Family Residential (SFR). However, staff would recommend a condition that would only permit public facilities for the area encompassing the Gunderson Road extension. The subject application accommodates urban population within the UGB by providing an efficient transportation network per the Sandy TSP and does not involve new commercial, industrial, or agricultural uses in the area proposed in the UGB expansion.

The parkland will enhance the lives of the residents in the vicinity of the Bailey Meadows subdivision. Interim use and development of Tax Lot 701 is not associated with the subject application. Therefore, staff finds this application is consistent with Goal 14.

Transportation Planning Rule Compliance - Oregon Administrative Rule Chapter 660, Division 12

OAR 660, Division 12, is the Oregon Transportation Planning Rule (the TPR) adopted by LCDC. The TPR implements Goal 12, Transportation, and is an independent approval standard in addition to Goal 12 for map amendments. OAR 660-012-0060(1) and (2) apply to amendments to acknowledged maps, as is the case with this application. The TPR requires a two-step analysis. First, under OAR 660-012-0060(1), the applicant shall determine if the application has a “significant affect,” as that term is defined in OAR 660-012-0060(1). The City may rely on transportation improvements found in transportation system plans, as allowed by OAR 660-012-0060(3)(a), (b), and (c), to show that failing intersections will not be made worse or intersections not now failing will not fail. If there is a “significant affect,” then the applicant must demonstrate appropriate mitigation under OAR 660-012-0060(2). The City Transportation Engineer (Exhibit E) stated the following: “The [applicant’s traffic] engineer provides a detailed response to the criteria specified in the TPR. He explains that the proposed amendment to expand the UGB does not change the functional classification of any transportation facility and does not increase developable property that will increase trip generation. He concludes that the proposal helps to implement a project specified in the TSP. I think his argument is sound and supported by the analysis.”

One of the two primary reasons for the subject UGB application is to implement the City’s adopted TSP, by constructing Gunderson Road, a planned City Minor Arterial roadway. Refer to the submitted TIA (Exhibit C) and the comments from the City of Sandy Transportation Engineer (Exhibit E) for additional information. The subject property (Tax Lot 701) is in unincorporated Clackamas County and accessible from Highway 211. Highway 211 is currently classified as a major arterial in both the City and County TSPs but is under the jurisdiction of the State of Oregon Department of Transportation. The applicant met with City, County, and ODOT staff prior to submitting the applicable UGB expansion application to discuss the effects of the application. The City has coordinated the application with Clackamas County by providing the County with timely notice of this application, allowing the County to comment on the application, and including the County’s comments in the decision, as is reasonable. The City has also notified ODOT of the application and will continue to coordinate with ODOT.

Based on the applicant’s TIA and the opinion of the City’s transportation engineer, staff finds that the application satisfies the TPR.

Oregon Administrative Rule Chapter 660, Division 24

This application involves a UGB expansion to meet a need for the public facilities described in this report: a public transportation facility (i.e. Gunderson Road) as illustrated in the Sandy TSP and land for park purposes as indicated in the Parks Master Plan. The Division 24 rule allows the City to consider one category of land needs (in this instance, public

facilities) without simultaneously reviewing other categories of land needs. The application is not seeking to add land for additional residential, commercial or industrial development. Approving the application would only allow a road and public parkland in the area proposed for expansion.

When the primary purpose for expanding the UGB is to accommodate a public facility with specific site characteristics, the study area can be limited to areas within the City's URA that provide the required site characteristics. In this instance, the proximity of lands to the existing UGB boundary and to Highway 211 to meet the need results in a study area that is reasonably limited to TL 701. The conceptual alignment of Gunderson Road as proposed by the applicant to meet the needs of the Sandy TSP is on property not currently within the UGB. The subject property, Tax Lot 701, is the most feasible location for Gunderson Road to safely intersect with Highway 211. The remnant parcel that would exist in the northeast portion of TL 701 is therefore the best location to accommodate the need for additional parkland without further expansion into the URA.

Based on the above, the applicant's narrative and the applicant's TIA, staff finds that the applicable criteria in the Division 24 rule are satisfied.

III. RECOMMENDATION

Staff recommends the Planning Commission forward a recommendation of approval to City Council.



EXHIBIT A

LAND USE APPLICATION FORM

(Please print or type the information below)

Planning Department
39250 Pioneer Blvd.
Sandy OR 97055
503-489-2160

Name of Project City of Sandy Urban Growth Boundary Expansion

Location or Address Southeast of Ponder Lane, northwest of Oregon Highway 211

Map & Tax Lot Number T 25 , R 4E , Section 23 ; Tax Lot(s) 701

Request: This application involves the expansion of the City of Sandy's Urban Growth Boundary to accommodate a public transportation facility (e.g. Gunderson Road).

Please contact the Applicant's consultant and legal counsel (below) with any inquiries:

AKS Engineering & Forestry, LLC - Chris Goodell: (503) 563-6151; chrisg@aks-eng.com
Schwabe, Williamson & Wyatt - Michael Robinson: (503) 796-3756; mrobinson@schwabe.com

I am the (check one) owner lessee of the property listed above, and the statements and information contained herein are in all respects true, complete and correct to the best of my knowledge and belief.

| | |
|--|--|
| Applicant (if different than owner) Allied Homes & Development | Owner Richard L Pullen, Lawrence Pullen, Sherrene Teneyck |
| Address 12404 SE Sunnyside Road, Suite 706 | Address 37020 SE Deming Road |
| City/State/Zip Clackamas, OR 97015 | City/State/Zip Sandy, OR 97055 |
| Phone Please contact Applicant's consultant | Phone Please contact Applicant's consultant |
| Email Please contact Applicant's consultant | Email Please contact Applicant's consultant |
| Signature <small>DocuSigned by:</small> <i>Cody Bugan</i> | Signature <small>DocuSigned by:</small> <i>Richard L Pullen</i> <small>DocuSigned by:</small> <i>Lawrence Pullen</i> <small>DocuSigned by:</small> <i>Sherrene Teneyck</i> |

If signed by Agent, owner's written authorization must be attached.

| File No. | Date | Rec. No. | Fee \$ |
|--|------|----------|--------|
| Type of Review (circle one): Type I Type II Type III Type IV | | | |

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Fees Included: \$3,184 UGB Expansion Request
\$1,500 Traffic Review Fee

EXHIBIT B

City of Sandy Urban Growth Boundary Amendment

Date: January 2020

Submitted to: City of Sandy
Planning Department
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

AKS Job Number: 7107



AKS
ENGINEERING & FORESTRY
12965 SW Herman Road, Suite 100
Tualatin, OR 97062
(503) 563-6151

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Exhibits

- Exhibit A:** City of Sandy Land Use Application Form
 - Exhibit B:** Clackamas County Land Use Application Form
 - Exhibit C:** Property Ownership Information
 - Exhibit D:** Clackamas County Assessor’s Map
 - Exhibit E:** City of Sandy Noticing Materials
 - Exhibit F:** Lancaster Mobley Engineering Traffic Documentation
 - Exhibit G:** Supplemental Materials
-

Land Use Application for an Urban Growth Boundary Amendment

Submitted to: City of Sandy
Planning Department
39250 Pioneer Boulevard
Sandy, OR 97055

Applicant: Allied Homes & Development
12042 SE Sunnyside Road, Suite 706
Clackamas, OR 97015

Property Owners: Lawrence Pullen
36940 Deming Road
Sandy, OR 97055

Richard Pullen
36969 Deming Road
Sandy, OR 97055

Sherrene TenEyck
37020 SE Deming Road
Sandy, OR 97055

Applicant's Consultant: AKS Engineering & Forestry, LLC
12965 SW Herman Road, Suite 100
Tualatin, OR 97062

Contact: Chris Goodell, AICP, LEED^{AP}
Email: chrisg@aks-eng.com
Phone: (503) 563-6151

Applicant's Legal Counsel: Schwabe, Williamson & Wyatt
Pacwest Center 1211 SW 5th Avenue, Suite 190
Portland, OR 97204

Contact: Michael Robinson
Email: mrobinson@schwabe.com
Phone: (503) 796-3756

Site Location: North of Highway 211 and south of Ponder Lane



**Clackamas County
Assessor's Map:**

2 4E 23, Tax Lot 701

Site Size:

±14.24 acres

Land Use District:

Exclusive Farm Use (EFU)



I. Executive Summary

The City of Sandy is currently processing a land use application for the Bailey Meadows subdivision (local file No. 19-023 SUB/VAR/TREE). Bailey Meadows is located in the southwestern portion of the City, near Oregon Route 211 (OR 211) and SE Ponder Lane. A condition of approval is anticipated to be included in the City's Notice of Decision that would cause submittal of an application for an amendment to the City's UGB. This application, if approved, would permit the construction of Gunderson Road (a Minor Arterial roadway per City of Sandy's Transportation System Plan) and provide an additional means of access to Bailey Meadows. The purpose of this application is to fulfill this forthcoming condition of approval. Additionally, the Applicant is willing to dedicate a portion of the subject site for parkland.

The alignment for the Gunderson Road extension, as discussed above, falls within property (Clackamas County Assessor's Map 2 4E 23 Tax Lot 701) that is located outside of Sandy's City limits and UGB. This property is currently designated Exclusive Farm Use (EFU) by Clackamas County, but is within the City of Sandy's Urban Reserve Area (URA). The portion of the property that is planned to be included within the amended UGB is limited to areas necessary to construct the Gunderson Road extension, including land for the roadway, associated storm drainage improvements, accompanying utilities, grading, etc. and additional area for parkland dedication.

Based upon the Urban Growth Management Agreement between the City of Sandy and Clackamas County, this UGB amendment application is subject to a coordinated City-County effort. Although it is understood that the City will hold hearings for the application prior to the County doing so, the application is being submitted to both jurisdictions for review at the same time.

II. Site Description/Setting

The property (Tax Lot 701) included in this application has a total area of ±14.30 acres, though only the acreage required for the road right-of-way and associated improvements and parkland dedication are planned to be incorporated within the Sandy UGB. Tax Lot 701 is located outside of, but adjacent to the UGB, immediately south of the active Bailey Meadows Subdivision application (City of Sandy Local Case File No. 19-023 SUB/VAR/TREE), northwest of OR 211, and west of the intersection of SE Ponder Lane and OR 211.

The property is fairly flat with wooded areas on the northwest half and pasture on the eastern half. The property does not contain structures and access is served from OR 211 on the south side of the site.

III. Applicable Review Criteria

The Oregon Statewide Planning Goals, Oregon Administrative Rules, and Oregon Revised Statutes are relevant to the UGB Amendment application. Therefore, the responses are applicable for review by both the City of Sandy and Clackamas County.

The Sandy Comprehensive Plan Goals and Policies and the Clackamas County Comprehensive Plan Goals and Policies are applicable to the City and County jurisdictions respectively. If any of the findings for these items are needed for responses to other jurisdictions (e.g., City, County, ODOT, DLCD, or LCDC), they will be referenced specifically. This limitation applies to this complete application narrative.



OREGON STATEWIDE PLANNING GOALS AND GUIDELINES (The Goals)

The following Oregon Statewide Planning Goals are applicable to this action:

- Goal 1 – Citizen Involvement
- Goal 2 – Land Use Planning
- Goal 6 – Air, Land, and Water Resources Quality
- Goal 8 – Recreational Needs
- Goal 11 – Public Facilities and Services
- Goal 12 – Transportation
- Goal 14 – Urbanization

Goals 3 (Agricultural Lands) and 4 (Forest Lands) are not applicable to UGB amendments pursuant to Oregon Administrative Rule (OAR) 660-024-0020(1)(b) and have been omitted for brevity.

Goal 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces) is not applicable, pursuant to OAR 660-023-0250(3)(a)-(c), because there are no identified Goal 5 resources on the property, and has been omitted for brevity.

Goal 7 (Areas Subject to Natural Hazards) is not applicable and has been omitted because the subject site does not contain mapped areas of steep slopes 25 percent or greater or other known hazard areas.

Goals 9 (Economic Development) and 10 (Housing) are not applicable because the proposed comprehensive plan amendments allow for a public transportation facility and are not associated with employment lands or residential development.

Goal 13 (Energy Conservation) is not applicable because the amendment does not affect the City or County goals or policies governing energy conservation.

Goals 15 (Willamette River Greenway), 16 (Estuarine Resources), 17 (Coastal Shorelands), 18 (Beaches and Dunes), and 19 (Ocean Resources) are not applicable because the subject site does not contain lands described in those goals. Thus, the approval criteria have been omitted for brevity.

Goal 1 (Citizen Involvement)

To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

Response: Goal 1 calls for the opportunity for citizens to be involved in all phases of the planning process. The City of Sandy has an established citizen involvement program. The application will be processed according to Chapter 17.12 of the LDC, which involves public notification, public hearings, and decision appeal procedures, as established in City of Sandy LDC Section 17.12.30 and 17.12.40.

Clackamas County maintains a Committee for Citizen Involvement with membership that includes representatives of Community Planning Organizations. The application will be processed in accordance with Section 1307 of the Clackamas County Zoning and



Development Ordinance (ZDO) which involves public notification, public hearings, and decision appeal procedures. Therefore, the application is consistent with Goal 1.

Goal 2 (Land Use Planning)

To establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions.

Response: This application will be processed by the City through a Quasi-Judicial Type IV procedure in accordance with LDC Chapter 17.12. The City and County have acknowledged comprehensive plans and land use development (zoning) codes that implement the irrespective comprehensive plans. The City will review and process this application consistent with the procedures detailed in the LDC. The County will review and process this application consistent with the process detailed in Section 1307 of the Clackamas County ZDO.

This application provides an adequate factual basis for the City and County to approve the application because it describes the current and planned future site characteristics and applies the relevant approval criteria to those characteristics. Therefore, following this process will ensure consistency with Statewide Planning Goal 2.

Goal 6 (Air, Water and Land Resources Quality)

To maintain and improve the quality of the air, water and land resources of the state.

Response: Goal 6 is implemented by Comprehensive Plan policies to protect air, land, and water resource quality. Generally, these policies rely on coordination with the Department of Environmental Quality (DEQ) for their implementation. Specific standards related to the project include requirements for addressing stormwater runoff, grading, and erosion control standards related to a minor public facility (i.e. Gunderson Road) and requirements related to site planning for parkland dedication will be addressed in the future. The property planned to be brought into the UGB is within the City's existing Urban Reserve Area and will retain its' existing zoning until annexed into the City in the future. Thus, the application is consistent with Goal 6.

Goal 8 (Recreational Needs)

To satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities including destination resorts.

Response: Goal 8 is implemented by Comprehensive Plan policies pertaining to parks, open space, and recreation facilities. The City's Comprehensive Plan with respect to Goal 8, its parks master plan, and its development regulations governing recreational needs (e.g., park dedication/fee in-lieu-of requirements, open space provisions, etc.) are supported by this application. The subject property is providing land to be brought within the UGB to dedicate as parkland and satisfy the recreational needs of citizens in the area. Although Bailey Meadows Subdivision provides for and meets SDC criteria for on-site needs, in this case the City and Applicant agree to an off-site improvement. The site-specific location for the off-site extension of Gunderson Road and parkland improvements are outside the UGB, as described in this written document, and require a UGB amendment to allow an



urban facility to be built on land currently within the County’s jurisdiction. The planned parkland dedication provided by this application will benefit the City and its residents. Therefore, Goal 8 is satisfied.

Goal 11 (Public Facilities and Services)

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

Response: The subject property is currently located outside the UGB and the City limits. Since the purpose of the amendment is to permit construction of a road, public facilities, water, and/or sanitary sewer service are not required. The property is planned for the extension of a public road and will include necessary stormwater infrastructure. Additionally, the Applicant is willing to dedicate area for a park facility to satisfy needs of the residents in the general vicinity. This application will not impact urban services or utilities and will serve the transportation system in the area consistent with the Sandy TSP. Therefore, this application is consistent with Goal 11.

Goal 12 (Transportation)

To provide and encourage a safe, convenient and economic transportation system.

Response: A portion of the subject property is planned to be used as a public transportation facility, connecting to the transportation system north of the site. The UGB Amendment & Gunderson Road Connection Traffic Impact Analysis (TIA) prepared by Lancaster Engineering is included in Exhibit F that documents compliance with Goal 12 and applicable State, County, and City transportation-related requirements. Please refer to the TIA for further information. The intended street and connectivity improvements encourage a safe, convenient, and economic transportation system. Therefore, this application is consistent with Goal 12.

Goal 14 (Urbanization)

To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities.

Response: Tax Lot 701 is located within the URA and is currently designated with Clackamas County EFU zoning designation. An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow creation of the public transportation and parkland facilities. The subject application accommodates urban population within the UGB by providing an efficient transportation network per the Sandy TSP and does not involve new commercial, industrial, or agricultural uses. Additionally, the Applicant is providing area for parkland to dedicate to the City and enhance the lives of the residents in the vicinity. The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property to permit both the minor public facility uses. Interim use and development, prior to annexation, is not associated with this application. Therefore, the application is consistent with Goal 14.



FINDINGS FOR TRANSPORTATION PLANNING RULE COMPLIANCE

Response: OAR 660, Division 12, is the Oregon Transportation Planning Rule (the TPR) adopted by the Land Conservation and Development Commission (LCDC). The TPR implements Goal 12, Transportation, and is an independent approval standard in addition to Goal 12 for map amendments. OAR 660-012-0060(1) and (2) apply to amendments to acknowledged maps, as is the case with this application.

The TPR requires a two-step analysis. First, under OAR 660-012-0060(1), the Applicant must determine if the application has a “significant affect,” as that term is defined in OAR 660-012-0060(1). The City may rely on transportation improvements found in transportation system plans, as allowed by OAR 660-012-0060(3)(a), (b), and (c), to show that failing intersections will not be made worse or intersections not now failing will not fail. If there is a “significant affect,” then the Applicant must demonstrate appropriate mitigation under OAR 660-012-0060(2), et seq.

OREGON ADMINISTRATIVE RULES

Chapter 660 Division 12 TRANSPORTATION PLANNING

660-012-0060 Plan and Land Use Regulation Amendments

- (1) If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:
- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);
 - (b) Change standards implementing a functional classification system; or
 - (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.
 - (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;
 - (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or
 - (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Response: The analysis provided by Lancaster Engineering found that this amendment would not “significantly affect” an existing or planned transportation facility. In fact, the purpose of



the application is to implement the City's adopted TSP, by providing for the completion of Gunderson Road, a planned City Minor Arterial roadway. Please refer to the TIA (Exhibit A) for further information. Therefore, the criteria are met.

- (2) If a local government determines that there would be a significant effect, then the local government must ensure that allowed land uses are consistent with the identified function, capacity, and performance standards of the facility measured at the end of the planning period identified in the adopted TSP through one or a combination of the remedies listed in (a) through (e) below, unless the amendment meets the balancing test in subsection (2)(e) of this section or qualifies for partial mitigation in section (11) of this rule. A local government using subsection (2)(e), section (3), section (10) or section (11) to approve an amendment recognizes that additional motor vehicle traffic congestion may result and that other facility providers would not be expected to provide additional capacity for motor vehicles in response to this congestion.
- (a) Adopting measures that demonstrate allowed land uses are consistent with the planned function, capacity, and performance standards of the transportation facility.
 - (b) Amending the TSP or comprehensive plan to provide transportation facilities, improvements or services adequate to support the proposed land uses consistent with the requirements of this division; such amendments shall include a funding plan or mechanism consistent with section (4) or include an amendment to the transportation finance plan so that the facility, improvement, or service will be provided by the end of the planning period.
 - (c) Amending the TSP to modify the planned function, capacity or performance standards of the transportation facility.
 - (d) Providing other measures as a condition of development or through a development agreement or similar funding method, including, but not limited to, transportation system management measures or minor transportation improvements. Local governments shall, as part of the amendment, specify when measures or improvements provided pursuant to this subsection will be provided.
 - (e) Providing improvements that would benefit modes other than the significantly affected mode, improvements to facilities other than the significantly affected facility, or improvements at other locations, if:
 - (A) The provider of the significantly affected facility provides a written statement that the system-wide benefits are sufficient to balance the significant effect, even though the improvements would not result in consistency for all performance standards;
 - (B) The providers of facilities being improved at other locations provide written statements of approval; and
 - (C) The local jurisdictions where facilities are being improved provide written statements of approval.

Response: Since a "significant affect" is not found, this section does not apply. Please refer to the TIA (Exhibit A) for further information. Therefore, the criteria are met.

- (3) Notwithstanding sections (1) and (2) of this rule, a local government may approve an amendment that would significantly affect an existing transportation facility without assuring that the allowed land uses are consistent with the function, capacity and performance standards of the facility where:
- (a) In the absence of the amendment, planned transportation facilities, improvements and services as set forth in section (4) of this rule would not be



adequate to achieve consistency with the identified function, capacity or performance standard for that facility by the end of the planning period identified in the adopted TSP;

- (b) Development resulting from the amendment will, at a minimum, mitigate the impacts of the amendment in a manner that avoids further degradation to the performance of the facility by the time of the development through one or a combination of transportation improvements or measures;
- (c) The amendment does not involve property located in an interchange area as defined in paragraph (4)(d)(C); and
- (d) For affected state highways, ODOT provides a written statement that the proposed funding and timing for the identified mitigation improvements or measures are, at a minimum, sufficient to avoid further degradation to the performance of the affected state highway. However, if a local government provides the appropriate ODOT regional office with written notice of a proposed amendment in a manner that provides ODOT reasonable opportunity to submit a written statement into the record of the local government proceeding, and ODOT does not provide a written statement, then the local government may proceed with applying subsections (a) through (c) of this section.

Response: Since a “significant affect” is not found, this section does not apply. Please refer to the TIA (Exhibit A) for further information. Therefore, the criteria are met.

- (4) Determinations under sections (1)–(3) of this rule shall be coordinated with affected transportation facility and service providers and other affected local governments.
 - (a) In determining whether an amendment has a significant effect on an existing or planned transportation facility under subsection (1)(c) of this rule, local governments shall rely on existing transportation facilities and services and on the planned transportation facilities, improvements and services set forth in subsections (b) and (c) below.
 - (b) Outside of interstate interchange areas, the following are considered planned facilities, improvements and services:
 - (A) Transportation facilities, improvements or services that are funded for construction or implementation in the Statewide Transportation Improvement Program or a locally or regionally adopted transportation improvement program or capital improvement plan or program of a transportation service provider.
 - (B) Transportation facilities, improvements or services that are authorized in a local transportation system plan and for which a funding plan or mechanism is in place or approved. These include, but are not limited to, transportation facilities, improvements or services for which: transportation systems development charge revenues are being collected; a local improvement district or reimbursement district has been established or will be established prior to development; a development agreement has been adopted; or conditions of approval to fund the improvement have been adopted.
 - (C) Transportation facilities, improvements or services in a metropolitan planning organization (MPO) area that are part of the area's federally-approved, financially constrained regional transportation system plan.



-
- (D) Improvements to state highways that are included as planned improvements in a regional or local transportation system plan or comprehensive plan when ODOT provides a written statement that the improvements are reasonably likely to be provided by the end of the planning period.
 - (E) Improvements to regional and local roads, streets or other transportation facilities or services that are included as planned improvements in a regional or local transportation system plan or comprehensive plan when the local government(s) or transportation service provider(s) responsible for the facility, improvement or service provides a written statement that the facility, improvement or service is reasonably likely to be provided by the end of the planning period.

Response: The subject site is located outside of interstate interchange areas. Therefore, these criteria apply. That said, the amendment is sought to implement a portion of the City's adopted TSP (e.g. Gunderson Road). The amendment has no other purpose and does not include re-designation/amendments that serve another purpose than those already considered as part of the City's TSP.

- (c) Within interstate interchange areas, the improvements included in (b)(A)–(C) are considered planned facilities, improvements and services, except where:
 - (A) ODOT provides a written statement that the proposed funding and timing of mitigation measures are sufficient to avoid a significant adverse impact on the Interstate Highway system, then local governments may also rely on the improvements identified in paragraphs (b)(D) and (E) of this section; or
 - (B) There is an adopted interchange area management plan, then local governments may also rely on the improvements identified in that plan and which are also identified in paragraphs (b)(D) and (E) of this section.

Response: The subject site is located outside of interstate interchange areas. Therefore, the above criteria are not applicable.

- (c) For purposes of this section, a written statement provided pursuant to paragraphs (b)(D), (b)(E) or (c)(A) provided by ODOT, a local government or transportation facility provider, as appropriate, shall be conclusive in determining whether a transportation facility, improvement or service is a planned transportation facility, improvement or service. In the absence of a written statement, a local government can only rely upon planned transportation facilities, improvements and services identified in paragraphs (b)(A)–(C) to determine whether there is a significant effect that requires application of the remedies in section (2).

Response: This section of the TPR requires coordination with affected transportation service providers. The Oregon Department of Transportation (ODOT) provides the road that serves the subject property. The subject property (Tax Lot 701) is within unincorporated Clackamas County and served by OR 211. Additionally, OR 211 is functionally classified as a Major Arterial in both the City and County TSPs but is under the jurisdiction of the State of Oregon. The Applicant met with City, County, and ODOT staff prior to submitting this application to discuss the effects of the application on their respective roads. The City will ensure coordination of the application with Clackamas County, as required by ORS



197.015, by providing the County with timely notice of this application, allowing the County to comment on the application, and including the County's comments in the decision, as is reasonable. The City will also coordinate with ODOT and TriMet as applicable. Therefore, the criteria of OAR 660-012-0060 (4) are met.

- (5) The presence of a transportation facility or improvement shall not be a basis for an exception to allow residential, commercial, institutional or industrial development on rural lands under this division or OAR 660-004-0022 and 660-004-0028.

Response:

The application is to include land within the UGB to allow the siting of a public transportation facility and dedication of parkland. This project does not involve an exception to allow residential, commercial, institutional, or industrial development on rural lands. The criterion is not applicable.

- (6) In determining whether proposed land uses would affect or be consistent with planned transportation facilities as provided in sections (1) and (2), local governments shall give full credit for potential reduction in vehicle trips for uses located in mixed-use, pedestrian-friendly centers, and neighborhoods as provided in subsections (a)-(d) below;
- (a) Absent adopted local standards or detailed information about the vehicle trip reduction benefits of mixed-use, pedestrian-friendly development, local governments shall assume that uses located within a mixed-use, pedestrian-friendly center, or neighborhood, will generate 10% fewer daily and peak hour trips than are specified in available published estimates, such as those provided by the Institute of Transportation Engineers (ITE) Trip Generation Manual that do not specifically account for the effects of mixed-use, pedestrian-friendly development. The 10% reduction allowed for by this section shall be available only if uses which rely solely on auto trips, such as gas stations, car washes, storage facilities, and motels are prohibited;
- (b) Local governments shall use detailed or local information about the trip reduction benefits of mixed-use, pedestrian-friendly development where such information is available and presented to the local government. Local governments may, based on such information, allow reductions greater than the 10% reduction required in subsection (a) above;
- (c) Where a local government assumes or estimates lower vehicle trip generation as provided in subsection (a) or (b) above, it shall assure through conditions of approval, site plans, or approval standards that subsequent development approvals support the development of a mixed-use, pedestrian-friendly center or neighborhood and provide for on-site bike and pedestrian connectivity and access to transit as provided for in OAR 660-012-0045(3) and (4). The provision of on-site bike and pedestrian connectivity and access to transit may be accomplished through application of acknowledged ordinance provisions which comply with 660-012-0045(3) and (4) or through conditions of approval or findings adopted with the plan amendment that assure compliance with these rule requirements at the time of development approval; and
- (d) The purpose of this section is to provide an incentive for the designation and implementation of pedestrian-friendly, mixed-use centers and neighborhoods by lowering the regulatory barriers to plan amendments which accomplish this type of development. The actual trip reduction benefits of mixed-use, pedestrian-friendly development will vary from case to case and may be somewhat higher or lower than presumed pursuant to subsection (a) above. The Commission concludes that this assumption is warranted given general information about the expected effects of mixed-use, pedestrian-friendly



development and its intent to encourage changes to plans and development patterns. Nothing in this section is intended to affect the application of provisions in local plans or ordinances which provide for the calculation or assessment of systems development charges or in preparing conformity determinations required under the federal Clean Air Act.

Response: The analysis provided by Lancaster Engineering does not rely upon credit for potential reductions in vehicle trips as described in this section. Therefore, these criteria do not apply.

Chapter 660 Division 14 **APPLICATION OF THE STATEWIDE PLANNING GOALS TO NEWLY INCORPORATED CITIES, ANNEXATION, AND URBAN DEVELOPMENT ON RURAL LANDS**

660-014-0060 **Annexations of Lands Subject to an Acknowledged Comprehensive Plan**

A city annexation made in compliance with a comprehensive plan acknowledged pursuant to ORS 197.251(1) or 197.625 shall be considered by the commission to have been made in accordance with the goals unless the acknowledged comprehensive plan and implementing ordinances do not control the annexation.

Response: This application includes an analysis of compliance with the goals and policies of the City of Sandy Comprehensive Land Use Plan (adopted October 20, 1997). Therefore, a City annexation for the subject property should be considered by the commission to have been made in accordance with the goals. The criterion is met.

...

Chapter 660 Division 24 **URBAN GROWTH BOUNDARIES**

660-024-0000 **Purpose and Applicability**

- (1) The rules in this division clarify procedures and requirements of Goal 14 regarding a local government adoption or amendment of an urban growth boundary (UGB). The rules in this division do not apply to the simplified UGB process under OAR chapter 660, division 38.
- (2) The rules in this division interpret Goal 14 as amended by the Land Conservation and Development Commission (LCDC or commission) on or after April 28, 2005, and are not applicable to plan amendments or land use decisions governed by previous versions of Goal 14 still in effect.
- (3) The rules in this division adopted on October 5, 2006, are effective April 5, 2007. The rules in this division amended on March 20, 2008, are effective April 18, 2008. The rules in this division adopted March 13, 2009, and amendments to rules in this division adopted on that date, are effective April 16, 2009, except as follows:
 - (a) A local government may choose to not apply this division to a plan amendment concerning the evaluation or amendment of a UGB, regardless of the date of that amendment, if the local government initiated the evaluation or amendment of the UGB prior to April 5, 2007;
 - (b) For purposes of this rule, "initiated" means that the local government either:
 - (A) Issued the public notice specified in OAR 660-018-0020 for the proposed plan amendment concerning the evaluation or amendment of the UGB; or
 - (B) Received LCDC approval of a periodic review work program that includes a work task to evaluate the UGB land supply or amend the UGB;



(c) A local government choice whether to apply this division must include the entire division and may not differ with respect to individual rules in the division.

(4) The rules in this division adopted on December 4, 2015, are effective January 1, 2016, except that a local government may choose to not apply the amendments to rules in this division adopted December 4, 2015 to a plan amendment concerning the amendment of a UGB, regardless of the date of that amendment, if the local government initiated the amendment of the UGB prior to January 1, 2016.

Response: The purpose of this division applies to the subject amendment of the UGB, which complies with the dates listed above.

...

660-024-0040 Land Need

(3) A local government may review and amend the UGB in consideration of one category of land need (for example, housing need) without a simultaneous review and amendment in consideration of other categories of land need (for example, employment need).

Response: This UGB amendment satisfies one need, public facilities (e.g. Gunderson Road and parkland dedication). Accordingly, other needs are not considered.

...

(7) The determination of 20-year land needs for transportation and public facilities for an urban area must comply with applicable requirements of Goals 11 and 12, rules in OAR chapter 660, divisions 11 and 12, and public facilities requirements in ORS 197.712 and 197.768. The determination of school facility needs must also comply with 195.110 and 197.296 for local governments specified in those statutes.

Response: This UGB amendment satisfies one need, public facilities (e.g. Gunderson Road and parkland dedication). Accordingly, other needs are not considered.

660-024-0050 Land Inventory and Response to Deficiency

(1) When evaluating or amending a UGB, a local government must inventory land inside the UGB to determine whether there is adequate development capacity to accommodate 20-year needs determined in OAR 660-024-0040. For residential land, the buildable land inventory must include vacant and redevelopable land, and be conducted in accordance with OAR 660-007-0045 or 660-008-0010, whichever is applicable, and ORS 197.296 for local governments subject to that statute. For employment land, the inventory must include suitable vacant and developed land designated for industrial or other employment use, and must be conducted in accordance with OAR 660-009-0015.

Response: This application involves a City of Sandy UGB Amendment to provide a public transportation facility (i.e. Gunderson Road) as illustrated in the Sandy TSP and to dedicate land to provide a park. The conceptual alignment of Gunderson Road shown in the Sandy TSP is on property not currently within the UGB; thus, the UGB amendment is needed to provide an efficient transportation network and serve residential lands already previously brought into the UGB. The subject property, Tax Lot 701, is the most feasible location where the extension of the transportation network and connection to OR 211 can be made safely. Please see the supplemental materials and TIA for further detailed



information. Additionally, please refer to the narrative responses which address OAR 660-024-0050(6) and (7) and OAR 660-024-0065(3).

(2) As safe harbors, a local government, except a city with a population over 25,000 or a metropolitan service district described in ORS 197.015(13), may use the following assumptions to inventory the capacity of buildable lands to accommodate housing needs:

- (a) The infill potential of developed residential lots or parcels of one-half acre or more may be determined by subtracting one-quarter acre (10,890 square feet) for the existing dwelling and assuming that the remainder is buildable land;
- (b) Existing lots of less than one-half acre that are currently occupied by a residence may be assumed to be fully developed.

(3) As safe harbors when inventorying land to accommodate industrial and other employment needs, a local government may assume that a lot or parcel is vacant if it is:

- (a) Equal to or larger than one-half acre, if the lot or parcel does not contain a permanent building; or
- (b) Equal to or larger than five acres, if less than one-half acre of the lot or parcel is occupied by a permanent building.

(4) If the inventory demonstrates that the development capacity of land inside the UGB is inadequate to accommodate the estimated 20-year needs determined under OAR 660-024-0040, the local government must amend the plan to satisfy the need deficiency, either by increasing the development capacity of land already inside the city or by expanding the UGB, or both, and in accordance with ORS 197.296 where applicable. Prior to expanding the UGB, a local government must demonstrate that the estimated needs cannot reasonably be accommodated on land already inside the UGB. If the local government determines there is a need to expand the UGB, changes to the UGB must be determined by evaluating alternative boundary locations consistent with Goal 14 and applicable rules at OAR 660-024-0060 or 660-024-0065 and 660-024-0067.

Response:

On February 6, 2017 the City of Sandy adopted the Urban Growth Boundary Expansion Analysis, Final Report. The analysis concluded the existing UGB did not contain sufficient residential lands to meet the City's housing needs to 2034 and subsequently annexed in property north of Tax Lot 701. To satisfy the needs of lands previously brought into the UGB, according to 660-024-050(4) above, the local government must amend the plan to satisfy the need by amending the UGB when applicable. Therefore, this application involves a Sandy UGB Amendment to respond to a public transportation facility need. Changes to the Sandy UGB are made consistent with Goal 14 and OAR 660-024-0065 and 660-024-0067, as addressed in this written document. OAR 660-024-0060 is not applicable to this application because the property is not within the Portland Metro UGB.

(5) In evaluating an amendment of a UGB submitted under ORS 197.626, the director or the commission may determine that a difference between the estimated 20-year needs determined under OAR 660-024-0040 and the amount of land and development capacity added to the UGB by the submitted amendment is unlikely to significantly affect land supply or resource land protection, and as a result, may determine that the proposed amendment complies with section (4) of this rule.

Response:

ORS 197.626 is not applicable to the UGB amendment because the amendment is not by a metropolitan service district, does not add more than 50 acres within the UGB, does not designate new lands as an urban reserve, does not amend the boundary of urban reserve



by a metropolitan service district, or designate or amend rural reserves. Therefore, the above criterion is not applicable to the application.

- (6) When land is added to the UGB, the local government must assign appropriate urban plan designations to the added land, consistent with the need determination and the requirements of section (7) of this rule, if applicable. The local government must also apply appropriate zoning to the added land consistent with the plan designation or may maintain the land as urbanizable land until the land is rezoned for the planned urban uses, either by retaining the zoning that was assigned prior to inclusion in the boundary or by applying other interim zoning that maintains the land's potential for planned urban development. The requirements of ORS 197.296 regarding planning and zoning also apply when local governments specified in that statute add land to the UGB.

Response: The land involved within the amendment area is anticipated to be designated Low Density Residential (LDR), but to retain Clackamas County zoning until annexed into the City of Sandy.

- (7) Lands included within a UGB pursuant to OAR 660-024-0065(3) to provide for a particular industrial use, or a particular public facility, must be planned and zoned for the intended use and must remain planned and zoned for that use unless the city removes the land from the UGB.

Response: The lands brought into the UGB are within the City's existing URA and will retain their existing Clackamas County zoning until annexed into the City in the future. Upon annexation and the application of City zoning designations to those lands, the land is intended to be converted for use as a public transportation facility and parkland and remain as such.

- (8) As a safe harbor regarding requirements concerning "efficiency," a local government that chooses to use the density and mix safe harbors in OAR 660-024-0040(8) is deemed to have met the Goal 14 efficiency requirements under:
- (a) Sections (1) and (4) of this rule regarding evaluation of the development capacity of residential land inside the UGB to accommodate the estimated 20-year needs; and
 - (b) Goal 14 regarding a demonstration that residential needs cannot be reasonably accommodated on residential land already inside the UGB, but not with respect to:
 - (A) A demonstration that residential needs cannot be reasonably accommodated by rezoning non-residential land, and
 - (B) Compliance with Goal 14 Boundary Location factors.

Response: The density and mix safe harbors standards in OAR 660-024-0040(8) are not applicable to this application. The criteria do not apply.

...
660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB

- (1) When considering a UGB amendment to accommodate a need deficit identified in OAR 660-024-0050(4), a city outside of Metro must determine which land to add to the UGB by evaluating alternative locations within a "study area" established pursuant to this rule. To establish the study area, the city must first identify a "preliminary study area" which shall not include land within a different UGB or the corporate limits of a city within a different UGB. The preliminary study area shall include:



-
- (a) All lands in the city's acknowledged urban reserve, if any;
 - (b) All lands that are within the following distance from the acknowledged UGB:
 - (A) For cities with a UGB population less than 10,000: one-half mile;
 - (B) For cities with a UGB population equal to or greater than 10,000: one mile;
 - (c) All exception areas contiguous to an exception area that includes land within the distance specified in subsection (b) and that are within the following distance from the acknowledged UGB:
 - (A) For cities with a UGB population less than 10,000: one mile;
 - (B) For cities with a UGB population equal to or greater than 10,000: one and one-half miles;
 - (d) At the discretion of the city, the preliminary study area may include land that is beyond the distance specified in subsections (b) and (c).
- (2) A city that initiated the evaluation or amendment of its UGB prior to January 1, 2016, may choose to identify a preliminary study area applying the standard in this section rather than section (1). For such cities, the preliminary study area shall consist of:
- (a) All land adjacent to the acknowledged UGB, including all land in the vicinity of the UGB that has a reasonable potential to satisfy the identified need deficiency, and
 - (b) All land in the city's acknowledged urban reserve established under OAR chapter 660, division 21, if applicable.

Response: This application involves a UGB Amendment to accommodate a need deficit identified in OAR 660-024-0050(4), as described above. Additionally, the purpose is to provide a specific public transportation facility and the location must be compliant with the Sandy TSP. Therefore, the above criteria are not applicable. Please see the following narrative response addressing OAR 660-024-0065(3).

- (3) When the primary purpose for expansion of the UGB is to accommodate a particular industrial use that requires specific site characteristics, or to accommodate a public facility that requires specific site characteristics, and the site characteristics may be found in only a small number of locations, the preliminary study area may be limited to those locations within the distance described in section (1) or (2), whichever is appropriate, that have or could be improved to provide the required site characteristics. For purposes of this section:
- (a) The definition of "site characteristics" in OAR 660-009-0005(11) applies for purposes of identifying a particular industrial use.
 - (b) A "public facility" may include a facility necessary for public sewer, water, storm water, transportation, parks, schools, or fire protection. Site characteristics may include but are not limited to size, topography and proximity.

Response: The primary purpose of this UGB Amendment application is to accommodate Gunderson Road, a future minor arterial roadway depicted in the Sandy TSP. Additionally, on February 6, 2017 the City of Sandy adopted the Urban Growth Boundary Expansion Analysis, Final Report. The analysis contains "Map #9 – Transportation System Plan and Street Stubs" which includes the Gunderson Road extension to OR 211.



To provide this public transportation facility improvement, the road should be extended to match the conceptual alignment in the Sandy TSP. In doing so, the road extension requires use of the subject property due to the specific location dictated in the Sandy TSP. Due to geometrical issues, safety concerns, and potential for transportation hazards, the alignment illustrated in the Sandy TSP is not practicable for construction. This application provides for a solution to extend Gunderson Road and fulfill the anticipated condition of approval associated with Bailey Meadows Subdivision. The location shown in the Supplemental Materials of Exhibit G can be improved to provide the required site characteristics and execute the extension of the transportation network to satisfy the needs of citizens in the general area. Please see the TIA and Supplemental Materials of Exhibit G for further details.

...

660-024-0067 Evaluation of Land in the Study Area for Inclusion in the UGB; Priorities

- (1) A city considering a UGB amendment must decide which land to add to the UGB by evaluating all land in the study area determined under OAR 660-024-0065, as follows:
 - (a) Beginning with the highest priority category of land described in section (2), the city must apply section (5) to determine which land in that priority category is suitable to satisfy the need deficiency determined under OAR 660-024-0050 and select for inclusion in the UGB as much of the land as necessary to satisfy the need.
 - (b) If the amount of suitable land in the first priority category is not sufficient to satisfy all the identified need deficiency, the city must apply section (5) to determine which land in the next priority is suitable and select for inclusion in the UGB as much of the suitable land in that priority as necessary to satisfy the need. The city must proceed in this manner until all the land need is satisfied, except as provided in OAR 660-024-0065(9).
 - (c) If the amount of suitable land in a particular priority category in section (2) exceeds the amount necessary to satisfy the need deficiency, the city must choose which land in that priority to include in the UGB by applying the criteria in section (7) of this rule.
 - (d) In evaluating the sufficiency of land to satisfy a need under this section, the city may use the factors identified in sections (5) and (6) of this rule to reduce the forecast development capacity of the land to meet the need.
 - (e) Land that is determined to not be suitable under section (5) of this rule to satisfy the need deficiency determined under OAR 660-024-0050 is not required to be selected for inclusion in the UGB unless its inclusion is necessary to serve other higher priority lands.
- (2) Priority of Land for inclusion in a UGB:
 - (a) First Priority is urban reserve, exception land, and nonresource land. Lands in the study area that meet the description in paragraphs (A) through (C) of this subsection are of equal (first) priority:
 - (A) Land designated as an urban reserve under OAR chapter 660, division 21, in an acknowledged comprehensive plan;
 - (B) Land that is subject to an acknowledged exception under ORS 197.732; and
 - (C) Land that is nonresource land.



Response: The land to be brought within the UGB is within the City of Sandy's Adopted URA. Therefore, the land is first priority for inclusion in a UGB. The criteria are met.

- (b) Second Priority is marginal land: land within the study area that is designated as marginal land under ORS 197.247 (1991 Edition) in the acknowledged comprehensive plan.
- (c) Third Priority is forest or farm land that is not predominantly high-value farm land: land within the study area that is designated for forest or agriculture uses in the acknowledged comprehensive plan and that is not predominantly high-value farmland as defined in ORS 195.300, or that does not consist predominantly of prime or unique soils, as determined by the United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). In selecting which lands to include to satisfy the need, the city must use the agricultural land capability classification system or the cubic foot site class system, as appropriate for the acknowledged comprehensive plan designation, to select lower capability or cubic foot site class lands first.
- (d) Fourth Priority is agricultural land that is predominantly high-value farmland: land within the study area that is designated as agricultural land in an acknowledged comprehensive plan and is predominantly high-value farmland as defined in ORS 195.300. A city may not select land that is predominantly made up of prime or unique farm soils, as defined by the USDA NRCS, unless there is an insufficient amount of other land to satisfy its land need. In selecting which lands to include to satisfy the need, the city must use the agricultural land capability classification system to select lower capability lands first.

Response: The land to be brought within the UGB is within the City of Sandy's URA and is therefore first priority for inclusion. Therefore, second, third, and fourth priority lands are not under consideration.

SANDY COMPREHENSIVE PLAN GOALS AND POLICIES

Goal 1 – Citizen Involvement

- POLICY 1:** The City of Sandy shall maintain a citizen involvement program to allow opportunity for citizen involvement in the ongoing planning process.
- POLICY 2:** Comprehensive Plan changes shall include the opportunity for participation of citizens affected by the change.
- POLICY 4:** The City shall disseminate information and public notice to the residents of the Sandy area concerning on-going planning activities and pending actions.

Response: The City of Sandy has an established citizen involvement program. The application will be processed according to Chapter 17.12 of the LDC, which involves public notification, public hearings, and decision appeal procedures, as established in City of Sandy LDC Section 17.12.30 and 17.12.40. Therefore, the application is consistent with Goal 1.

Goal 2 – Land Use Planning

- POLICY 2:** Changes to the Comprehensive Plan Map shall be consistent with the policies of the Comprehensive Plan, state law, and intergovernmental agreements.

Response: Changes to the Comprehensive Plan Map are consistent with SDC Chapter 17.12 and the applicable policies of the Comprehensive Plan, as detailed in this written narrative. Consistency with applicable State statute and rules and the Urban Growth Management



Agreement (UGMA) between City of Sandy and Clackamas County have been addressed in this document. The amendment is Therefore, Policy 2 above is met.

POLICY 10: Due to the demand which new development places upon the community's infrastructure, the city may impose off-site improvement requirements necessitated by a development. Each development shall provide for all onsite needs, and in areas which represent a critical link in the facility and service delivery systems, the city may require the over-sizing of these systems. The City may negotiate late-comer fees or other arrangements to compensate developers for over-sizing of facilities.

Response: The Applicant is submitting this application to satisfy an anticipated condition of approval associated with City of Sandy Local File No. 19-023 SUB/VAR/TREE. Although Bailey Meadows Subdivision provides for and meets SDC criteria for on-site needs, in this case the City and Applicant agree to an off-site improvement requirement (i.e., Gunderson Road extension and parkland dedication). The off-site extension of Gunderson Road and improvements are outside the UGB, as described in this written document, and require a UGB amendment to allow an urban facility to be built on land currently within the County's jurisdiction. The policy above is understood and met by this application submittal.

POLICY 14: Proposed plan elements such as parks, roadways, schools, etc., are intended to be conceptual. Actual locations and quantities should be determined through the development process.

Response: The alignment of the extension of Gunderson Road to OR 211, a proposed plan element in the City's TSP, is conceptual. The actual location should be determined through the development process, as outlined above. To provide this public transportation facility improvement, the road should be extended to match the conceptual alignment in the Sandy TSP. However, due to geometrical issues, safety concerns, and potential for transportation hazards, the alignment illustrated in the Sandy TSP is not practicable for construction. This application provides for a solution to extend Gunderson Road and determine the actual functionable location through site analysis and development review. The location shown in the Supplemental Materials of Exhibit G can be improved to provide the required site characteristics and execute the extension of the transportation network to satisfy the needs of citizens in the general area. Please see the TIA and Supplemental Materials of Exhibit G for further details.

Additionally, according to the Sandy Parks Master Plan adopted May 15, 1997, there is not a conceptual location for a park on or near the subject site. Therefore, the location for the improvement should be determined through the development process. Though parkland dedication is not required of the Bailey Meadows Subdivision application, the Applicant is providing it and it must be brought within the Sandy UGB and annexed to allow for it. Policy 14 above is met.

Goal 5 – Natural Resources

Response: Goal 5 is not applicable to the decision. The decision does not affect a Goal 5 resource under OAR 660-023-0250(3)(a)-(c) because:



-
- a) The decision does not “create or amend” a resource list or a portion of an acknowledged plan or land use regulation adopted in order to protect a significant Goal 5 resource or to address specific requirements of Goal 5.”
 - b) The decision does not “allow” new uses that could be conflicting uses with a particular significant Goal 5 resource site on an acknowledged resource list.”
 - c) While the decision “amends an acknowledged UGB” no “factual information [was] submitted demonstrating that a resource site, or the impact areas of such a site, is included in the amended UGB area.”

Goal 6 – Air, Water, and Land Resources Quality

POLICY 4: Reduce congestion and delay on major streets to lessen localized pollution impacts of automobile travel through methods such as signal timing, access management, intersection improvements, etc.

Response: The City’s Comprehensive Plan with respect to Goal 6 and its development regulations governing land, air, and water quality are not affected by the decision. The intent of extending Gunderson Road to OR 211 is to enhance neighborhood circulation, thereby reducing congestion and delay in the area. This mitigates localized pollution impacts of vehicle activity in the area.

Goal 7 – Areas Subject to Natural Hazards

Response: The City’s Comprehensive Plan, with respect to Goal 7 and its development regulations governing natural hazards, is not affected by the decision. The subject site does not contain mapped areas of steep slopes 25 percent or greater or other known hazard areas.

Goal 8 – Recreational Needs

POLICY 1: Ensure that new residential development contributes equitably to park land acquisition, development, and maintenance.

POLICY 2: Establish methods to maintain and enhance the quality and quantity of parks, open space, and recreational facilities and services. Ensure that these facilities and services serve the diverse recreational needs and interests of area residents and are accessible to all members of the community.

POLICY 10: The conceptual location of community and neighborhood parks and areas of open space have been indicated on the City of Sandy Land Use Map. Actual park locations may be determined based on more site-specific information.

Response: According to the Sandy Parks Master Plan adopted May 15, 1997, there is not a conceptual location for a park on or near the subject site. Therefore, the location for the improvement should be determined through the development process. Though parkland dedication is not required of the Bailey Meadows Subdivision application, the Applicant is providing it and it must be brought within the Sandy UGB and annexed to allow for it. Goal 8 above is met.

Goal 9 – Economic Development

Response: The City’s Comprehensive Plan with respect to Goal 9 and its employment lands are not affected by the decision.



Goal 10 – Housing

Response: The subject property associated with this application to be incorporated within the UGB will be strictly for the purpose of constructing a public transportation facility and providing land for a park, and is not planned to include land for residential use. Therefore, the City’s Comprehensive Plan with respect to Goal 10 and residential land is not affected by the decision.

Goal 11 – Public Facilities and Services

Response: The City’s Comprehensive Plan contains an acknowledged Goal 11 element that includes policies to ensure sufficient and adequate public services are available (or will be available as appropriate) to serve lands within the UGB. The property north of the subject site, Bailey Meadows Subdivision, was found to be sufficiently served by public services at the time it was annexed into the City in June 2017. This application involves amending the City’s UGB to permit the extension of a public transportation facility (i.e., Gunderson Road) to allow for a future connection to OR 211. If approved, the extension is intended as an additional access to the subdivision and to distribute traffic from local streets to the surrounding area. The extension is not required for subdivision approval. Although providing parkland on the northeast portion of Tax Lot 701 will enhance quality of life for the residents in the area, it is not required for subdivision approval. Goal 11 is satisfied.

POLICY 3: Consider the needs of emergency service providers in the review of all development. Particular attention should be paid to:

- a) Street and driveway layout and site design features that ensure emergency vehicle access and building identification.
- b) Fire hydrant locations and fire flow.
- c) Security through appropriate lighting and landscape design.

Response: Policy 3 above, regarding emergency service provider access, is discussed in detail under Goal 12, Policy 2.

Goal 12 – Transportation

POLICY 1: Support a pattern of connected streets, sidewalks, and bicycle routes to: a) provide safe and convenient options for cars, bikes, and pedestrians; b) create a logical, recognizable pattern of circulation; and, c) spread traffic over local streets so that collector and arterial streets are not overburdened.

Response: This application involves the extension of a public transportation facility (i.e., Gunderson Road) to allow Bailey Meadows Subdivision a future connection to OR 211, as illustrated in the City of Sandy TSP. If approved, the extension is intended as an additional access to the subdivision and to distribute traffic from local streets to the surrounding area. The extension is planned to support a pattern of connected streets as stated above but is not required for subdivision approval.

POLICY 2: Work with fire district, police, and other emergency service providers to ensure that adequate emergency access is possible on all streets.

Response: Appendix D, Section D107 of the Oregon Fire Code addresses standards regarding fire apparatus access roads for one or two-family developments. As discussed in the Bailey



Meadows Subdivision application (City of Sandy Local File No. 19-023 SUB/VAR/TREE), the subdivision currently provides two separate and approved fire apparatus access roads (Melissa Avenue and SE Ponder Lane) and shall meet the requirements of Section D104.3.

The extension of Gunderson Road would provide an additional access to the subdivision. Therefore, if approved, the Gunderson Road extension will provide the secondary access to the subdivision and SE Ponder Lane will not be utilized to serve as an emergency access as described above.

Additionally, the nature of Policy 2 above requires coordination of the application by the City with affected governmental entities. Coordination requires notice of an application, an opportunity for an affected governmental entity to comment on the application, and the City's incorporation of the comments to a reasonable extent. The City can find that coordination of this application will be accomplished in two ways: by the Applicant prior to application submittal, and by the City in the review process for the application. Goal 12, Policy 2 is satisfied.

POLICY 21: Work with ODOT to determine locations for necessary traffic control signals. Proposed locations for future traffic signals have been determined for the downtown area in the City of Sandy Transportation System Plan. Other locations need to be determined in order to improve the safety and convenience of pedestrians, bicycles, and automobiles. The location of traffic signals should be consistent with the street network indicated in the Comprehensive Plan Map and current traffic engineering standards.

POLICY 22: Submit notice of development proposals impacting Highways 26 and 211 to ODOT for review and comment.

Response: The above criteria applies to City processes for noticing and coordinating with ODOT, as applicable. The standards above apply as the project plans to extend Gunderson Road to OR 211. Direct action by the Applicant will be taken as applicable. Policy 21 and 22 can be satisfied.

Goal 13 – Energy Conservation

Response: The City's Comprehensive Plan with respect to Goal 13 and its standards governing energy conservation are not affected by the decision.

Goal 14 – Urbanization

POLICY 1: Maintain an urban growth boundary with sufficient residential, commercial, industrial, and public use lands necessary to support forecast population and employment for a 20-year horizon. The City will evaluate and update the 20-year land supply at each periodic review plan update.

Response: This application to amend the City UGB is necessary to provide a public transportation facility (i.e., Gunderson Road) to support residential land north of the project site which was included within the UGB and subsequently annexed in 2017. Additionally, this application provides parkland dedication which will benefit residential lands in the vicinity. As described above, the City is required to maintain a UGB with sufficient residential lands, as addressed in the February 2017 City of Sandy Urban Growth Boundary Expansion Analysis. This application will provide a public road as illustrated in



the Sandy TSP that aligns with the existing transportation network in the area and implement a connection to OR 211.

POLICY 2: Urban growth should be directed in a generally contiguous manner consistent with the city's ability to economically maintain and extend public services and facilities.

POLICY 3: The City of Sandy shall encourage the development of land according to the following priorities:

- a) Vacant, buildable lands or underutilized lands located within developed or developing areas.
- b) Lands contiguous to development areas where services can be easily and economically extended.
- c) Lands which are significantly separated from developing areas by vacant land, or areas which would place an undue burden on the city's infrastructure.

Response: The project site is currently vacant, with pasture and vegetated areas. As stated above, urban growth should be directed in a contiguous manner and the planned Gunderson Road extension will facilitate growth north of the project site while having no impact on urban services or utilities. Per Goal 14, Policy 3(b) above, the City shall encourage the development of land which is contiguous to development areas where services can be easily and economically extended. The extension of Gunderson Road will provide access and distribute traffic from local streets to the surrounding area and provide parkland dedication, a benefit to lands north of the project site and those within the City limits.

POLICY 4: An Urban Growth Boundary (UGB) and Urban Reserve Area (URA) shall be jointly adopted by the City of Sandy and Clackamas County. Procedures for coordinated management of the unincorporated lands within the UGB and URA shall be specified in an intergovernmental agreement adopted by the Sandy City Council and the Clackamas County Board of Commissioners.

Response: The property involved in this application, Tax Lot 701, is associated with an UGMA, as it is within the Sandy Adopted URA. The applicable elements are addressed within this written narrative.

POLICY 6: Designated URA lands will be considered for inclusion within the UGB on a phased basis, primary at periodic review. Legislative amendments to the UGB shall be large enough to facilitate cohesive neighborhood framework planning and efficient provision of public facilities. Property owners will also have the opportunity to request that land within the designated URA be included within the Sandy UGB, based on the criteria outlined in LCDC Goal 14 and the Urban Growth Management Agreement with Clackamas County.

Response: This application involves a property owner's (i.e., the Applicant's) request that Tax Lot 701, land within the designated Sandy URA, be included with the Sandy UGB. The applicable criteria, including Land Conservation and Development Commission (LCDC) Goal 14 noted above, have been addressed in this written document. Policy 6 is relevant and satisfied.

POLICY 7: The City of Sandy shall have the lead role in designating planned land uses and densities for incorporated and unincorporated lands within the UGB and the URA. The Comprehensive Plan shall constitute the comprehensive plan for all land within the Urban Growth Boundary and Urban Reserve Area.



Response: The subject application involves property which is located within the URA. This written document contains analysis of the City’s comprehensive plan goals and policies associated with the property. Therefore, Policy 7 is applicable.

POLICY 8: The City of Sandy shall have the lead role in coordinating public facility planning (streets, sanitary and storm sewers, water, parks and open space, schools) within the UGB and the URA.

Response: Tax Lot 701 is located within the Sandy Adopted URA. Therefore, Policy 8 is applicable, and the City of Sandy shall have the lead role in coordinating this application for the planned public transportation facilities and parkland.

POLICY 9: County zoning shall apply to unincorporated lands within the UGB and URA until annexation to the City of Sandy.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation and a comprehensive plan amendment is necessary to apply City zoning to allow for the public transportation facilities and parkland. Policy 9 is applicable and satisfied.

POLICY 11: Clackamas County shall have the lead role in processing land use and development applications for unincorporated lands within the UGB and URA.

Response: Tax Lot 701 is located within the Sandy Adopted URA. Therefore, Policy 11 is applicable, and the City of Sandy shall coordinate with Clackamas County in processing the subject land use and development application for unincorporated lands within the URA.

POLICY 12: The City of Sandy will support development within the areas outside the city limits but within the Sandy Urban Growth Boundary or Urban Reserve Area based on the following standards and restrictions:

- a) County zoning in effect at the time of adoption of the Urban Reserve Area will be frozen until the unincorporated land is included within the UGB and annexed for urban development.
- b) New commercial and industrial uses will generally be discouraged outside the City limits and within the UGB or within the Urban Reserve Area.
- c) Agricultural and forest uses will be allowed in accordance with Clackamas County zoning.
- d) The City and County shall coordinate plans for interim rural residential development within the designated Urban Reserve Area. The following strategies will be used to ensure that interim rural development does not inhibit long-term urbanization of lands within the Sandy UGB and Urban Reserve Area:
 - 1) shadow plats
 - 2) cluster development
 - 3) redevelopment plans
 - 4) non-remonstrance agreements or deed restrictions for annexation and provision of urban facilities

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation and a comprehensive plan amendment is necessary to apply City zoning allowing this urban development (i.e.,



creation of a public transportation facility and parkland). Therefore, the subject application does not involve new commercial, industrial, or agricultural uses. The Applicant understands that City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations are intended for the property. Interim use and development, prior to annexation, is not associated with this application. The application complies with the applicable components of Policy 12 above.

CLACKAMAS COUNTY COMPREHENSIVE PLAN GOALS AND POLICIES

GOALS

The overall goals of the plan are:

- Balance public and private interests and adopt a coordinated set of goals and policies to guide future development in Clackamas County.
- Identify the most appropriate land uses for individual sites by evaluating site characteristics in light of market demand, human needs, technology, and state, regional, and County goals.
- Provide for growth in areas where public facilities can economically be provided to support growth.
- Create development opportunities most compatible with the fiscal and financial capacity of the County and its residents.

Response: This application balances public and private interests by complying with goals and policies in the Clackamas County Comprehensive Plan. The primary purpose of this application is to facilitate a transportation need in the area by extending Gunderson Road to provide a connection to OR 211, as illustrated in the Sandy TSP. Additionally, the Applicant plans to provide area for parkland. The project site is relatively flat with no existing improvements which makes it an appropriate site to facilitate the City's transportation vision. To distribute traffic from local streets to arterials and collectors, the extension of this public facility can economically be provided to support growth north of the subject site. The overall goals of the plan are incorporated into this UGB Amendment.

Chapter 4: LAND USE

URBANIZATION

URBANIZATION GOALS

- Clearly distinguish Urban and Urban Reserve areas from non-urban areas.
- Encourage development in areas where adequate public services and facilities can be provided in an orderly and economic way.
- Insure an adequate supply of land to meet immediate and future urban needs.
- Provide for an orderly and efficient transition to urban land use.
- Distinguish lands immediately available for urban uses from Future Urban areas within Urban Growth Boundaries.

Response: The subject property is within the Sandy Urban Reserve Area. This application supports development in an area of the City where a public transportation facility has been deemed necessary to accommodate planned growth. Tax Lot 701 is relatively flat and unimproved, allowing the extension of Gunderson Road to be provided in an economic way and



facilitate the needs of urban residential housing north of the site. This application provides for an efficient transition to urban land use because the portion of land to be annexed is the necessary area for the improvement and land will not be annexed to allow or develop homes. The area for parkland dedication will enhance the lives of local residents. The subject site will be available for urban uses, specifically both minor public facilities, after annexation.

4.A. General Urbanization Policies

4.A.2 Coordinate with affected cities in designating urban areas outside of Metro. Land designated as a Rural Reserve, as shown on Map 4-9, shall not be designated as an Urban Reserve or added to an urban growth boundary. The following areas may be designated as Urban:

4.A.2.3. Land to which public facilities and services can be provided in an orderly and economic way.

Response: The subject property is not designated as a Rural Reserve on Map 4-9. Tax Lot 701 is planned to provide a public transportation facility to meet the needs of the surrounding area.

4.A.3 Land use planning for urban areas shall integrate all applicable policies found throughout the Plan including the following:

4.A.3.1. Locate land uses of higher density or intensity to increase the effectiveness of transportation and other public facility investments.

Response: The purpose of this application is to allow the extension of a public transportation facility (e.g. Gunderson Road) thereby providing the improvement illustrated in the Sandy TSP and to provide land for a park. Therefore, the application will increase effectiveness of the City's transportation network.

4.A.4 Establish Urban Growth Management Areas and Urban Growth Management Agreements to clarify planning responsibilities between the County and cities for areas of mutual interest.

Response: The Urban Growth Management Agreement (UGMA) between Clackamas County and the City of Sandy coordinates the development and amendment of comprehensive plans and implementing measures affecting the City's urban growth. The document is addressed in this written document and is included as Exhibit H.

4.E. Urban Reserve Area Policies

4.E.1. The following policies apply to Urban Reserve areas established pursuant to OAR 660, Division 21:

4.E.1.1 Clackamas County shall recommend to Metro land in Clackamas County which should be designated Urban Reserve, when Urban Reserve amendments to the Region 2040 Urban Growth Management Functional Plan are considered by Metro. The cities of Sandy, Molalla, Estacada and Canby, in coordination with Clackamas County, may designate and adopt other urban reserve areas in a manner consistent with OAR 660-021-0000.

Response: The Urban Growth Management Agreement (UGMA) between Clackamas County and the City of Sandy coordinates the development and amendment of comprehensive plans and implementing measures affecting the City's urban growth. The document is addressed in this written narrative and is included as Exhibit H.



4.E.1.5 Lands within a designated Urban Reserve area shall continue to be planned and zoned for rural uses in a manner that ensures a range of opportunities for the orderly, economic and efficient provision of urban services when these lands are included in the Urban Growth Boundary. Planning and zoning shall be done in a manner consistent with OAR 660-021-0000 and the Metro Code, in areas where Metro has jurisdiction.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow for the urban development (i.e., creation of a minor public transportation facility and parkland). The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. Interim use and development, prior to annexation, is not associated with this application

4.E.2. The following policies apply to Urban Reserve areas established pursuant to OAR 660, Division 27, as shown on Map 4-9:

4.E.2.3 The County shall not amend the Comprehensive Plan or Zoning and Development Ordinance or the Comprehensive Plan Map or zoning designations:

- a. To allow within Urban Reserve areas, new uses that were not allowed on the date the Urban Reserve areas were designated, except those uses authorized by amendments to the Oregon Revised Statutes or Oregon Administrative Rules enacted after designation of Urban Reserve areas.
- b. To allow within Urban Reserve areas, the creation of new lots or parcels smaller than allowed on the date Urban Reserve areas were designated, except as authorized by amendments to the Oregon Revised Statutes or Oregon Administrative Rules enacted after designation of Urban Reserve areas.

Response: Tax Lot 701 is located within the Sandy Adopted URA and is currently designated with Clackamas County EFU zoning. An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow for the urban development (i.e., creation of a minor public transportation facility and parkland). The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. Interim use and development, prior to annexation, is not associated with this application. This application will not allow new uses that were not allowed on the date the URA was designated or allow the creation of new lots.

URBAN GROWTH MANAGEMENT AGREEMENT BETWEEN CITY OF SANDY AND CLACKAMAS COUNTY

IV. Boundaries

- A. The Urban Growth Boundary (UGB) and Urban Growth Area (UGA) shall be as shown on map Attachment "A" to this agreement.



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- B. The Urban Reserve Area (URA) shall be established as shown on map Attachment “A” to this Agreement. The URA shall establish the planned limits of the City’s urban growth for the mutually coordinated population and employment growth for a 30 to 50-year timeframe.
 - C. Amendments to the City’s and County’s Comprehensive Plans which modify the Urban Growth Boundary or Urban Reserve Area shall be deemed incorporated into this agreement. Any amendment proposed to the City’s UGB or URA shall be a coordinated city-county effort with adoption by both city and county. The county shall not consider adoption of any City UGB or URA amendment unless adopted by the city first. The city shall be responsible for initiating all legislative documents.

Response: This application involves an amendment to the City’s UGB and should be a coordinated city-county effort with adoption by both the City of Sandy and Clackamas County. As stated above, the City is responsible for initiating the legislative amendments.

V. Coordination and Planning

- A. The City comprehensive plan shall establish urban comprehensive plan land use designations and densities for all incorporated and unincorporated lands within the Urban Growth Boundary and Urban Reserve Areas.
- B. The City shall have the lead role on all urban legislative and quasi-judicial plan amendments within the City’s UGB and URA, with notice to the County. Proposed amendments to the comprehensive plan may be made at any time, whether initiated by the city or in response to a development application. The city may hear and act on comprehensive plan and zone change applications prior to annexation, although such actions will not be effective until the effective date of annexation.
- C. After annexation to the City, the County zoning districts will continue to apply in accordance with the provisions of ORS 215.130 until the City applies its own land use plan and/or zoning designations.

Response: An application for annexation to the City of Sandy will be processed separately and include a comprehensive plan amendment to apply City zoning to allow for the urban development (i.e., creation of a minor public transportation facility and parkland). The Applicant plans to obtain City Low-Density Residential (LDR) Comprehensive Plan and Single-Family Residential (SFR) Zoning designations for the property. Interim use and development, prior to annexation, is not associated with this application.

- D. The City shall be responsible for public facilities planning with the County.
- E. The City shall be responsible for preparing and adopting a local transportation system plan for all lands within the City’s UGB and URA. As required by OAR 660, Division 12, the City shall coordinate its transportation planning with the County, affected state agencies, special districts and affected private transportation service providers.

Response: The Sandy TSP provides

- F. Where applications are made for a use of property under the same ownership that is divided by the City limit boundary, the City shall be responsible for processing both the City and County applications. Except as otherwise provided in this Agreement, the application for the County portion of the property shall be evaluated pursuant to City Code procedures, but applying the applicable substantive provisions of the County’s Comprehensive Plan and Zoning and Development Ordinance.

VI. Zoning and Development Proposals in Unincorporated UGA and URA

...



B. Land use applications for the following permits within the unincorporated UGB or URA shall be forwarded to the City prior to a County Decision. These applications shall include:

1. Comprehensive plan and zone changes
2. Subdivisions and partitions
3. Conditional use permits
4. Design review applications for new commercial or industrial buildings, and communication towers. Any city comments shall be made within 14 days.

Response: This UGB Amendment application involves a comprehensive plan and zone change for a property within the unincorporated UGB and URA and is therefore submitted to the City prior to a County decision.

IV. Conclusion

The required findings have been made and this written narrative and accompanying documentation demonstrate that the application is consistent with the applicable provisions of the Oregon Statewide Planning Goals, Oregon Administrative Rules, Oregon Revised Statutes, City of Sandy Comprehensive Plan, and Clackamas County Comprehensive Plan. The City and County can rely upon this information in their approval of this application.



EXHIBIT C

Technical Memorandum

To: Cody Bjugan, Allied Homes & Development
From: Jessica Hijar
Date: January 6, 2020
Subject: UGB Amendment & Gunderson Road Connection
Traffic Impact Analysis, Addendum #1



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This memorandum is written as an addendum to the Bailey Meadows Subdivision Traffic Impact Analysis prepared by Lancaster Engineering dated June 20, 2019. Specifically, analysis is provided regarding the potential new roadway connection to Highway 211. The current planning effort includes a connection of Gunderson Road to Highway 211 as considered in the City of Sandy's Transportation System Plan (TSP).

In addition, this memorandum addresses the Transportation Planning Rule and associated approval criteria relative to the proposed Urban Growth Boundary (UGB) amendment, comprehensive plan and zone map amendments, and annexation applications. All of these are necessary to accommodate a connection of Gunderson Road to Highway 211.

Future Roadway Connection

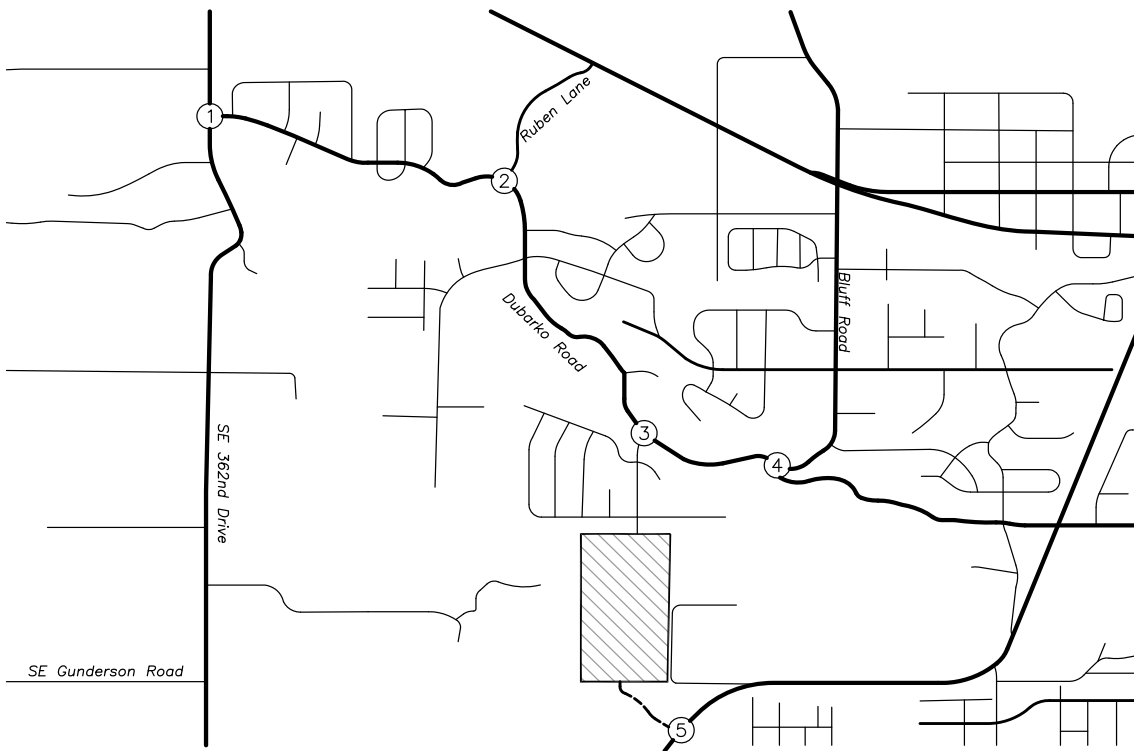
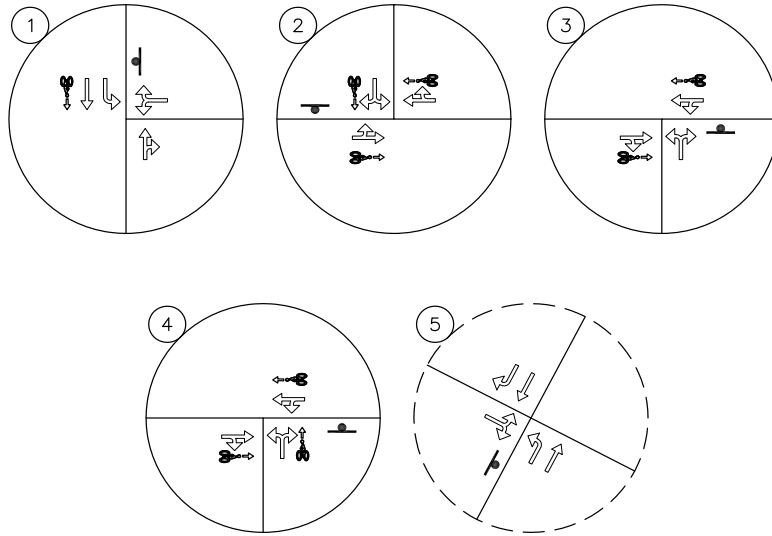
The planned connection of Gunderson Road to Highway 211 will provide an additional route into and out of the Bailey Meadows subdivision as well as the existing neighborhood to the north. This will reduce reliance on Melissa Avenue, which will provide access to the Bailey Meadows subdivision via Dubarko Road. The planned intersection of Gunderson Road at Highway 211 will be a three-legged intersection that is stop-controlled for the SE Gunderson Road approach. Future development on the south side of Highway 211 could extend the street to the east, to eventually connect with Cascadia Village Drive, as shown in the TSP. The existing characteristics of the subject roadways are shown in Table 1. The existing and future intersection configurations are shown in Figure 1 on page two.

Table 1: Vicinity Roadway Characteristics

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|--------------------------|---------------|-----------------------|------------------|---------|-----------|---------------|
| Highway 211 | ODOT | District Highway | 45-55 mph posted | No | No | Partial |
| Gunderson Road (planned) | City of Sandy | Future Minor Arterial | Not Posted | Partial | Partial | Yes |

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STUDY INTERSECTION (PROPOSED)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY
-  FUTURE MINOR ARTERIAL



VICINITY MAP



FIGURE 1

PAGE 2



Trip Distribution

The Gunderson connection to Highway 211 is expected to serve trips to and from the Bailey Meadows subdivision, as well as trips from the existing neighborhood north of Bailey Meadows, which currently uses only Melissa Avenue. Based on travel time studies, it is not expected that traffic from outside the immediate area (such as residents in Bornstedt Village or Cascadia Village) would use the new Gunderson Road connection as a bypass route. Those trips would have to use Gunderson Road, three different streets within Bailey Meadows, Melissa Avenue, and Dubarko Road. This would be a very circuitous route and would not be faster than existing travel routes serving these neighborhoods.

Bailey Meadows Trips

The overall directional distribution of site trips to and from Bailey Meadows was based on the original TIS, but trip routing was modified to reflect the new street connection.

To & From the East

It is expected that 15 percent of site trips in the TIS previously assigned to Dubarko Road to the east will all use the new Gunderson Road connection. Turning left onto Highway 211 at the new intersection will have significantly lower delay than turning left or crossing Highway 211 at Dubarko Road.

Contribution: 15% via Gunderson

To & From the South

A total of 10 percent of the trips are expected to be to and from the south, and all these trips will use the Gunderson Road connection to Highway 211, since that will be a much more direct route.

Contribution: 10% via Gunderson

To & From the West

Trips to and from the west (30%) were assigned primarily to 362nd Avenue, as this is the quickest route to shopping destinations as well as Highway 26 west of Sandy. Travel time studies show that the route using Dubarko Road to 362nd Avenue is identical in time to the route using Highway 211 to 362nd Avenue. Therefore, the 30% was split evenly via Melissa Avenue to the north and Gunderson Road to the south.

Contribution: 15% via Gunderson

The total percentage of site trips using Gunderson Road is 40 percent, or 378 of the site's 944 trips per day.



Rerouted Existing Trips

Since 40 percent of the Bailey Meadows trips are expected to use the Gunderson Road connection to Highway 211, it is expected that a similar, although slightly lower percentage of the existing neighborhood traffic would also use Gunderson. Since the existing neighborhood is north of the project site, the use of Gunderson could decrease from 40 percent to approximately 30 percent. As shown in the TIS, the existing traffic volume on Melissa Avenue was measured to be 1160 vehicles per day.

In total, 30 percent of the existing 1160 average daily traffic (ADT) on Melissa Avenue would reroute via Gunderson Road, or 348 trips per day.

In summary, the table below shows the total daily traffic volumes to the north (via Melissa Avenue) and to the south (via Gunderson Road) with the future street connection in place.

Table 2: Trip Distribution Summary

| | Daily Traffic Volumes | |
|--|-----------------------|----------------|
| | Melissa Avenue | Gunderson Road |
| Existing neighborhood traffic | 1160 | 0 |
| Existing neighborhood traffic w/ Gunderson | 812 | 348 |
| Bailey Meadows site trips with Gunderson | 566 | 378 |
| <i>Total Daily Volume with Gunderson</i> | <i>1378</i> | <i>726</i> |

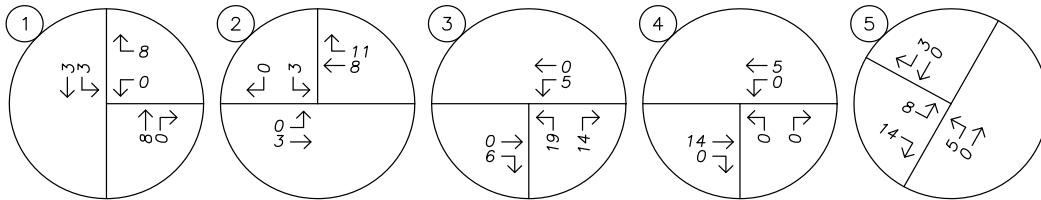
The updated trip distribution and assignment during the morning and evening peak hours are shown in Figure 2 on page five.

LEGEND

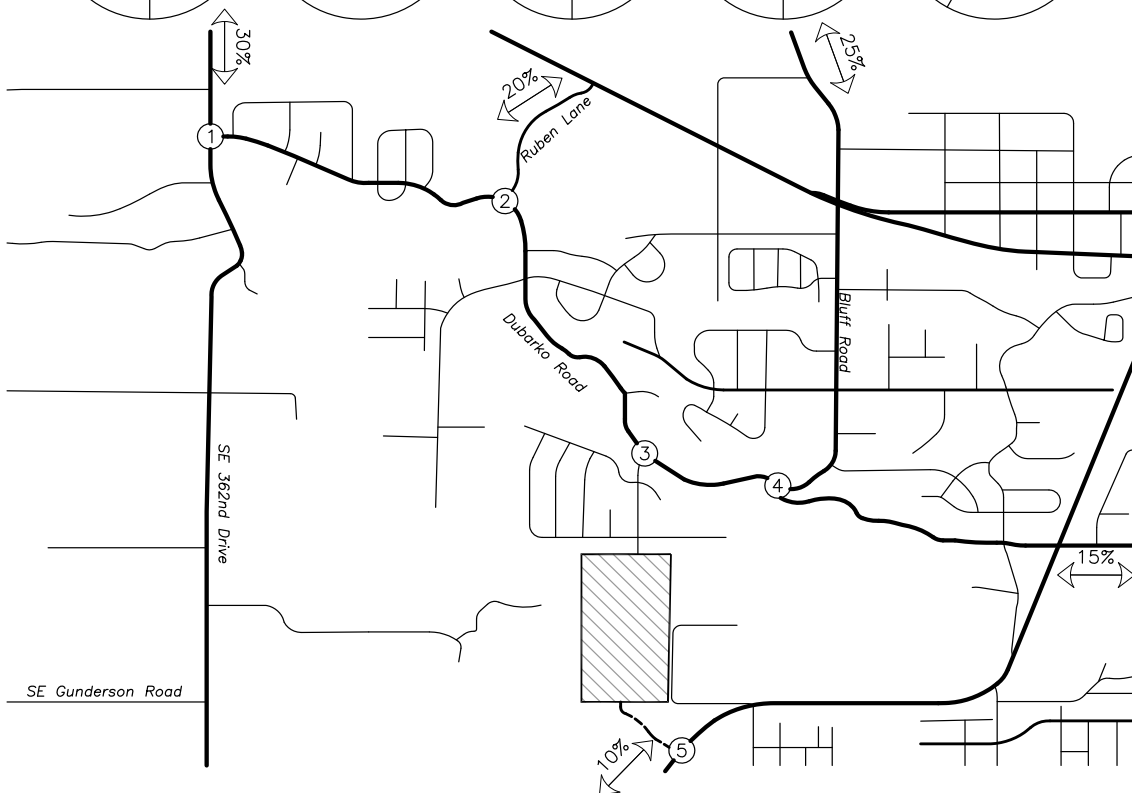
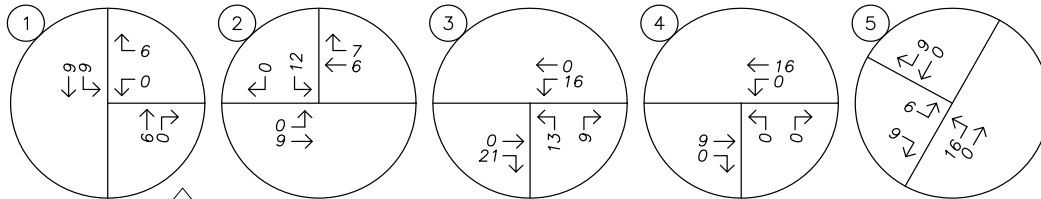
XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |

AM PEAK HOUR



PM PEAK HOUR



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Development Plan – Site Trips
 AM & PM Peak Hours



FIGURE
2
PAGE
5



Traffic Volumes

Existing Conditions

Twenty-four-hour speed data was collected on Highway 211 near the intersection with Ponder Lane on December 4th, 2018. The morning and evening peak hours of traffic occurred between 7:00 AM and 8:00 AM and between 4:00 PM and 5:00 PM, respectively.

Since Highway 211 is under the jurisdiction of ODOT, highway traffic volumes were seasonally adjusted to reflect the 30th highest hour per methodologies in ODOT's Analysis Procedures Manual (APM). Based on the commuter seasonal trend in ODOT's 2018 Seasonal Trend Table, a seasonal factor of 1.122 was calculated and applied to through volumes on Highway 211.

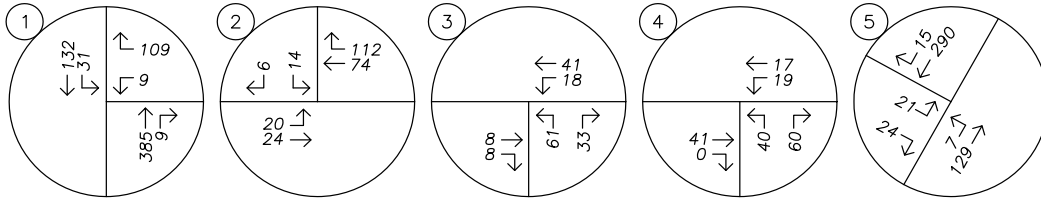
Buildout Conditions

A compounded growth rate of two percent per year was used to estimate growth on all streets under the City of Sandy jurisdiction as described within the TIS. Growth rates for traffic volumes on Highway 211 were derived using ODOT's 2037 Future Volume Tables in accordance with the APM. Using data corresponding to mileposts 3.75 and 5.07, a linear growth rate of 2.8 percent was calculated and applied to through volumes on the highway. Traffic volumes were projected over a period of four years in order to estimate the year 2022 buildout traffic volumes (traffic count data was collected in 2018).

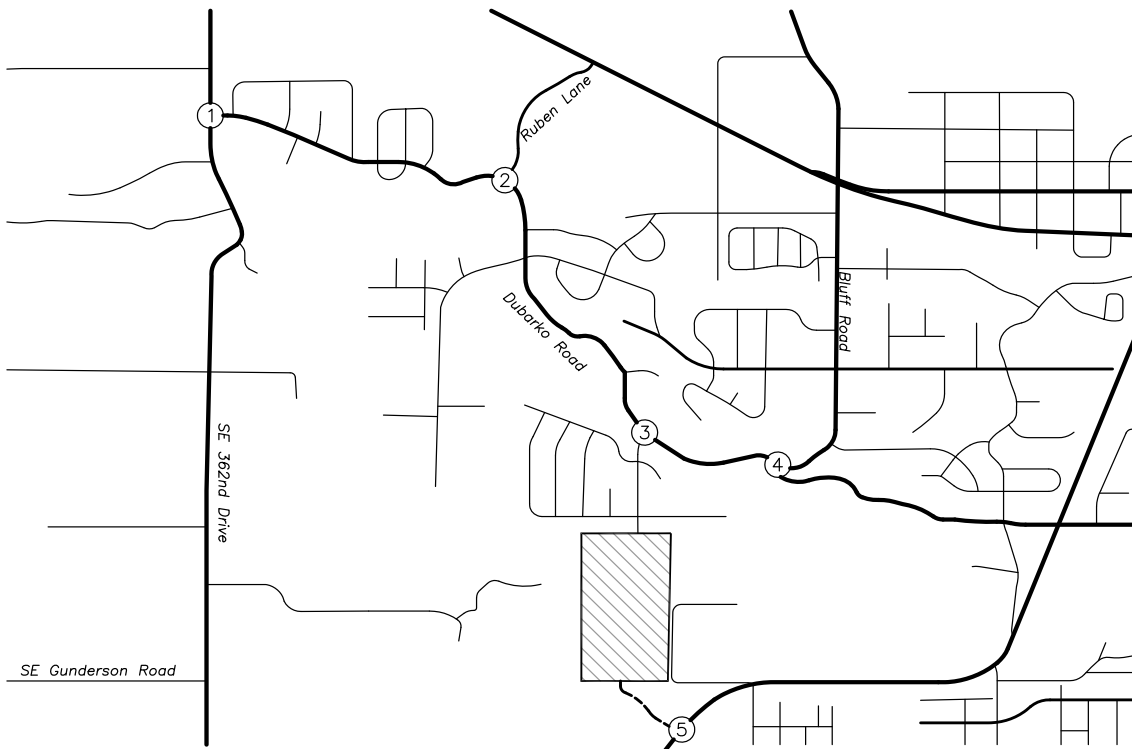
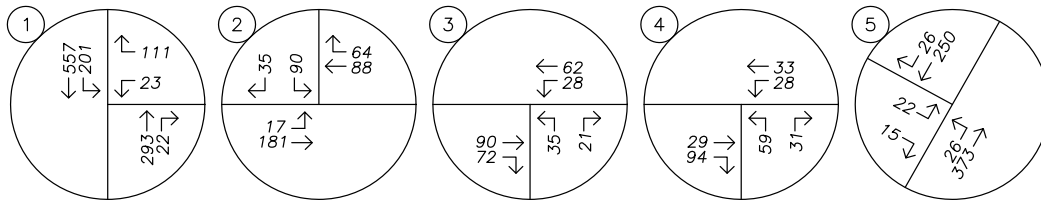
The year 2022 buildout scenario was updated to include a redistribution of existing trips that are likely to use the new Highway 211 roadway connection. Finally, site trips generated by the Bailey Meadows subdivision, discussed previously within the Trip Distribution section, were added to the projected year 2022 volumes in order to obtain the year 2022 buildout traffic volumes.

The year 2022 buildout traffic volumes are shown in Figure 3 on page seven.

AM PEAK HOUR



PM PEAK HOUR



TRAFFIC VOLUMES
 Year 2022 Buildout Traffic Volumes
 AM & PM Peak Hours



FIGURE
3
PAGE
7



January 6, 2020
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Preliminary Traffic Signal Warrants

Preliminary traffic signal warrants were examined for all study intersections based on methodologies in the *Manual on Uniform Traffic Control Devices*¹ (MUTCD) and the Analysis Procedures Manual. Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT and that the eighth-highest hour is 5.6 percent of the daily traffic. Volumes were used for the evening peak hour under the year 2022 buildout scenario.

For the intersection under ODOT jurisdiction, the APM dictates that minor-street right turns are only used if the volume exceeds 85 percent of the lane capacity, and even then, only the increment of volume in excess of 85 percent can be used. In this case, none of the right turns can be used for the purpose of the signal warrant analysis.

Due to insufficient minor street volumes, traffic signal warrants are not met at the intersection of SE Gunderson Road at Highway 211 under year 2022 buildout scenario.

Left-Turn Lane Warrants

Left-turn lane warrants were examined at the planned intersection of Highway 211 at SE Gunderson Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream.

Warrants were examined based on the design curves developed by the Texas Transportation Institute, as adopted by the APM. This methodology evaluates the need for a left-turn lane based on the number of left-turning vehicles, the number of travel lanes, the number of advancing and opposing vehicles, and the roadway travel speed.

A left-turn lane is warranted at the intersection of SE Gunderson Road at Highway 211 under the year 2022 buildout scenario and it is recommended that a left-turn lane be constructed as part of the intersection improvements.

¹ Federal Highway Administration (FTA), American Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual of Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010



Operational Analysis

A capacity analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*² (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s TSP states that both signalized and unsignalized intersections are required to operate at LOS D or better.

The applicable minimum operational standards for ODOT facilities are established under the Oregon Highway Plan and are based on the classification of the roadway and its v/c ratio. District highways located outside the Urban Growth Boundary and within an unincorporated community has a peak hour v/c ratio target of 0.80.

Table 3: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 13 | B | 0.24 | 19 | C | 0.36 |
| Ruben Lane at Dubarko Road | | | | | | |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Year 2022 Buildout Conditions | 9 | A | 0.13 | 10 | B | 0.09 |
| Dubarko Road at Bluff Road | | | | | | |
| Year 2022 Buildout Conditions | 8 | A | 0.16 | 8 | A | 0.15 |
| Highway 211 at SE Gunderson Road | | | | | | |
| Year 2022 Buildout Conditions | 11 | B | 0.08 | 13 | B | 0.08 |

All intersections are projected to operate within the City of Sandy and ODOT’s operational standards under all analysis scenarios.

² Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*



Intersection Location

The City of Sandy TSP shows a planning-level depiction of the Gunderson Road extension that was outside of the UGB at the time the TSP was adopted but is within the current UGB. This is shown below in Figure 4.



Figure 4: Alignment from Sandy TSP

However, upon closer investigation and engineering analysis, it was determined that the alignment shown on the TSP was not feasible for construction of an intersection with Highway 211, primarily due to poor sight distance, the need for a perpendicular intersection, and a very steep superelevated roadway section.

Looking to the northeast from the TSP-identified location, sight distance is limited by both horizontal and vertical curves on Highway 211. In addition, sight distance from the future fourth leg of the intersection would be particularly poor. At

the TSP-identified location, the highway was designed for moving traffic, not for accommodation of an intersection. Due to the high design speed and the horizontal curve, superelevation (the banking of the roadway around the curve) is very steep. This facilitates through traffic on the highway, but makes an intersection at this location problematic, due to difficult turning and crossing movements across the steep curve.

Need for UGB Expansion

The nearest suitable intersection location was found to be farther to the southwest, at the location currently proposed for a UGB amendment. From this location, it is far enough from the horizontal and vertical curves to the northeast to have adequate sight distance and far enough southwest of the curve to not be in a

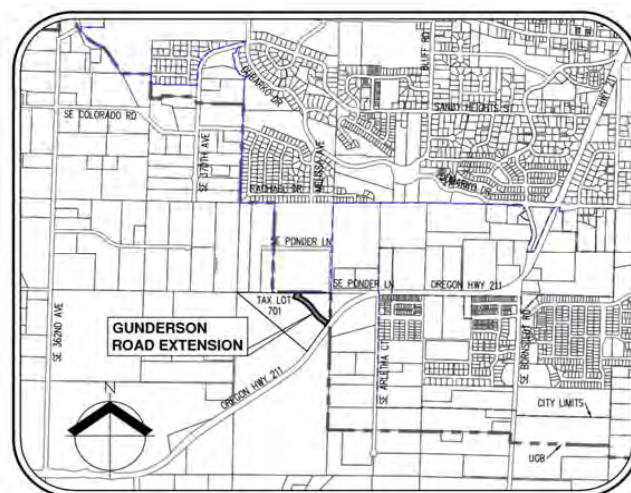


Figure 5: Planned Alignment



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superelevated roadway section. However, this alignment is outside of the current UGB of the City of Sandy, as shown in Figure 5. As such, a UGB amendment is proposed to accommodate the road extension.

With the proposed UGB amendment, there will be a triangle-shaped remnant piece of property that will also be brought into the UGB. This remnant is approximately 2.38 acres in size and is proposed to be dedicated as a public neighborhood park. This will be a small, passive-use neighborhood park that will be used primarily by the residents in the area. Trips to and from the park will be primarily pedestrian and bicycle trips and no separate parking lot is planned.

Oregon Administrative Rules

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation applications trigger the need to address the Transportation Planning Rule (TPR) and associated criteria from the Oregon Administrative Rules. These are addressed below.

OAR 660-012-0060 Transportation Planning Rule

The primary purpose of the TPR is to account for the potential transportation impacts associated with any amendments to adopted plans and land use regulations. The TPR is quoted in *italics* below, with a response immediately following each section.

1. *If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*

- (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);*

Response: The proposed UGB amendment, comprehensive plan and zone map amendment, and annexation will not change the functional classification of any transportation facilities. In fact, it will implement planned roadway connections in the TSP.

- (b) Change standards implementing a functional classification system; or*

Response: The standards that implement the functional classification system are contained in the TSP and will not change as part of this proposal.

- (c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing*



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requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

- (A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;*
- (B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or*
- (C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.*

Response: The proposed UGB amendment and associated plan amendments will facilitate the Gunderson Road connection and will not result in developable property that will increase trip generation. In fact, by facilitating an important street connection it is implementing the City of Sandy TSP, will improve connectivity for the neighborhood, and will improve performance of the surrounding transportation system. The proposal will not result in a significant effect as defined by the TPR and no mitigations are necessary.

OAD 660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB

This section of the OAR is specific to UGB expansions and speaks to public facilities (such as transportation facilities) that require specific site characteristics. The OAR is quoted in *italics* below, with a response immediately following each section.

- 3. When the primary purpose for expansion of the UGB is to accommodate a particular industrial use that requires specific site characteristics, or to accommodate a public facility that requires specific site characteristics, and the site characteristics may be found in only a small number of locations, the preliminary study area may be limited to those locations within the distance described in section (1) or (2), whichever is appropriate, that have or could be improved to provide the required site characteristics. For purposes of this section:*

- (a) The definition of "site characteristics" in OAR 660-009-0005(11) applies for purposes of identifying a particular industrial use.*

Response: In OAR 660-009-0005(11), "Site Characteristics" are defined by visibility, proximity to a particular transportation facility, and major transportation routes. In this case, the "site" for the UGB amendment is very narrowly defined and the location between the subdivision and Highway 211 is dictated by engineering standards that must be satisfied for a safe and efficient intersection location.

- (b) A "public facility" may include a facility necessary for public sewer, water, storm water, transportation, parks, schools, or fire protection. Site characteristics may include but are not limited to size, topography and proximity.*



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Response: Since the primary purpose of the proposed UGB amendment is to accommodate the extension of Gunderson Road to Highway 211, it is by definition a “public facility”. Site characteristics such as topography are what have dictated the need for the intersection in the location as proposed. Additionally, the applicant is providing area for a neighborhood park, a minor public facility.

Summary & Conclusions

The proposed UGB amendment, comprehensive plan and zone map amendments, and annexation will implement the City of Sandy TSP and result in improved operation at the study area roadways and intersections. The connection will improve conditions for the existing neighborhood to the north of the Bailey Meadows subdivision by providing another means of vehicular access to the area.



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Appendix

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 1/6/2020
 Scenario: Year 2022 Buildout Conditions - Evening Peak Hour

Major Street: Highway 211 Minor Street: SE Gunderson Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 675 PM Peak Hour Volumes: 22

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 6,750 | 8,850 | |
| Minor Street* | 220 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 6,750 | 13,300 | |
| Minor Street* | 220 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 6,750 | 10,640 | |
| Minor Street* | 220 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 85% of the turn lane capacity.



Project: Bailey Meadows Subdivision
 Intersection: Highway 211 at SE Gunderson Road
 Date: 1/6/2020
 Scenario: 2022 Buildout conditions

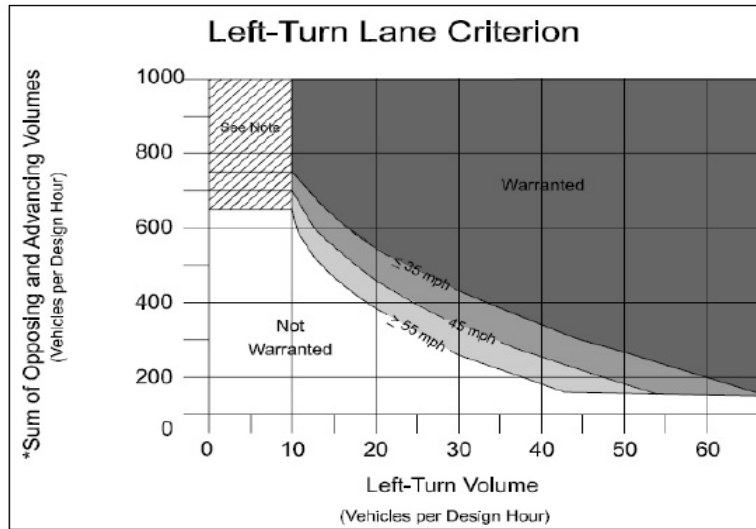
Speed? 45 mph

PM Peak Hour

| | |
|------------------------------|-----|
| Left-Turn Volume | 26 |
| Approaching DHV | 250 |
| # of Advancing Through Lanes | 1 |
| Opposing DHV | 399 |
| # of Opposing Through Lanes | 1 |

O+A DHV 649

Lane Needed? **Yes**



Source: Oregon DOT Analysis Procedures Manual 2008

***(Advancing Vol/ # of Advancing Through Lanes)+
 (Opposing Vol/ # of Opposing Through Lanes)**

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

Lanes, Volumes, Timings
 1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Volume (vph) | 9 | 109 | 385 | 9 | 31 | 132 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.876 | | 0.997 | | | |
| Flt Protected | 0.996 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Flt Permitted | 0.996 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1857 | 0 | 1703 | 1792 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 2% | 2% | 6% | 6% |
| Adj. Flow (vph) | 11 | 128 | 453 | 11 | 36 | 155 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 139 | 0 | 464 | 0 | 36 | 155 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 39.7% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

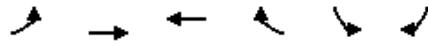
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 2.7 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Future Vol, veh/h | 9 | 109 | 385 | 9 | 31 | 132 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 128 | 453 | 11 | 36 | 155 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 686 | 459 | 0 | 0 | 464 | |
| Stage 1 | 459 | - | - | - | - | |
| Stage 2 | 227 | - | - | - | - | |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | |
| Pot Cap-1 Maneuver | 415 | 604 | - | - | 1077 | |
| Stage 1 | 638 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 401 | 604 | - | - | 1077 | |
| Mov Cap-2 Maneuver | 401 | - | - | - | - | |
| Stage 1 | 617 | - | - | - | - | |
| Stage 2 | 813 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 13.1 | 0 | | 1.6 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 582 | 1077 | - | |
| HCM Lane V/C Ratio | - | - | 0.239 | 0.034 | - | |
| HCM Control Delay (s) | - | - | 13.1 | 8.5 | - | |
| HCM Lane LOS | - | - | B | A | - | |
| HCM 95th %tile Q(veh) | - | - | 0.9 | 0.1 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Volume (vph) | 20 | 24 | 74 | 112 | 14 | 6 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | 0.919 | | 0.959 | |
| Flt Protected | | 0.978 | | | 0.966 | |
| Satd. Flow (prot) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Flt Permitted | | 0.978 | | | 0.966 | |
| Satd. Flow (perm) | 0 | 1753 | 1712 | 0 | 1558 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 6% | 6% | 2% | 2% | 13% | 13% |
| Adj. Flow (vph) | 22 | 27 | 83 | 126 | 16 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 49 | 209 | 0 | 23 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.4% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

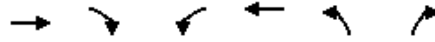
HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 1.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 24 | 74 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 27 | 83 | 126 | 16 | 7 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 209 | 0 | - | 0 | 217 | 146 |
| Stage 1 | - | - | - | - | 146 | - |
| Stage 2 | - | - | - | - | 71 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1338 | - | - | - | 747 | 873 |
| Stage 1 | - | - | - | - | 855 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1338 | - | - | - | 734 | 873 |
| Mov Cap-2 Maneuver | - | - | - | - | 734 | - |
| Stage 1 | - | - | - | - | 840 | - |
| Stage 2 | - | - | - | - | 925 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 3.5 | 0 | 9.8 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1338 | - | - | - | 771 | |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.029 | |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.8 | |
| HCM Lane LOS | A | A | - | - | A | |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Volume (vph) | 8 | 8 | 18 | 41 | 61 | 33 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr't | 0.932 | | | | 0.952 | |
| Flt Protected | | | 0.985 | | 0.969 | |
| Satd. Flow (prot) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Flt Permitted | | | 0.985 | | 0.969 | |
| Satd. Flow (perm) | 1451 | 0 | 0 | 1835 | 1718 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 |
| Heavy Vehicles (%) | 22% | 22% | 2% | 2% | 2% | 2% |
| Adj. Flow (vph) | 10 | 10 | 23 | 52 | 77 | 42 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 20 | 0 | 0 | 75 | 119 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.9% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

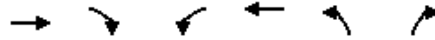
HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|-------|-------|
| Int Delay, s/veh | 6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Future Vol, veh/h | 8 | 8 | 18 | 41 | 61 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 10 | 23 | 52 | 77 | 42 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 20 | 0 | 113 | 15 |
| Stage 1 | - | - | - | - | 15 | - |
| Stage 2 | - | - | - | - | 98 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1596 | - | 884 | 1065 |
| Stage 1 | - | - | - | - | 1008 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1596 | - | 871 | 1065 |
| Mov Cap-2 Maneuver | - | - | - | - | 871 | - |
| Stage 1 | - | - | - | - | 993 | - |
| Stage 2 | - | - | - | - | 926 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.2 | 9.4 | | | |
| HCM LOS | | | A | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 931 | - | - | 1596 | - | |
| HCM Lane V/C Ratio | 0.128 | - | - | 0.014 | - | |
| HCM Control Delay (s) | 9.4 | - | - | 7.3 | 0 | |
| HCM Lane LOS | A | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Volume (vph) | 41 | 0 | 19 | 17 | 40 | 60 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | | | 0.919 | |
| Flt Protected | | | | 0.974 | 0.980 | |
| Satd. Flow (prot) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Flt Permitted | | | | 0.974 | 0.980 | |
| Satd. Flow (perm) | 1696 | 0 | 0 | 1698 | 1645 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles (%) | 12% | 12% | 9% | 9% | 4% | 4% |
| Adj. Flow (vph) | 59 | 0 | 27 | 24 | 57 | 86 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 59 | 0 | 0 | 51 | 143 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | | 9 | 15 | | 15 | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 21.2% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Future Vol, veh/h | 41 | 0 | 19 | 17 | 40 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 0 | 27 | 24 | 57 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.8 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 40% | 0% | 53% |
| Vol Thru, % | 0% | 100% | 47% |
| Vol Right, % | 60% | 0% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 100 | 41 | 36 |
| LT Vol | 40 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 0 | 0 |
| Lane Flow Rate | 143 | 59 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.154 | 0.072 | 0.064 |
| Departure Headway (Hd) | 3.877 | 4.396 | 4.456 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 913 | 807 | 796 |
| Service Time | 1.95 | 2.466 | 2.528 |
| HCM Lane V/C Ratio | 0.157 | 0.073 | 0.064 |
| HCM Control Delay | 7.7 | 7.8 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.2 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | SEL | SER | NEL | NET | SWT | SWR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Volume (vph) | 21 | 24 | 7 | 129 | 290 | 15 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.928 | | | | | 0.850 |
| Flt Protected | 0.977 | | 0.950 | | | |
| Satd. Flow (prot) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.977 | | 0.950 | | | |
| Satd. Flow (perm) | 1556 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 30 | 30 | |
| Link Distance (ft) | 827 | | | 1043 | 1164 | |
| Travel Time (s) | 18.8 | | | 23.7 | 26.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 23 | 26 | 8 | 140 | 315 | 16 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 49 | 0 | 8 | 140 | 315 | 16 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 26.6% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

Intersection

Int Delay, s/veh 1.1

Movement SEL SER NEL NET SWT SWR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Future Vol, veh/h | 21 | 24 | 7 | 129 | 290 | 15 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 23 | 26 | 8 | 140 | 315 | 16 |

Major/Minor Minor2 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|-------|---|---|---|
| Conflicting Flow All | 471 | 315 | 331 | 0 | - | 0 |
| Stage 1 | 315 | - | - | - | - | - |
| Stage 2 | 156 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 551 | 725 | 1228 | - | - | - |
| Stage 1 | 740 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 547 | 725 | 1228 | - | - | - |
| Mov Cap-2 Maneuver | 547 | - | - | - | - | - |
| Stage 1 | 735 | - | - | - | - | - |
| Stage 2 | 872 | - | - | - | - | - |

Approach SE NE SW

| | | | |
|----------------------|------|-----|---|
| HCM Control Delay, s | 11.2 | 0.4 | 0 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NEL NET SELn1 SWT SWR

| | | | | | |
|-----------------------|-------|---|-------|---|---|
| Capacity (veh/h) | 1228 | - | 629 | - | - |
| HCM Lane V/C Ratio | 0.006 | - | 0.078 | - | - |
| HCM Control Delay (s) | 8 | - | 11.2 | - | - |
| HCM Lane LOS | A | - | B | - | - |
| HCM 95th %tile Q(veh) | 0 | - | 0.3 | - | - |

Lanes, Volumes, Timings
 1: SE 362nd Drive & Dubarko Road

12/13/2019



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|--------------|-------|-------|------------------------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Volume (vph) | 23 | 111 | 293 | 22 | 201 | 557 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | 0 | | 0 | 115 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (ft) | 25 | | | | 25 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.888 | | 0.991 | | | |
| Flt Protected | 0.992 | | | | 0.950 | |
| Satd. Flow (prot) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Flt Permitted | 0.992 | | | | 0.950 | |
| Satd. Flow (perm) | 1641 | 0 | 1846 | 0 | 1787 | 1881 |
| Link Speed (mph) | 25 | | 35 | | 35 | |
| Link Distance (ft) | 435 | | 701 | | 662 | |
| Travel Time (s) | 11.9 | | 13.7 | | 12.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 1% | 1% |
| Adj. Flow (vph) | 25 | 121 | 318 | 24 | 218 | 605 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 146 | 0 | 342 | 0 | 218 | 605 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(ft) | 12 | | 12 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | 9 | | 9 | 15 | |
| Sign Control | Stop | | Free | | | Free |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 46.0% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

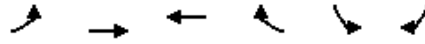
HCM 6th TWSC
1: SE 362nd Drive & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|----------|-------|--------|-------|------|
| Int Delay, s/veh | 3.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Future Vol, veh/h | 23 | 111 | 293 | 22 | 201 | 557 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 121 | 318 | 24 | 218 | 605 |
| Major/Minor | Minor1 | Major1 | | Major2 | | |
| Conflicting Flow All | 1371 | 330 | 0 | 0 | 342 | |
| Stage 1 | 330 | - | - | - | - | |
| Stage 2 | 1041 | - | - | - | - | |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | |
| Pot Cap-1 Maneuver | 161 | 712 | - | - | 1223 | |
| Stage 1 | 728 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Platoon blocked, % | | | - | - | - | |
| Mov Cap-1 Maneuver | 132 | 712 | - | - | 1223 | |
| Mov Cap-2 Maneuver | 132 | - | - | - | - | |
| Stage 1 | 598 | - | - | - | - | |
| Stage 2 | 340 | - | - | - | - | |
| Approach | WB | NB | | SB | | |
| HCM Control Delay, s | 18.7 | 0 | | 2.3 | | |
| HCM LOS | C | | | | | |
| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT | | |
| Capacity (veh/h) | - | - | 406 | 1223 | - | |
| HCM Lane V/C Ratio | - | - | 0.359 | 0.179 | - | |
| HCM Control Delay (s) | - | - | 18.7 | 8.6 | - | |
| HCM Lane LOS | - | - | C | A | - | |
| HCM 95th %tile Q(veh) | - | - | 1.6 | 0.6 | - | |

Lanes, Volumes, Timings
2: Dubarko Road & Ruben Lane

12/13/2019



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | ↕ | ↕ | | ↘ | ↘ |
| Traffic Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Volume (vph) | 17 | 181 | 88 | 64 | 90 | 35 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | | | 0.943 | | 0.962 | |
| Flt Protected | | 0.996 | | | 0.965 | |
| Satd. Flow (prot) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Flt Permitted | | 0.996 | | | 0.965 | |
| Satd. Flow (perm) | 0 | 1874 | 1792 | 0 | 1746 | 0 |
| Link Speed (mph) | | 25 | 25 | | 25 | |
| Link Distance (ft) | | 560 | 633 | | 717 | |
| Travel Time (s) | | 15.3 | 17.3 | | 19.6 | |
| Peak Hour Factor | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 | 0.89 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 19 | 203 | 99 | 72 | 101 | 39 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 0 | 222 | 171 | 0 | 140 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Left | Right | Left | Right |
| Median Width(ft) | | 0 | 0 | | 12 | |
| Link Offset(ft) | | 0 | 0 | | 0 | |
| Crosswalk Width(ft) | | 16 | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 15 | | | 9 | 15 | 9 |
| Sign Control | | Free | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 36.1% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
2: Dubarko Road & Ruben Lane

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 181 | 88 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 203 | 99 | 72 | 101 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 171 | 0 | - | 0 | 376 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 241 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1412 | - | - | - | 627 | 917 |
| Stage 1 | - | - | - | - | 894 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1412 | - | - | - | 618 | 917 |
| Mov Cap-2 Maneuver | - | - | - | - | 618 | - |
| Stage 1 | - | - | - | - | 881 | - |
| Stage 2 | - | - | - | - | 801 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.7 | 0 | 11.7 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1412 | - | - | - | 680 | |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.207 | |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.7 | |
| HCM Lane LOS | A | A | - | - | B | |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 | |

Lanes, Volumes, Timings
3: Melissa Avenue & Dubarko Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|-------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Volume (vph) | 90 | 72 | 28 | 62 | 35 | 21 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.940 | | | | 0.949 | |
| Flt Protected | | | 0.985 | | 0.970 | |
| Satd. Flow (prot) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Flt Permitted | | | 0.985 | | 0.970 | |
| Satd. Flow (perm) | 1768 | 0 | 0 | 1872 | 1749 | 0 |
| Link Speed (mph) | 25 | | 25 | | 25 | |
| Link Distance (ft) | 1479 | | 1123 | | 1279 | |
| Travel Time (s) | 40.3 | | 30.6 | | 34.9 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 1% | 1% | 0% | 0% | 0% | 0% |
| Adj. Flow (vph) | 106 | 85 | 33 | 73 | 41 | 25 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 191 | 0 | 0 | 106 | 66 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | 0 | | 12 | |
| Link Offset(ft) | 0 | | 0 | | 0 | |
| Crosswalk Width(ft) | 16 | | 16 | | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | | 15 | |
| Sign Control | Free | | Free | | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 27.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

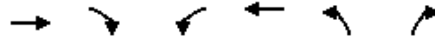
HCM 6th TWSC
3: Melissa Avenue & Dubarko Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|-------|------|------|
| Int Delay, s/veh | 2.6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Future Vol, veh/h | 90 | 72 | 28 | 62 | 35 | 21 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 85 | 33 | 73 | 41 | 25 |
| Major/Minor | Major1 | Major2 | Minor1 | | | |
| Conflicting Flow All | 0 | 0 | 191 | 0 | 288 | 149 |
| Stage 1 | - | - | - | - | 149 | - |
| Stage 2 | - | - | - | - | 139 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1395 | - | 707 | 903 |
| Stage 1 | - | - | - | - | 884 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1395 | - | 689 | 903 |
| Mov Cap-2 Maneuver | - | - | - | - | 689 | - |
| Stage 1 | - | - | - | - | 862 | - |
| Stage 2 | - | - | - | - | 893 | - |
| Approach | EB | WB | NB | | | |
| HCM Control Delay, s | 0 | 2.4 | 10.2 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT | |
| Capacity (veh/h) | 756 | - | - | 1395 | - | |
| HCM Lane V/C Ratio | 0.087 | - | - | 0.024 | - | |
| HCM Control Delay (s) | 10.2 | - | - | 7.6 | 0 | |
| HCM Lane LOS | B | - | - | A | A | |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0.1 | - | |

Lanes, Volumes, Timings
4: Dubarko Road & Bluff Road

12/13/2019



| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|-----------------------------------|--------------|-------|------|------------------------|-------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Volume (vph) | 29 | 94 | 28 | 33 | 59 | 31 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Fr t | 0.897 | | | 0.954 | | |
| Flt Protected | | | | 0.978 | 0.968 | |
| Satd. Flow (prot) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Flt Permitted | | | | 0.978 | 0.968 | |
| Satd. Flow (perm) | 1704 | 0 | 0 | 1858 | 1737 | 0 |
| Link Speed (mph) | 25 | | | 25 | 25 | |
| Link Distance (ft) | 750 | | | 780 | 615 | |
| Travel Time (s) | 20.5 | | | 21.3 | 16.8 | |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 1% | 1% |
| Adj. Flow (vph) | 34 | 111 | 33 | 39 | 69 | 36 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 145 | 0 | 0 | 72 | 105 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 0 | | | 0 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 9 | | 15 | 15 | | 9 |
| Sign Control | Stop | | | Stop | Stop | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 25.8% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th AWSC
4: Dubarko Road & Bluff Road

12/13/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Future Vol, veh/h | 29 | 94 | 28 | 33 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 111 | 33 | 39 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.4 | 7.8 | 7.9 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 46% |
| Vol Thru, % | 0% | 24% | 54% |
| Vol Right, % | 34% | 76% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 123 | 61 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 145 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.124 | 0.148 | 0.086 |
| Departure Headway (Hd) | 4.213 | 3.682 | 4.29 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 841 | 959 | 825 |
| Service Time | 2.29 | 1.761 | 2.368 |
| HCM Lane V/C Ratio | 0.126 | 0.151 | 0.087 |
| HCM Control Delay | 7.9 | 7.4 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.3 |

Lanes, Volumes, Timings
 5: Highway 211 & SE Gunderson Road

12/13/2019



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|--------------|-------|-------|------------------------|------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Volume (vph) | 22 | 15 | 26 | 373 | 250 | 26 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Storage Length (ft) | 0 | 0 | 100 | | | 100 |
| Storage Lanes | 1 | 0 | 1 | | | 1 |
| Taper Length (ft) | 25 | | 25 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.946 | | | | | 0.850 |
| Flt Protected | 0.971 | | 0.950 | | | |
| Satd. Flow (prot) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Flt Permitted | 0.971 | | 0.950 | | | |
| Satd. Flow (perm) | 1576 | 0 | 1630 | 1716 | 1716 | 1458 |
| Link Speed (mph) | 30 | | | 45 | 45 | |
| Link Distance (ft) | 1495 | | | 875 | 917 | |
| Travel Time (s) | 34.0 | | | 13.3 | 13.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 24 | 16 | 28 | 405 | 272 | 28 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 40 | 0 | 28 | 405 | 272 | 28 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(ft) | 12 | | | 12 | 12 | |
| Link Offset(ft) | 0 | | | 0 | 0 | |
| Crosswalk Width(ft) | 16 | | | 16 | 16 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| Turning Speed (mph) | 15 | 9 | 15 | | | 9 |
| Sign Control | Stop | | | Free | Free | |
| Intersection Summary | | | | | | |
| Area Type: | Other | | | | | |
| Control Type: | Unsignalized | | | | | |
| Intersection Capacity Utilization | 31.3% | | | ICU Level of Service A | | |
| Analysis Period (min) | 15 | | | | | |

HCM 6th TWSC
5: Highway 211 & SE Gunderson Road

12/13/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh | 1 | | | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations | Y | | Y | ↑ | ↑ | Y |
| Traffic Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Future Vol, veh/h | 22 | 15 | 26 | 373 | 250 | 26 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | 100 | - | - | 100 |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 24 | 16 | 28 | 405 | 272 | 28 |
| Major/Minor | Minor2 | Major1 | | Major2 | | |
| Conflicting Flow All | 733 | 272 | 300 | 0 | - | 0 |
| Stage 1 | 272 | - | - | - | - | - |
| Stage 2 | 461 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | 4.12 | - | - | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | 2.218 | - | - | - |
| Pot Cap-1 Maneuver | 388 | 767 | 1261 | - | - | - |
| Stage 1 | 774 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Platoon blocked, % | | | | - | - | - |
| Mov Cap-1 Maneuver | 379 | 767 | 1261 | - | - | - |
| Mov Cap-2 Maneuver | 379 | - | - | - | - | - |
| Stage 1 | 757 | - | - | - | - | - |
| Stage 2 | 635 | - | - | - | - | - |
| Approach | EB | NB | | SB | | |
| HCM Control Delay, s | 13.2 | 0.5 | | 0 | | |
| HCM LOS | B | | | | | |
| Minor Lane/Major Mvmt | NBL | NBT | EBLn1 | SBT | SBR | |
| Capacity (veh/h) | 1261 | - | 477 | - | - | |
| HCM Lane V/C Ratio | 0.022 | - | 0.084 | - | - | |
| HCM Control Delay (s) | 7.9 | - | 13.2 | - | - | |
| HCM Lane LOS | A | - | B | - | - | |
| HCM 95th %tile Q(veh) | 0.1 | - | 0.3 | - | - | |

Bailey Meadows Subdivision

Traffic Impact Analysis
Sandy, Oregon

Date:

June 20, 2019

Prepared for:

Cody Bjugan, Allied Homes & Development

Prepared by:

Jessica Hijar
Todd Mobley, PE



RENEWS: 12/31/2020



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Executive Summary

1. A 100-lot single family detached swelling unit subdivision is proposed for the following tax lots in Sandy, Oregon: 24E23 800, 801, 802, 803, and 804.
2. Access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.
3. The proposed subdivision is calculated to generate 74 trips during the morning peak hour, 99 trips during the evening peak hour, and 944 trips each weekday.
4. Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.
5. Due to insufficient major and minor street volumes, preliminary traffic signal warrants were not met at the study intersections under all analysis scenarios.
6. Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not met under any analysis scenario.
7. All study intersections, including the intersection of Melissa Avenue at Dubarko Road, are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.



Project Description

Introduction

The proposed development will include the construction of a 100-lot subdivision to be located on tax lots 24E23 800, 801, 802, 803, and 804 in Sandy, Oregon. The site is currently within the City of Sandy Urban Growth Boundary, the city limits, and is zoned Single Family Residential (SFR), which allows the subdivision as proposed. The project will be built in three phases, with the expected completion year of 2022.

This report includes traffic counts and a full operational analysis at the intersections listed below. This scope was developed based on City of Sandy's Traffic Impact Analysis (TIA) requirements and was approved by Replinger and Associates, the City's consulting transportation engineer. Coordination of the scope of work with the Oregon Department of Transportation (ODOT) was not necessary since no intersections on the state highway are affected.

1. SE 362nd Drive at Dubarko Road,
2. Ruben Lane at Dubarko Road,
3. Dubarko Road at Melissa Avenue, and
4. Dubarko Road at Bluff Road.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of supporting the existing uses as well as the proposed subdivision and to determine if mitigation is necessary. Detailed information on traffic counts, trip generation calculations, safety analyses, and level-of-service calculations is included in the appendix to this report.

Location Description

The subject site is located south of Rachel Drive and west of Ponder Lane in Sandy, Oregon. Although roadway stubs will be provided within the site for future roadway connections, access to the project is planned via an existing right-of-way street stub on Melissa Avenue that was created to provide access to the subject site as part of the adjoining Nicholas Glen No. 2 subdivision.

Access to the subdivision cannot be provided via SE Ponder Lane in the southeast corner of the site since the existing right-of-way along SE Ponder Lane does not allow for two directions of travel and the current configuration of SE Ponder Lane at Highway 211 cannot support additional vehicle trips. There is not sufficient right-of-way available to realign Ponder Lane at its intersection with Highway 211. It is expected that additional access will be available to the east of the site as other properties develop.

Vicinity Streets

Five roadways have been identified in the traffic study scope. Table 1 provides a description of each of the roadways.



Table 1: Vicinity Roadway Descriptions

| Street Name | Jurisdiction | Classification | Speed (MPH) | Curbs | Sidewalks | Bicycle Lanes |
|----------------------------|---------------|----------------------|------------------|---------|-----------|---------------|
| SE 362 nd Drive | City of Sandy | Rural Minor Arterial | 35 mph posted | Partial | Partial | Partial |
| Ruben Lane | City of Sandy | Collector | 25 mph posted | Yes | Partial | Yes |
| Dubarko Road | City of Sandy | Minor Arterial | 25 mph posted | Yes | Yes | Partial |
| Melissa Avenue | City of Sandy | Local Road | 25 mph statutory | Yes | Yes | No |
| Bluff Road | City of Sandy | Minor Arterial | 25 mph posted | Partial | Partial | Partial |

Study Intersections

Four nearby intersections were identified in discussions with City staff that are expected to be impacted by the proposed project. Table 2 below provides a summary of each of the study intersections.

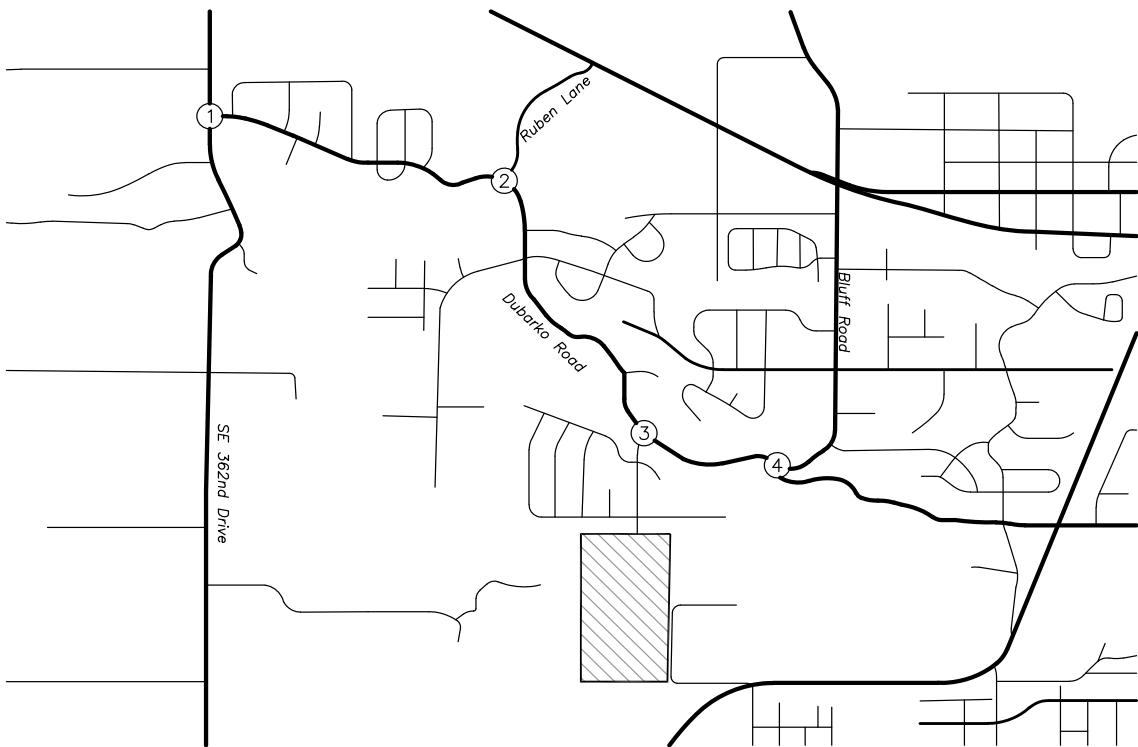
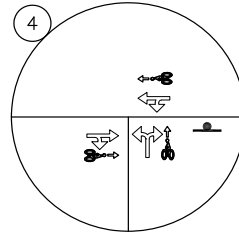
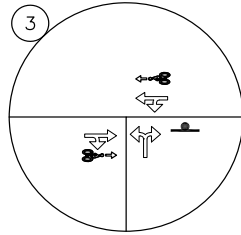
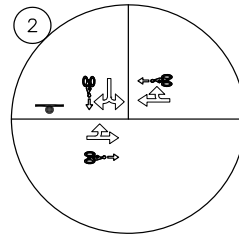
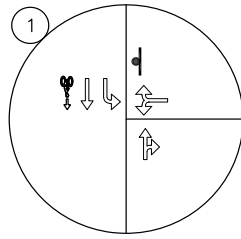
Table 2: Vicinity Intersection Descriptions

| Number | Intersection | Geometry | Traffic Control | Stopped Approaches |
|--------|--|--------------|-------------------------|--------------------|
| 1 | SE 362 nd Drive at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Westbound |
| 2 | Ruben Lane at Dubarko Road | Three-Legged | Two-Way Stop Controlled | Southbound |
| 3 | Dubakro Road at Melissa Avenue | Three-Legged | Two-Way Stop Controlled | Northbound |
| 4 | Dubarko Road at Bluff Rod | Three-Legged | All-Way Stop Controlled | All |

The figure on the following page shows the site vicinity and the study intersection configurations.

LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY



VICINITY MAP



FIGURE 1

PAGE 4



Site Trips

Trip Generation

To estimate the number of trips that will be generated by the proposed use, trip rates from the *Trip Generation Manual*¹ were used. Data from land use codes 210, *Single-Family Detached Housing*, was used to estimate the proposed development's trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed subdivision is projected to generate 74 morning peak hour trips, 99 evening peak hour trips, and 944 average weekday trips. The trip generation estimates are summarized in Table 3 below and detailed trip generation calculations are included as an attachment to this report.

Table 3: Trip Generation Summary

| Land Use Code | Size | Morning Peak Hour | | | Evening Peak Hour | | | Weekday Total |
|--------------------------------------|-----------|-------------------|-----|-------|-------------------|-----|-------|---------------|
| | | In | Out | Total | In | Out | Total | |
| 210 – Single-Family Detached Housing | 100 units | 19 | 55 | 74 | 62 | 37 | 99 | 944 |

Custom Trip Rates

Based on traffic counts collected at the existing intersection of Melissa Avenue at Dubarko Road and 24-hour counts collected along Melissa Avenue, a localized trip rate was derived for the existing subdivision that accesses Dubarko Road via Melissa Avenue. The custom trip rate was calculated to be 0.49 trips per unit during the morning peak hour, 0.63 trips per unit during the evening peak hour, and 6.90 trips per unit during each weekday. A comparison of the ITE trip rates and the trip rates based on localized data is provided in the following table.

Table 4: Trip Rate Comparison

| Data | Morning Trip Rate | Evening Trip Rate | Weekday Trip Rate |
|------------|-------------------|-------------------|-------------------|
| ITE | 0.74 trips/unit | 0.99 trips/unit | 9.44 trips/unit |
| Local Data | 0.49 trips/unit | 0.63 trips/unit | 6.90 trips/unit |

Since the localized data shows lower trip rates during all analysis periods, it can be expected that the proposed subdivision will yield site trips at a similar rate. Although this lower trip generation rate was not used for analysis, it should be noted that the trip generation based on ITE rates represents a conservative, worst-case analysis.

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017.

Trip Distribution

The directional distribution of site trips to and from the proposed development was calculated based on travel patterns of trips to and from the existing neighborhood that is served by Melissa Avenue. In addition, the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections.

The following trip distribution was estimated and used for analysis:

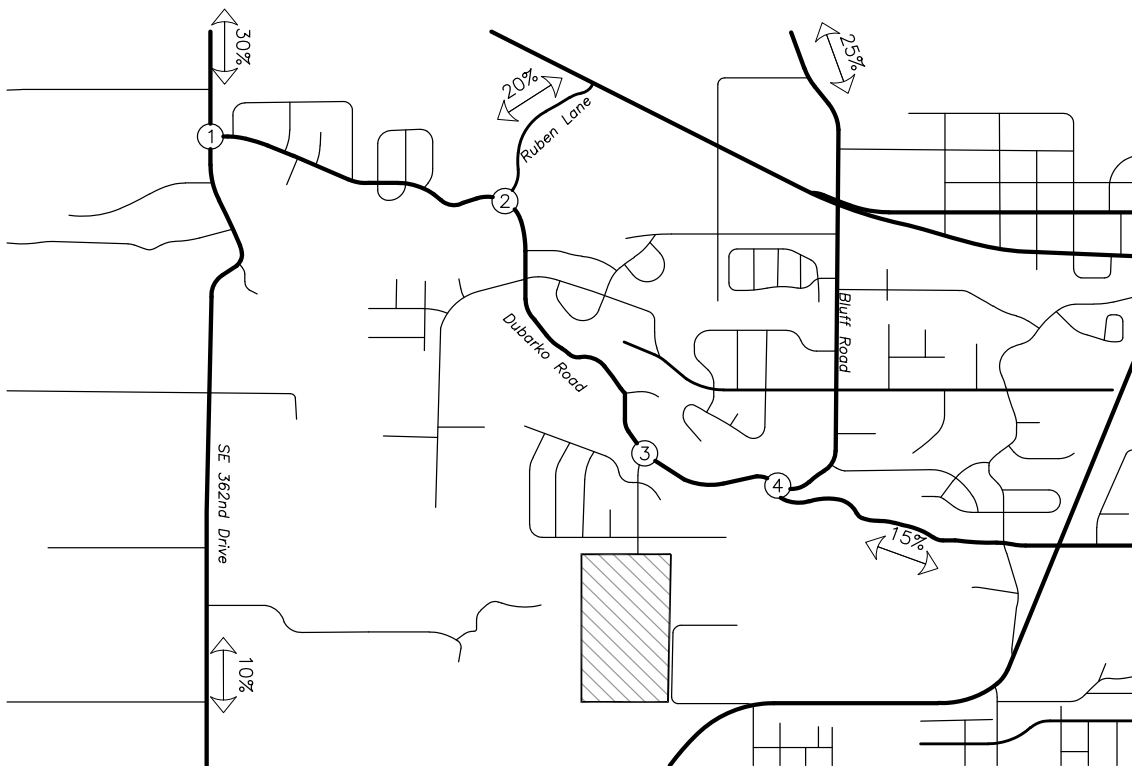
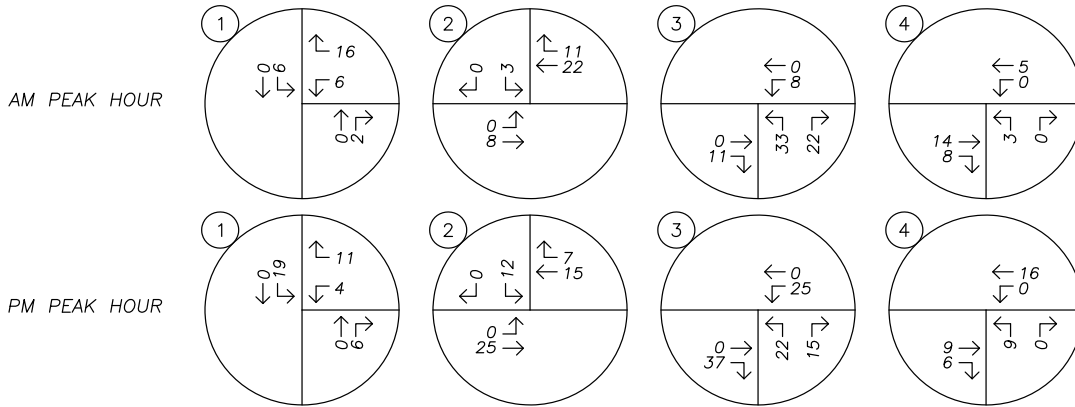
- Approximately 30 percent of site trips will travel to/from the north along SE 362nd Drive;
- Approximately 25 percent of site trips will travel to/from the north along Bluff Road;
- Approximately 20 percent of site trips will travel to/from the north on Ruben Lane;
- Approximately 15 percent of site trips will travel to/from the east along Dubarko Road; and
- Approximately 10 percent of site trips will travel to/from the south along SE 362nd Drive.

Figure 2 on page 7 shows the distribution and assignment of site trips for the proposed development.

LEGEND

XX% PERCENT OF PROJECT TRIPS

| TRIP GENERATION | | | |
|-----------------|----|-----|-------|
| | IN | OUT | TOTAL |
| AM | 19 | 55 | 74 |
| PM | 62 | 37 | 99 |



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Development Plan – Site Trips
 AM & PM Peak Hours



FIGURE
 2
PAGE
 7



Traffic Volumes

Existing Conditions

Traffic counts were conducted at the intersection of Melissa Avenue at Dubarko Road on Thursday, April 25th, 2019 from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM. Traffic counts were conducted at all other study intersections on Wednesday, May 22nd, 2019 from 4:00 PM to 6:00 PM, and on Thursday, May 23rd, 2019 from 7:00 AM to 9:00 AM. Each intersection's respective morning and evening peak hours were used for analysis.

Background Conditions

In order to calculate the future traffic volumes on local streets, an exponential growth rate of two percent per year for an assumed period of three years was applied to the measured existing traffic volumes to approximate year 2022 background conditions.

In-Process Trips

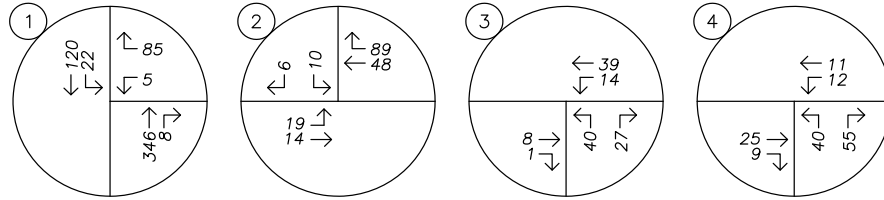
In-process trips associated with previously approved developments were added to the background volumes in order to represent future traffic volumes at the study intersections prior to the approval of the subject development. Trips associated with the approved 138-unit Sandy Heights Apartments were added to the study intersections.

Buildout Conditions

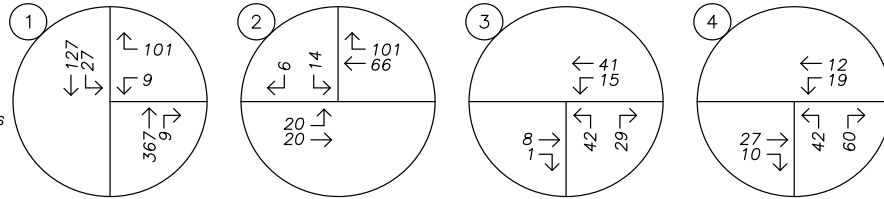
Trips to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2022 background traffic volumes to obtain the expected year 2022 buildout volumes.

Figure 3 on page 9 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the morning peak hour. Figure 4 on page 10 shows the existing, year 2022 background, and year 2022 buildout traffic volumes for the evening peak hour.

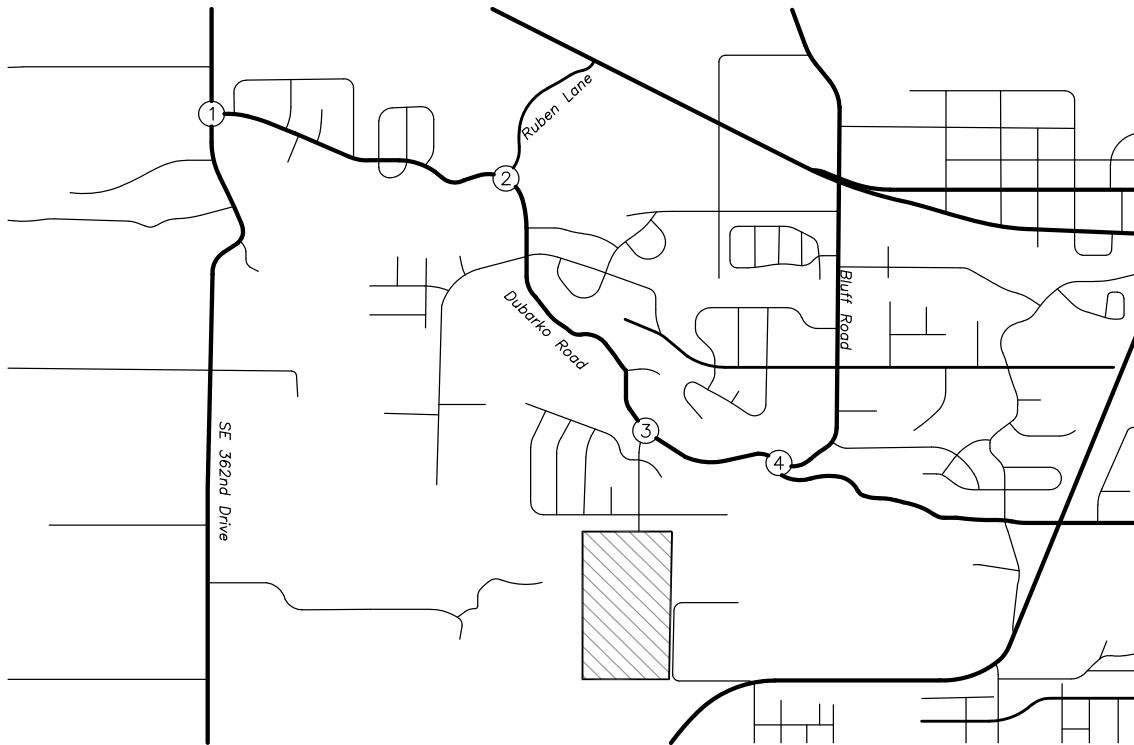
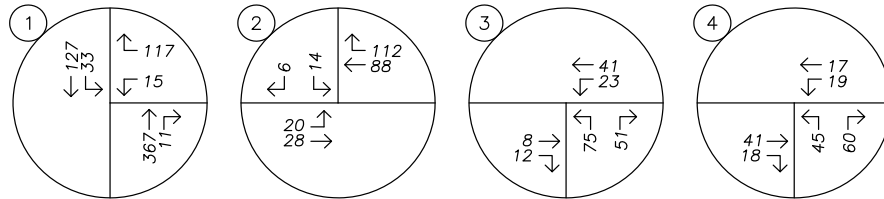
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



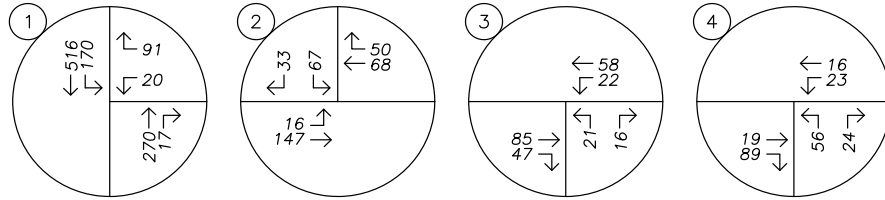
TRAFFIC VOLUMES
All Analysis Scenarios
AM Peak Hour



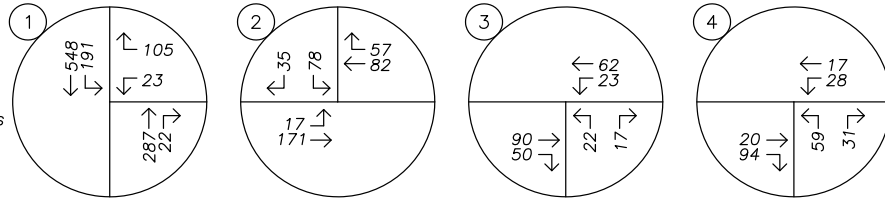
FIGURE
3

PAGE
9

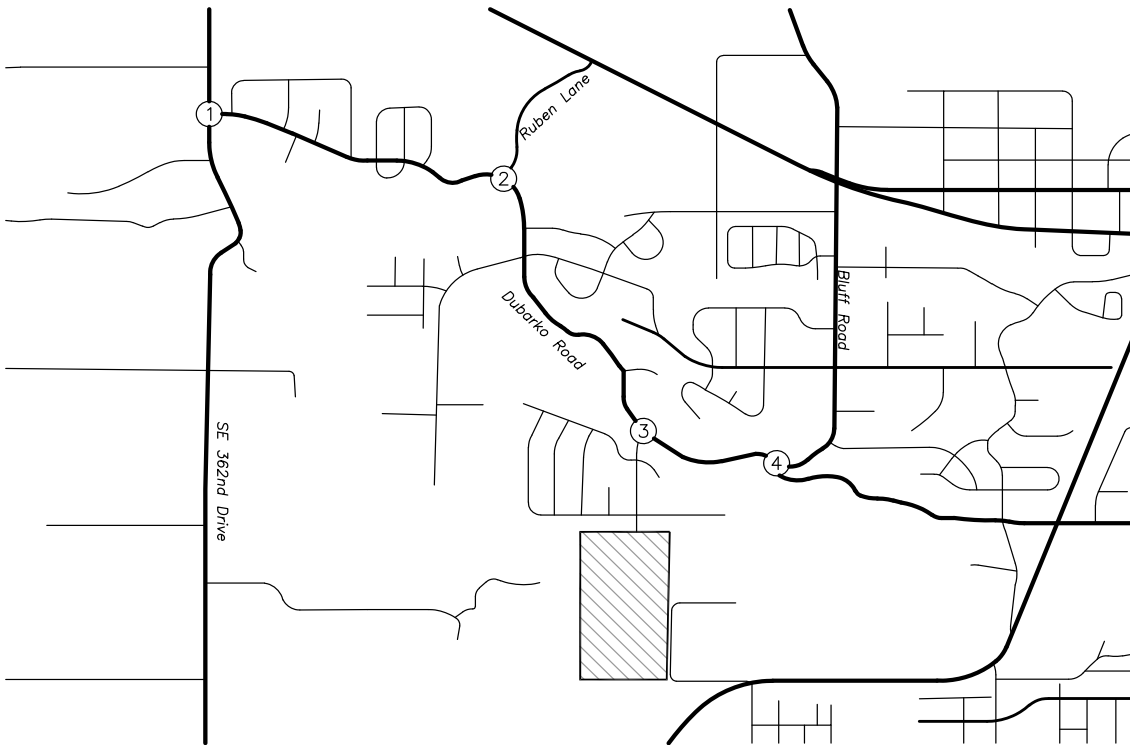
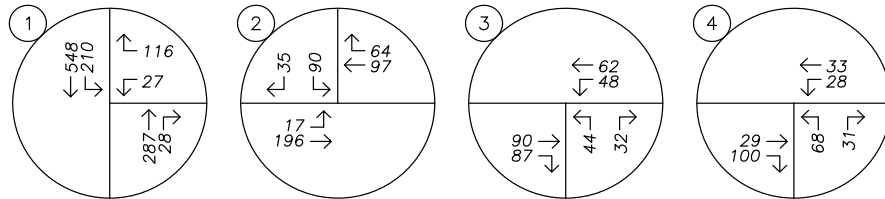
Year 2019
Existing Conditions



Year 2022
Background Conditions



Year 2022
Buildout Conditions



TRAFFIC VOLUMES
All Analysis Scenarios
PM Peak Hour



FIGURE
4

PAGE
10



Safety Analysis

Crash History Review

Using data obtained from the ODOT's Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2012 to December 2016) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

Table 5: Crash Analysis Summary

| Intersection | Crash Type | | Crash Severity | Total | AADT | Crash Rate |
|--|------------|-----------|----------------|-------|--------|------------|
| | Turn | Sideswipe | PDO | | | |
| Dubarko Road at SE 362 nd Drive | 0 | 1 | 1 | 1 | 10,840 | 0.05 |
| Dubarko Road at Melissa Avenue | 2 | 0 | 2 | 2 | 2,490 | 0.44 |

The calculated crash rates at the intersections of Dubarko Road at SE 362nd Drive and at Melissa Avenue are not indicative of safety deficiencies or design flaws. No mitigation is recommended.

No reported crashes were found at the intersections of Dubarko Road at Ruben Lane and Dubarko Road at Bluff Road during the analysis period. Accordingly, no safety concerns were identified at these study intersections.

Warrant Analysis

Traffic Signal Warrants

Traffic signal warrants were examined for all study intersections based on the methodologies in the *Manual on Uniform Traffic Control Devices*² (MUTCD). Warrant 1, *Eight Hour Vehicular Volumes*, was used from the MUTCD. Warrants were evaluated based on the common assumption that traffic counted during the evening peak hour represents ten percent of the AADT. Volumes were used for the year 2022 buildout conditions. Traffic signal warrants were not met at any of the study intersections due to low major and minor street

² Federal Highway Administration (FTA), America Traffic Safety Services Association (ATSSA), Institute of Transportation Engineers (ITE), American Association of State Highway and Transportation Officials (AASHTO), *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009 Edition, 2010.



traffic volumes. Detailed information on the traffic signal warrant analysis is included in the attached appendix.

Left-Turn Lane Warrants

Left-turn lane warrants were examined for the westbound left-turn lane at the intersection of Melissa Avenue at Dubarko Road. A left-turn refuge is primarily a safety consideration for the major-street approach, removing left-turning vehicles from the through traffic stream. Warrants were based on the methodology outlined in the National Cooperative Highway Research Program (NCHRP) Report Number 457³. These turn-lane warrants were evaluated based on the number of left-turning vehicles, the number of advancing and opposing vehicles, and the roadway travel speed.

Left-turn lanes were not warranted during any of the analysis scenarios. No new left-turn lanes are recommended.

³ Bonneson, James A. and Michael D. Fontaine, *NCHRP Report 457: An Engineering Study Guide for Evaluating Intersection Improvements*, Transportation Research Board, 2001.



Operational Analysis

Delay & Capacity Analysis

A capacity and delay analysis was conducted for the study intersection per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual*⁴ (HCM). Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

The City of Sandy’s Transportation System Plan states that both signalized and unsignalized intersections are required to operate at LOS D or better.

Based on the results of the operational analysis, shown in Table 6, the study intersections are currently operating acceptably and are projected to continue operating acceptably through the 2022 buildout year of the site. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

Table 6: Intersection Capacity Analysis Summary

| | Morning Peak Hour | | | Evening Peak Hour | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Delay | LOS | V/C | Delay | LOS | V/C |
| SE 362nd Drive at Dubarko Road | | | | | | |
| Existing Conditions | 12 | B | 0.17 | 16 | C | 0.27 |
| Year 2022 Background Conditions | 13 | B | 0.22 | 18 | C | 0.34 |
| Year 2022 Buildout Conditions | 13 | B | 0.27 | 21 | C | 0.40 |
| Ruben Lane at Dubarko Road | | | | | | |
| Existing Conditions | 9 | A | 0.02 | 11 | B | 0.15 |
| Year 2022 Background Conditions | 10 | A | 0.03 | 11 | B | 0.18 |
| Year 2022 Buildout Conditions | 10 | A | 0.03 | 12 | B | 0.21 |
| Dubarko Road at Melissa Avenue | | | | | | |
| Existing Conditions | 9 | A | 0.09 | 10 | A | 0.05 |
| Year 2022 Background Conditions | 9 | A | 0.09 | 10 | A | 0.06 |
| Year 2022 Buildout Conditions | 10 | A | 0.17 | 11 | B | 0.12 |
| Dubarko Road at Bluff Road | | | | | | |
| Existing Conditions | 8 | A | 0.15 | 8 | A | 0.13 |
| Year 2022 Background Conditions | 8 | A | 0.16 | 8 | A | 0.14 |
| Year 2022 Buildout Conditions | 8 | A | 0.17 | 8 | A | 0.16 |

⁴ Transportation Research Board, *Highway Capacity Manual, 6th Edition, 2016.*

Conclusions

Based on a review of the most recent five years of crash history, no significant safety issues or trends are evident at the study intersections.

Due to insufficient major and minor street volumes, traffic signal warrants were not met at the study intersections under all analysis scenarios.

Left-turn lane warrants were analyzed for the intersection of Melissa Avenue at Dubarko Road and not estimated to be met under any analysis scenario.

All study intersections, including the intersection of Melissa Avenue and Dubarko Road are currently operating within the City's performance standards and are projected to continue operating acceptably through year 2022, with or without the addition of site trips from the proposed development.

1e

Appendix



TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Setting/Location: General Urban/Suburban
Variable: Dwelling Units
Variable Value: 100

AM PEAK HOUR

Trip Rate: 0.74

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 25% | 75% | |
| Trip Ends | 19 | 55 | 74 |

PM PEAK HOUR

Trip Rate: 0.99

| | Enter | Exit | Total |
|--------------------------|-----------|-----------|-----------|
| Directional Distribution | 63% | 37% | |
| Trip Ends | 62 | 37 | 99 |

WEEKDAY

Trip Rate: 9.44

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 472 | 472 | 944 |

SATURDAY

Trip Rate: 9.54

| | Enter | Exit | Total |
|--------------------------|------------|------------|------------|
| Directional Distribution | 50% | 50% | |
| Trip Ends | 477 | 477 | 954 |

Source: Trip Generation Manual, Tenth Edition

All Traffic Data Services, Inc.
alltrafficdata.net

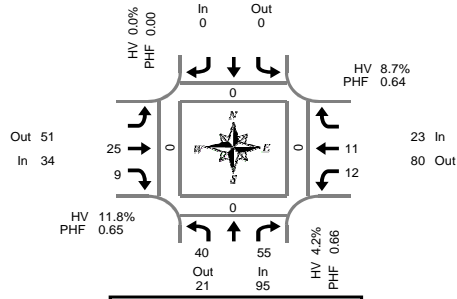
Melissa Ave S-O Dubarko Rd

| Start Time | 25-Apr-19 Thu | NB | SB | Total | | | | | |
|-------------|---------------|------------|-------------|------------|---|---|---|---|-------|
| 12:00 AM | | 2 | 5 | 7 | | | | | |
| 01:00 | | 1 | 1 | 2 | | | | | |
| 02:00 | | 1 | 0 | 1 | | | | | |
| 03:00 | | 7 | 2 | 9 | | | | | |
| 04:00 | | 20 | 1 | 21 | | | | | |
| 05:00 | | 30 | 5 | 35 | | | | | |
| 06:00 | | 57 | 11 | 68 | | | | | |
| 07:00 | | 67 | 15 | 82 | | | | | |
| 08:00 | | 37 | 17 | 54 | | | | | |
| 09:00 | | 30 | 17 | 47 | | | | | |
| 10:00 | | 25 | 18 | 43 | | | | | |
| 11:00 | | 23 | 22 | 45 | | | | | |
| 12:00 PM | | 35 | 25 | 60 | | | | | |
| 01:00 | | 16 | 24 | 40 | | | | | |
| 02:00 | | 29 | 46 | 75 | | | | | |
| 03:00 | | 35 | 58 | 93 | | | | | |
| 04:00 | | 44 | 64 | 108 | | | | | |
| 05:00 | | 30 | 54 | 84 | | | | | |
| 06:00 | | 32 | 74 | 106 | | | | | |
| 07:00 | | 28 | 40 | 68 | | | | | |
| 08:00 | | 16 | 36 | 52 | | | | | |
| 09:00 | | 9 | 30 | 39 | | | | | |
| 10:00 | | 5 | 12 | 17 | | | | | |
| 11:00 | | 0 | 4 | 4 | | | | | |
| Total | | 579 | 581 | 1160 | | | | | |
| Percent | | 49.9% | 50.1% | | | | | | |
| AM Peak | - | 07:00 | 11:00 | - | - | - | - | - | 07:00 |
| Vol. | - | 67 | 22 | - | - | - | - | - | 82 |
| PM Peak | - | 16:00 | 18:00 | - | - | - | - | - | 16:00 |
| Vol. | - | 44 | 74 | - | - | - | - | - | 108 |
| Grand Total | | 579 | 581 | | | | | | 1160 |
| Percent | | 49.9% | 50.1% | | | | | | |
| ADT | | ADT 11,874 | AADT 11,874 | | | | | | |

Total Vehicle Summary



Clay Carney
(603) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

**5-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 3 | 4 | 0 | | | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:05 AM | 1 | 8 | 0 | | | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:10 AM | 3 | 7 | 0 | | | 0 | 5 | 1 | 0 | 2 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 6 | 0 | | | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 19 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 11 | 0 | 0 | 0 | 0 |
| 7:25 AM | 6 | 7 | 0 | | | 0 | 3 | 2 | 0 | 4 | 2 | 0 | 24 | 0 | 0 | 0 | 0 |
| 7:30 AM | 3 | 2 | 0 | | | 0 | 6 | 1 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:35 AM | 1 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:40 AM | 3 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 1 | 2 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| 7:50 AM | 5 | 6 | 0 | | | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 15 | 0 | 0 | 0 | 0 |
| 7:55 AM | 4 | 2 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:00 AM | 2 | 1 | 0 | | | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:05 AM | 2 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 5 | 0 | | | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:15 AM | 2 | 7 | 0 | | | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:20 AM | 3 | 2 | 0 | | | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 5 | 0 | | | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 5 | 0 | | | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:35 AM | 3 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| 8:40 AM | 3 | 2 | 0 | | | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:45 AM | 1 | 1 | 0 | | | 0 | 1 | 1 | 0 | 3 | 1 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| 8:55 AM | 1 | 0 | 0 | | | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

**15-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 7 | 19 | 0 | | | 0 | 9 | 2 | 0 | 3 | 2 | 0 | 42 | 0 | 0 | 0 | 0 |
| 7:15 AM | 16 | 20 | 0 | | | 0 | 7 | 2 | 0 | 5 | 4 | 0 | 54 | 0 | 0 | 0 | 0 |
| 7:30 AM | 7 | 6 | 0 | | | 0 | 8 | 2 | 0 | 3 | 2 | 0 | 28 | 0 | 0 | 0 | 0 |
| 7:45 AM | 10 | 10 | 0 | | | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 28 | 0 | 0 | 0 | 0 |
| 8:00 AM | 5 | 7 | 0 | | | 0 | 3 | 3 | 0 | 3 | 2 | 0 | 23 | 0 | 0 | 0 | 0 |
| 8:15 AM | 8 | 14 | 0 | | | 0 | 4 | 3 | 0 | 4 | 1 | 0 | 34 | 0 | 0 | 0 | 0 |
| 8:30 AM | 6 | 7 | 0 | | | 0 | 0 | 6 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 2 | 0 | | | 0 | 1 | 4 | 0 | 4 | 1 | 0 | 14 | 0 | 0 | 0 | 0 |
| Total Survey | 61 | 85 | 0 | | | 0 | 33 | 25 | 0 | 24 | 16 | 0 | 244 | 0 | 0 | 0 | 0 |

**Peak Hour Summary
7:00 AM to 8:00 AM**

| By Approach | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-------|-----------------------|-----|-------|-------|--------------------|-----|-------|-------|--------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 95 | 21 | 116 | 0 | 0 | 0 | 0 | 0 | 34 | 51 | 85 | 0 | 23 | 80 | 103 | 0 | 0 | 0 | 0 | 0 | |
| %HV | 4.2% | | | | 0.0% | | | | 11.8% | | | | 8.7% | | | | 6.6% | | | | |
| PHF | 0.66 | | | | 0.00 | | | | 0.65 | | | | 0.64 | | | | 0.70 | | | | |

| By Movement | Northbound Dubarko Rd | | | | Southbound Dubarko Rd | | | | Eastbound Bluff Rd | | | | Westbound Bluff Rd | | | | Total |
|-------------|-----------------------|------|-------|-------|-----------------------|----|-------|-------|--------------------|-------|-------|-------|--------------------|------|-------|-------|-------|
| | L | R | Total | Bikes | | | Total | Bikes | T | R | Total | Bikes | L | T | Total | Bikes | |
| Volume | 40 | 55 | 95 | 0 | NA | NA | NA | 0.0% | NA | 25 | 9 | 34 | 12 | 11 | 23 | 152 | |
| %HV | 2.5% | NA | 5.5% | 4.2% | NA | NA | NA | 0.0% | NA | 12.0% | 11.1% | 11.8% | 8.3% | 9.1% | NA | 8.7% | 6.6% |
| PHF | 0.63 | 0.65 | 0.66 | | | | 0.00 | | 0.57 | 0.75 | 0.65 | | 0.50 | 0.69 | 0.64 | 0.70 | |

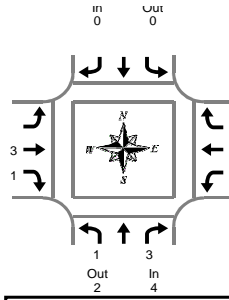
**Rolling Hour Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|----|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 55 | 0 | | | 0 | 25 | 9 | 0 | 12 | 11 | 0 | 152 | 0 | 0 | 0 | 0 |
| 7:15 AM | 38 | 43 | 0 | | | 0 | 19 | 10 | 0 | 12 | 11 | 0 | 133 | 0 | 0 | 0 | 0 |
| 7:30 AM | 30 | 37 | 0 | | | 0 | 16 | 11 | 0 | 11 | 8 | 0 | 113 | 0 | 0 | 0 | 0 |
| 7:45 AM | 29 | 38 | 0 | | | 0 | 8 | 15 | 0 | 9 | 7 | 0 | 106 | 0 | 0 | 0 | 0 |
| 8:00 AM | 21 | 30 | 0 | | | 0 | 8 | 16 | 0 | 12 | 5 | 0 | 92 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 7:05 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 7:10 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:20 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 0 | 1 | 1 | | | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2 |
| 7:15 AM | 1 | 0 | 1 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 7:30 AM | 0 | 1 | 1 | | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 1 | 2 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 2 | 6 | 8 | | | 0 | 4 | 1 | 5 | 1 | 1 | 2 | 15 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 4 | 2 | 6 | 0 | 0 | 0 | 4 | 2 | 6 | 2 | 6 | 8 | 10 |
| PHF | 0.50 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|--|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| PHF | 0.25 | 0.75 | 0.50 | | | 0.00 | 0.38 | 0.25 | 0.50 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 3 | 4 | | | 0 | 3 | 1 | 4 | 1 | 1 | 2 | 10 |
| 7:15 AM | 1 | 3 | 4 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 7 |
| 7:30 AM | 1 | 4 | 5 | | | 0 | 2 | 1 | 3 | 0 | 0 | 0 | 8 |
| 7:45 AM | 1 | 4 | 5 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| 8:00 AM | 1 | 3 | 4 | | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

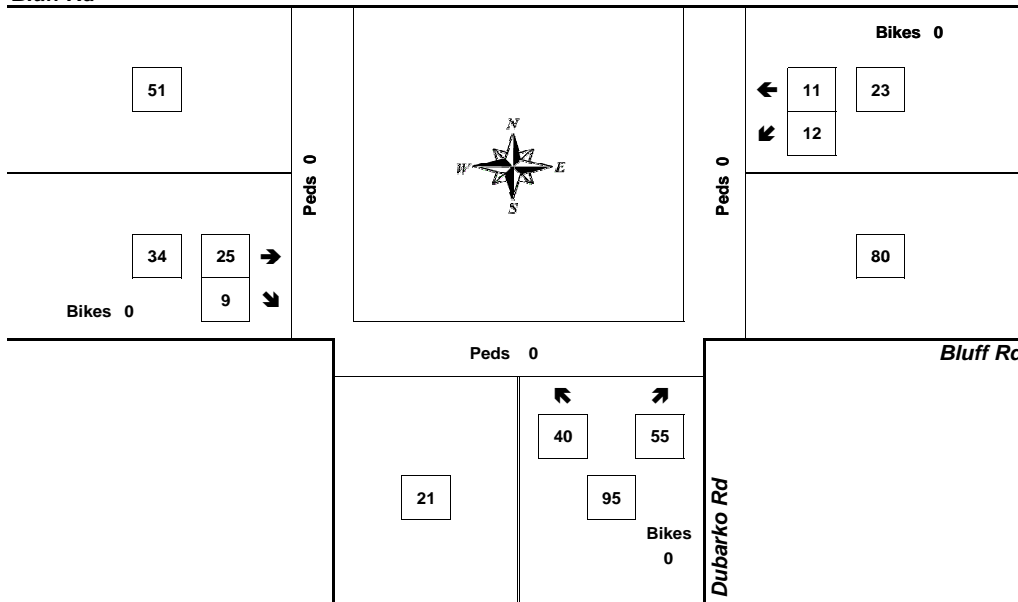
Dubarko Rd & Bluff Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019

Bikes
0

Bluff Rd

Peds 0



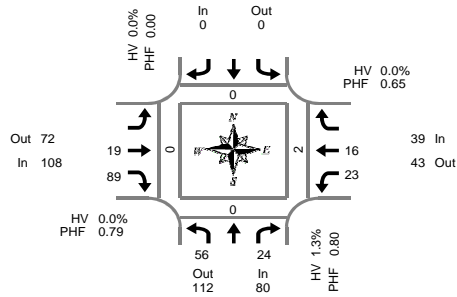
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.65 | 11.8% | 34 |
| WB | 0.64 | 8.7% | 23 |
| NB | 0.66 | 4.2% | 95 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.70 | 6.6% | 152 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 4 | 0 | 0 | | | 0 | | | 0 | 4 | 7 | 0 | 5 | 0 | 0 | 0 | 0 |
| 4:05 PM | 2 | 0 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 3 | 3 | 0 | 0 | 0 |
| 4:10 PM | 7 | 1 | 0 | | | 0 | | | 0 | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 |
| 4:15 PM | 5 | 1 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 1 | 0 | 0 | 0 |
| 4:20 PM | 3 | 0 | 0 | | | 0 | | | 0 | 0 | 5 | 0 | 2 | 3 | 0 | 0 | 0 |
| 4:25 PM | 7 | 2 | 0 | | | 0 | | | 0 | 3 | 8 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:30 PM | 6 | 2 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:35 PM | 2 | 2 | 0 | | | 0 | | | 0 | 3 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:40 PM | 7 | 3 | 0 | | | 0 | | | 0 | 2 | 7 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:45 PM | 7 | 0 | 0 | | | 0 | | | 0 | 0 | 10 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:50 PM | 8 | 4 | 0 | | | 0 | | | 0 | 2 | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| 4:55 PM | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:00 PM | 4 | 3 | 0 | | | 0 | | | 0 | 1 | 5 | 0 | 3 | 2 | 0 | 0 | 0 |
| 5:05 PM | 6 | 1 | 1 | | | 0 | | | 0 | 3 | 8 | 0 | 1 | 2 | 0 | 1 | 0 |
| 5:10 PM | 1 | 0 | 0 | | | 0 | | | 0 | 4 | 9 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:15 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 9 | 0 | 1 | 2 | 0 | 0 | 0 |
| 5:20 PM | 7 | 4 | 0 | | | 0 | | | 0 | 3 | 6 | 0 | 1 | 3 | 0 | 0 | 0 |
| 5:25 PM | 1 | 2 | 0 | | | 0 | | | 0 | 0 | 8 | 0 | 3 | 1 | 0 | 0 | 0 |
| 5:30 PM | 5 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 5 | 1 | 0 | 0 | 0 |
| 5:35 PM | 3 | 0 | 0 | | | 0 | | | 0 | 2 | 9 | 0 | 2 | 3 | 0 | 0 | 0 |
| 5:40 PM | 8 | 7 | 0 | | | 0 | | | 0 | 2 | 8 | 0 | 2 | 1 | 0 | 1 | 0 |
| 5:45 PM | 7 | 1 | 0 | | | 0 | | | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5:50 PM | 6 | 2 | 0 | | | 0 | | | 0 | 1 | 6 | 0 | 1 | 0 | 0 | 0 | 0 |
| 5:55 PM | 3 | 0 | 0 | | | 0 | | | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 13 | 1 | 0 | | | 0 | | | 0 | 6 | 15 | 0 | 10 | 3 | 0 | 0 | 0 |
| 4:15 PM | 15 | 3 | 0 | | | 0 | | | 0 | 5 | 20 | 0 | 6 | 4 | 0 | 0 | 0 |
| 4:30 PM | 15 | 7 | 0 | | | 0 | | | 0 | 5 | 22 | 0 | 3 | 0 | 0 | 0 | 0 |
| 4:45 PM | 18 | 5 | 0 | | | 0 | | | 0 | 2 | 21 | 0 | 4 | 1 | 0 | 0 | 0 |
| 5:00 PM | 11 | 4 | 1 | | | 0 | | | 0 | 8 | 22 | 0 | 5 | 4 | 0 | 1 | 0 |
| 5:15 PM | 11 | 6 | 0 | | | 0 | | | 0 | 4 | 23 | 0 | 5 | 6 | 0 | 0 | 0 |
| 5:30 PM | 16 | 9 | 0 | | | 0 | | | 0 | 5 | 23 | 0 | 9 | 5 | 0 | 1 | 0 |
| 5:45 PM | 16 | 3 | 0 | | | 0 | | | 0 | 2 | 11 | 0 | 2 | 3 | 0 | 0 | 0 |
| Total Survey | 115 | 38 | 1 | | | 0 | | | 0 | 37 | 157 | 0 | 44 | 26 | 0 | 2 | 0 |

Peak Hour Summary
4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|-----------------------|-----|-------|-----------------------|----|-----|--------------------|-------|-----|--------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 80 | 112 | 192 | 1 | 0 | 0 | 0 | 0 | 108 | 72 | 180 | 0 | 39 | 43 | 82 | 0 | 227 |
| %HV | 1.3% | | | 0.0% | | | 0.0% | | | 0.0% | | | 0.4% | | | | |
| PHF | 0.80 | | | 0.00 | | | 0.79 | | | 0.65 | | | 0.85 | | | | |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|------|-------|-----------------------|----|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | |
| Volume | 56 | 24 | 80 | | | 0 | 19 | 89 | 108 | 23 | 16 | 39 | 227 |
| %HV | 1.8% | NA | 0.0% | 1.3% | NA | NA | 0.0% | NA | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% |
| PHF | 0.78 | 0.67 | 0.80 | | | 0.00 | 0.59 | 0.86 | 0.79 | 0.58 | 0.67 | 0.65 | 0.85 |

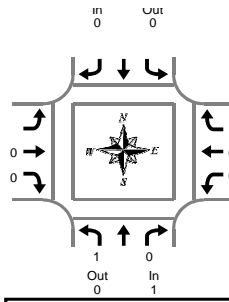
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-----------------------|----|-------|-----------------------|--|-------|--------------------|---|-------|--------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 61 | 16 | 0 | | | 0 | | | 0 | 18 | 78 | 0 | 23 | 8 | 0 | 0 | 0 |
| 4:15 PM | 59 | 19 | 1 | | | 0 | | | 0 | 20 | 85 | 0 | 18 | 9 | 0 | 1 | 0 |
| 4:30 PM | 55 | 22 | 1 | | | 0 | | | 0 | 19 | 88 | 0 | 17 | 11 | 0 | 1 | 0 |
| 4:45 PM | 56 | 24 | 1 | | | 0 | | | 0 | 19 | 89 | 0 | 23 | 16 | 0 | 2 | 0 |
| 5:00 PM | 54 | 22 | 1 | | | 0 | | | 0 | 19 | 79 | 0 | 21 | 18 | 0 | 2 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Dubarko Rd & Bluff Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:45 PM to 5:45 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 5 |

Heavy Vehicle Peak Hour Summary 4:45 PM to 5:45 PM

| By Approach | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|-----|-------|-----------------------|-----|-------|--------------------|-----|-------|--------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | | 0.00 | | | 0.00 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Total |
|-------------|-----------------------|---|-------|-----------------------|-------|--------------------|------|-------|--------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Dubarko Rd | | | Southbound Dubarko Rd | | Eastbound Bluff Rd | | | Westbound Bluff Rd | | | Interval Total |
|---------------------|-----------------------|---|-------|-----------------------|-------|--------------------|---|-------|--------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 2 | 0 | 2 | 2 | 0 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 4:45 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Peak Hour Summary



Clay Carney
(503) 833-2740

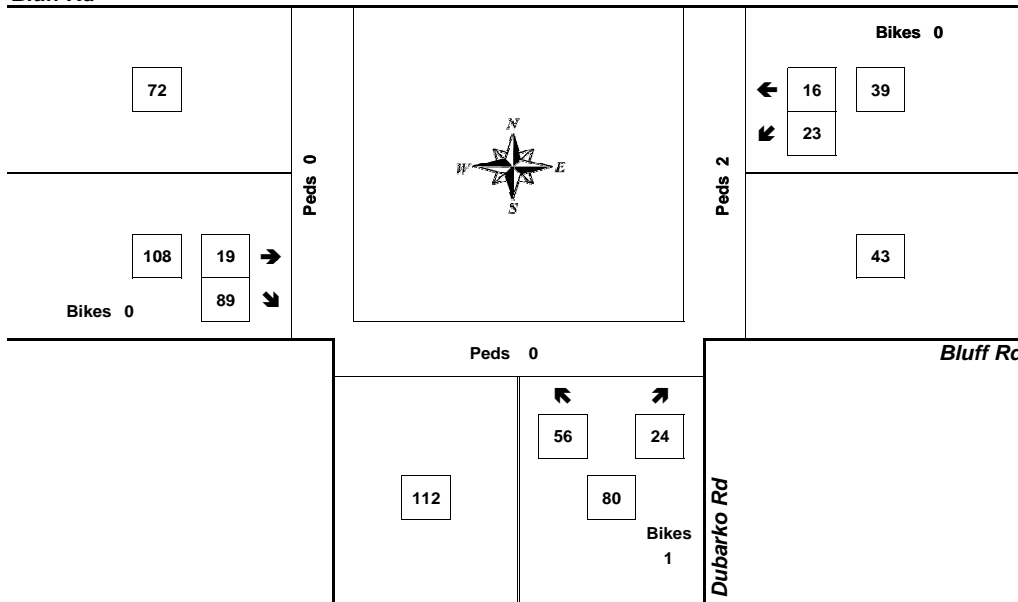
Dubarko Rd & Bluff Rd

4:45 PM to 5:45 PM
Wednesday, May 22, 2019

Bikes
0

Bluff Rd

Peds 0



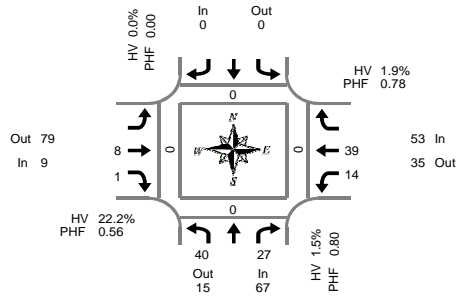
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.79 | 0.0% | 108 |
| WB | 0.65 | 0.0% | 39 |
| NB | 0.80 | 1.3% | 80 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 227 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 5 | 2 | 0 | | | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:05 AM | 4 | 6 | 0 | | | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 16 | 0 | 0 | 0 | 0 |
| 7:10 AM | 2 | 2 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:15 AM | 4 | 1 | 0 | | | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| 7:20 AM | 2 | 3 | 0 | | | 0 | 2 | 0 | 0 | 2 | 3 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:25 AM | 2 | 3 | 0 | | | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 12 | 0 | 0 | 0 | 0 |
| 7:30 AM | 6 | 4 | 0 | | | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 17 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 5 | 0 | 0 | 0 | 0 |
| 7:40 AM | 2 | 1 | 0 | | | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 8 | 0 | 0 | 0 | 0 |
| 7:45 AM | 4 | 1 | 0 | | | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 7:50 AM | 6 | 1 | 0 | | | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 13 | 0 | 0 | 0 | 0 |
| 7:55 AM | 3 | 3 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 10 | 0 | 0 | 0 | 0 |
| 8:00 AM | 3 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 |
| 8:05 AM | 4 | 0 | 0 | | | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:10 AM | 3 | 1 | 0 | | | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:15 AM | 1 | 0 | 0 | | | 0 | 1 | 1 | 0 | 1 | 3 | 0 | 7 | 0 | 0 | 0 | 0 |
| 8:20 AM | 1 | 3 | 0 | | | 0 | 3 | 1 | 0 | 1 | 4 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:25 AM | 3 | 2 | 0 | | | 0 | 2 | 0 | 0 | 1 | 4 | 0 | 12 | 0 | 0 | 0 | 0 |
| 8:30 AM | 3 | 3 | 0 | | | 0 | 5 | 0 | 0 | 0 | 2 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:35 AM | 2 | 1 | 0 | | | 0 | 4 | 1 | 0 | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 2 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 2 | 0 | | | 0 | 5 | 1 | 0 | 0 | 5 | 0 | 13 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 1 | 0 | | | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 8 | 0 | 0 | 0 | 0 |
| 8:55 AM | 2 | 0 | 0 | | | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 8 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | 42 | 0 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 11 | 10 | 0 | | | 0 | 1 | 0 | 0 | 5 | 9 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7:15 AM | 8 | 7 | 0 | | | 0 | 2 | 1 | 0 | 2 | 13 | 0 | 33 | 0 | 0 | 0 | 0 |
| 7:30 AM | 8 | 5 | 0 | | | 0 | 3 | 0 | 0 | 4 | 10 | 0 | 30 | 0 | 0 | 0 | 0 |
| 7:45 AM | 13 | 5 | 0 | | | 0 | 2 | 0 | 0 | 3 | 7 | 0 | 30 | 0 | 0 | 0 | 0 |
| 8:00 AM | 10 | 1 | 0 | | | 0 | 1 | 1 | 0 | 1 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 8:15 AM | 5 | 5 | 0 | | | 0 | 6 | 2 | 0 | 3 | 11 | 0 | 32 | 0 | 0 | 0 | 0 |
| 8:30 AM | 5 | 6 | 0 | | | 0 | 13 | 2 | 0 | 1 | 6 | 0 | 33 | 0 | 0 | 0 | 0 |
| 8:45 AM | 2 | 3 | 0 | | | 0 | 7 | 3 | 0 | 4 | 10 | 0 | 29 | 0 | 0 | 0 | 0 |
| Total Survey | 62 | 42 | 0 | | | 0 | 35 | 9 | 0 | 23 | 71 | 0 | 242 | 0 | 0 | 0 | 0 |

Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|------------------------|----|-----|----------------------|-------|----|----------------------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 67 | 15 | 82 | 0 | 0 | 0 | 0 | 0 | 9 | 79 | 88 | 0 | 53 | 35 | 88 | 0 | 129 |
| %HV | 1.5% | | | 0.0% | | | 22.2% | | | 1.9% | | | 3.1% | | | | |
| PHF | 0.80 | | | 0.00 | | | 0.56 | | | 0.78 | | | 0.79 | | | | |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | | | | |
|-------------|------------------------|----|-------|------------------------|----|-------|----------------------|------|-------|----------------------|-------|-------|-------|------|----|------|------|
| | L | R | Total | | | Total | T | R | Total | L | T | Total | | | | | |
| Volume | 40 | 27 | 67 | | | 0 | 8 | 1 | 9 | 14 | 39 | 53 | | | | | |
| %HV | 2.5% | NA | 0.0% | 1.5% | NA | NA | NA | 0.0% | NA | 12.5% | ##### | 22.2% | 7.1% | 0.0% | NA | 1.9% | 3.1% |
| PHF | 0.77 | | 0.68 | 0.80 | | 0.00 | 0.67 | 0.25 | 0.56 | 0.70 | 0.75 | 0.78 | 0.79 | | | | |

Rolling Hour Summary

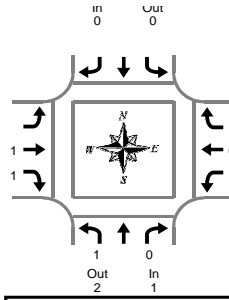
7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|---|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 7:00 AM | 40 | 27 | 0 | | | 0 | 8 | 1 | 0 | 14 | 39 | 0 | 129 | 0 | 0 | 0 | 0 |
| 7:15 AM | 39 | 18 | 0 | | | 0 | 8 | 2 | 0 | 10 | 35 | 0 | 112 | 0 | 0 | 0 | 0 |
| 7:30 AM | 36 | 16 | 0 | | | 0 | 12 | 3 | 0 | 11 | 33 | 0 | 111 | 0 | 0 | 0 | 0 |
| 7:45 AM | 33 | 17 | 0 | | | 0 | 22 | 5 | 0 | 8 | 29 | 0 | 114 | 0 | 0 | 0 | 0 |
| 8:00 AM | 22 | 15 | 0 | | | 0 | 27 | 8 | 0 | 9 | 32 | 0 | 113 | 0 | 0 | 0 | 0 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 2

Peak Hour Summary
7:00 AM to 8:00 AM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:10 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:20 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:25 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 8:20 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:25 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:35 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:55 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 |
| 7:15 AM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8:00 AM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:15 AM | 1 | 1 | 2 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 |
| 8:30 AM | 0 | 1 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8:45 AM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 3 | 2 | 5 | | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 9 |

Heavy Vehicle Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 1 | 2 | 3 | 0 | 0 | 0 | 2 | 1 | 3 | 1 | 1 | 2 | 4 |
| PHF | 0.25 | | | 0.00 | | | 0.50 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|---|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 1 | | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| PHF | 0.25 | | 0.25 | | 0.00 | 0.25 | 0.25 | 0.50 | 0.25 | 0.00 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 7:00 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 1 | 0 | 1 | 4 |
| 7:15 AM | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 3 |
| 7:30 AM | 2 | 1 | 3 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 5 |
| 7:45 AM | 2 | 2 | 4 | | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 6 |
| 8:00 AM | 2 | 2 | 4 | | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |

Peak Hour Summary



Clay Carney
(503) 833-2740

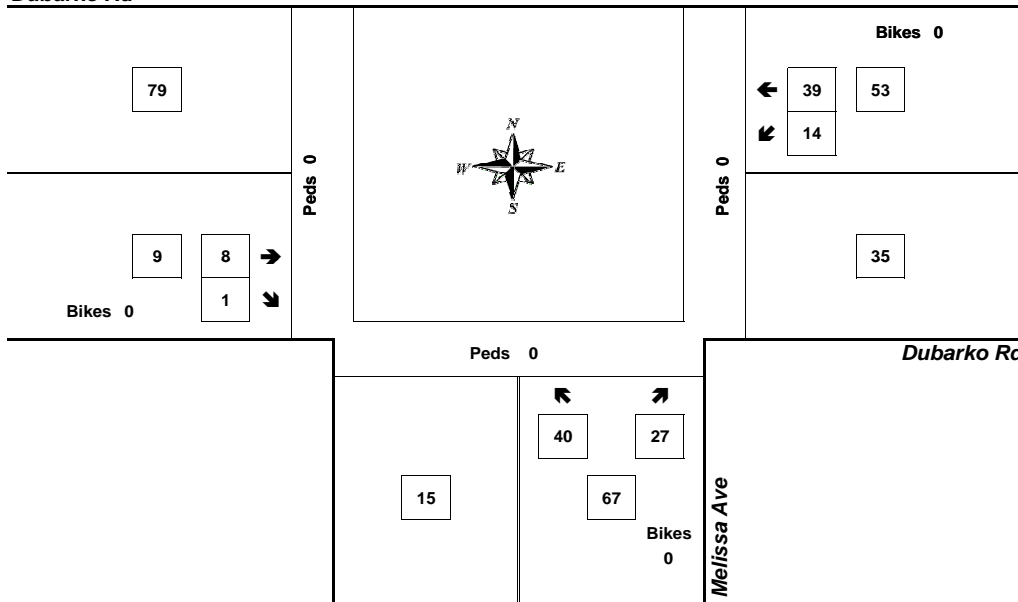
Melissa Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

Peds 0



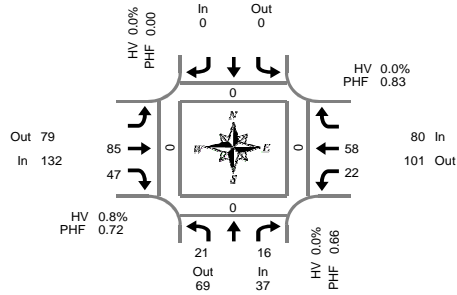
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.56 | 22.2% | 9 |
| WB | 0.78 | 1.9% | 53 |
| NB | 0.80 | 1.5% | 67 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.79 | 3.1% | 129 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(603) 833-2740



**Peak Hour Summary
4:40 PM to 5:40 PM**

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

**5-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 1 | 3 | 0 | | | 0 | 12 | 4 | 0 | 3 | 6 | 0 | 29 | 0 | 0 | 0 | 0 |
| 4:05 PM | 0 | 2 | 0 | | | 0 | 4 | 2 | 0 | 0 | 3 | 0 | 11 | 0 | 0 | 0 | 0 |
| 4:10 PM | 4 | 2 | 0 | | | 0 | 3 | 2 | 0 | 0 | 7 | 0 | 18 | 0 | 0 | 0 | 1 |
| 4:15 PM | 2 | 2 | 0 | | | 0 | 5 | 4 | 0 | 2 | 2 | 0 | 17 | 0 | 1 | 0 | 0 |
| 4:20 PM | 2 | 2 | 0 | | | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 4:25 PM | 3 | 2 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 17 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 1 | 0 | | | 0 | 7 | 4 | 0 | 2 | 4 | 0 | 18 | 0 | 0 | 0 | 0 |
| 4:35 PM | 1 | 0 | 0 | | | 0 | 8 | 2 | 0 | 3 | 5 | 0 | 19 | 0 | 0 | 0 | 0 |
| 4:40 PM | 1 | 2 | 0 | | | 0 | 5 | 7 | 0 | 5 | 6 | 0 | 26 | 0 | 0 | 0 | 0 |
| 4:45 PM | 5 | 2 | 0 | | | 0 | 4 | 5 | 0 | 0 | 4 | 0 | 20 | 0 | 0 | 0 | 0 |
| 4:50 PM | 2 | 1 | 0 | | | 0 | 7 | 8 | 0 | 3 | 6 | 0 | 27 | 0 | 0 | 0 | 0 |
| 4:55 PM | 2 | 2 | 0 | | | 0 | 7 | 5 | 0 | 0 | 5 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | | 0 | 14 | 5 | 0 | 1 | 1 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | | 0 | 9 | 1 | 0 | 0 | 5 | 0 | 16 | 0 | 0 | 0 | 0 |
| 5:10 PM | 2 | 1 | 0 | | | 0 | 5 | 3 | 0 | 3 | 7 | 0 | 21 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 1 | 0 | | | 0 | 4 | 1 | 0 | 1 | 3 | 0 | 10 | 0 | 0 | 0 | 0 |
| 5:20 PM | 3 | 3 | 0 | | | 0 | 10 | 4 | 0 | 3 | 4 | 0 | 27 | 0 | 0 | 0 | 0 |
| 5:25 PM | 1 | 1 | 0 | | | 0 | 4 | 2 | 0 | 1 | 5 | 0 | 14 | 0 | 0 | 0 | 0 |
| 5:30 PM | 2 | 1 | 0 | | | 0 | 7 | 3 | 0 | 3 | 7 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:35 PM | 2 | 2 | 0 | | | 0 | 9 | 3 | 0 | 2 | 5 | 0 | 23 | 0 | 0 | 0 | 0 |
| 5:40 PM | 3 | 0 | 0 | | | 0 | 3 | 6 | 0 | 0 | 1 | 0 | 13 | 0 | 0 | 0 | 0 |
| 5:45 PM | 1 | 1 | 0 | | | 0 | 8 | 2 | 0 | 4 | 5 | 0 | 21 | 0 | 0 | 0 | 1 |
| 5:50 PM | 3 | 0 | 0 | | | 0 | 5 | 2 | 0 | 0 | 5 | 0 | 15 | 0 | 0 | 0 | 0 |
| 5:55 PM | 2 | 0 | 0 | | | 0 | 9 | 4 | 0 | 0 | 2 | 0 | 17 | 0 | 0 | 0 | 1 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

**15-Minute Interval Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|-----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 5 | 7 | 0 | | | 0 | 19 | 8 | 0 | 3 | 16 | 0 | 58 | 0 | 0 | 0 | 1 |
| 4:15 PM | 7 | 6 | 0 | | | 0 | 17 | 7 | 0 | 2 | 8 | 0 | 47 | 0 | 1 | 0 | 0 |
| 4:30 PM | 2 | 3 | 0 | | | 0 | 20 | 13 | 0 | 10 | 15 | 0 | 63 | 0 | 0 | 0 | 0 |
| 4:45 PM | 9 | 5 | 0 | | | 0 | 18 | 18 | 0 | 3 | 15 | 0 | 68 | 0 | 0 | 0 | 0 |
| 5:00 PM | 3 | 1 | 0 | | | 0 | 28 | 9 | 0 | 4 | 13 | 0 | 58 | 0 | 0 | 0 | 0 |
| 5:15 PM | 4 | 5 | 0 | | | 0 | 18 | 7 | 0 | 5 | 12 | 0 | 51 | 0 | 0 | 0 | 0 |
| 5:30 PM | 7 | 3 | 0 | | | 0 | 19 | 12 | 0 | 5 | 13 | 0 | 59 | 0 | 0 | 0 | 0 |
| 5:45 PM | 6 | 1 | 0 | | | 0 | 22 | 8 | 0 | 4 | 12 | 0 | 53 | 0 | 0 | 0 | 2 |
| Total Survey | 43 | 31 | 0 | | | 0 | 161 | 82 | 0 | 36 | 104 | 0 | 457 | 0 | 1 | 0 | 3 |

**Peak Hour Summary
4:40 PM to 5:40 PM**

| By Approach | Northbound Melissa Ave | | | | Southbound Melissa Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|------------------------|-----|-------|-------|------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 37 | 69 | 106 | 0 | 0 | 0 | 0 | 0 | 132 | 79 | 211 | 0 | 80 | 101 | 181 | 0 | 249 | 0 | 0 | 0 | 0 |
| %HV | 0.0% | | | | 0.0% | | | | 0.8% | | | | 0.0% | | | | 0.4% | | | | |
| PHF | 0.66 | | | | 0.00 | | | | 0.72 | | | | 0.83 | | | | 0.85 | | | | |

| By Movement | Northbound Melissa Ave | | | | Southbound Melissa Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|------------------------|------|-------|-------|------------------------|----|-------|-------|----------------------|------|-------|-------|----------------------|------|-------|-------|-------|
| | L | R | Total | Bikes | | | Total | Bikes | T | R | Total | Bikes | L | T | Total | Bikes | |
| Volume | 21 | 16 | 37 | 0 | NA | NA | NA | 0.0% | NA | 85 | 47 | 132 | 0 | 22 | 58 | 80 | 249 |
| %HV | 0.0% | NA | 0.0% | 0.0% | NA | NA | NA | 0.0% | NA | 1.2% | 0.0% | 0.8% | 0.0% | 0.0% | NA | 0.0% | 0.4% |
| PHF | 0.58 | 0.80 | 0.66 | 0.00 | | | 0.00 | | 0.71 | 0.59 | 0.72 | 0.69 | 0.85 | 0.83 | 0.85 | 0.85 | |

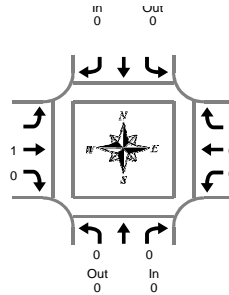
**Rolling Hour Summary
4:00 PM to 6:00 PM**

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|------------------------|----|-------|------------------------|--|-------|----------------------|----|-------|----------------------|----|-------|----------------|-----------------------|-------|------|------|
| | L | R | Bikes | | | Bikes | T | R | Bikes | L | T | Bikes | | North | South | East | West |
| 4:00 PM | 23 | 21 | 0 | | | 0 | 74 | 46 | 0 | 18 | 54 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:15 PM | 21 | 15 | 0 | | | 0 | 83 | 47 | 0 | 19 | 51 | 0 | 236 | 0 | 1 | 0 | 1 |
| 4:30 PM | 18 | 14 | 0 | | | 0 | 84 | 47 | 0 | 22 | 55 | 0 | 240 | 0 | 0 | 0 | 0 |
| 4:45 PM | 23 | 14 | 0 | | | 0 | 83 | 46 | 0 | 17 | 53 | 0 | 236 | 0 | 0 | 0 | 0 |
| 5:00 PM | 20 | 10 | 0 | | | 0 | 87 | 36 | 0 | 18 | 50 | 0 | 221 | 0 | 0 | 0 | 2 |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

Melissa Ave & Dubarko Rd

Thursday, April 25, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 4:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 4:10 PM | 1 | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:20 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:55 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:45 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 1 | 0 | 1 | | 0 | 1 | 1 | 2 | 0 | 2 | 2 | 5 |

Heavy Vehicle Peak Hour Summary

4:40 PM to 5:40 PM

| By Approach | Northbound Melissa Ave | | | Southbound Melissa Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|-----|-------|------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| PHF | 0.00 | | | 0.00 | | | 0.25 | | | 0.00 | | | 0.25 |

| By Movement | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|------------------------|------|-------|------------------------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| Volume | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| PHF | 0.00 | 0.00 | 0.00 | | 0.00 | 0.25 | 0.00 | 0.25 | 0.00 | 0.00 | 0.00 | 0.25 |

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Melissa Ave | | | Southbound Melissa Ave | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|------------------------|---|-------|------------------------|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | L | R | Total | | Total | T | R | Total | L | T | Total | |
| 4:00 PM | 1 | 0 | 1 | | 0 | 0 | 1 | 1 | 0 | 2 | 2 | 4 |
| 4:15 PM | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |

Peak Hour Summary



Clay Carney
(503) 833-2740

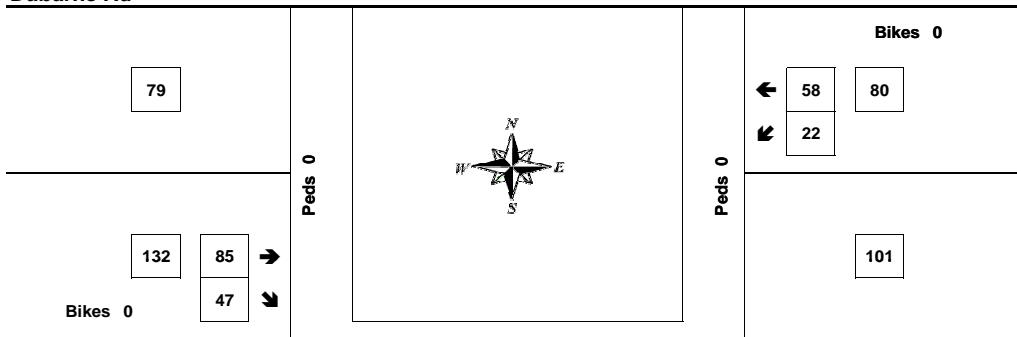
Melissa Ave & Dubarko Rd

4:40 PM to 5:40 PM
Thursday, April 25, 2019

Bikes
0

Dubarko Rd

Peds 0



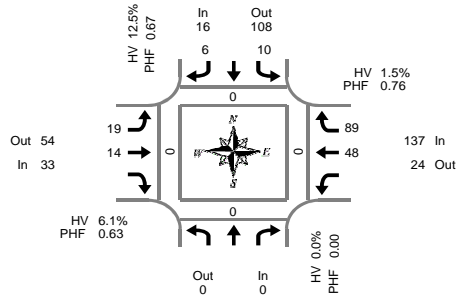
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.72 | 0.8% | 132 |
| WB | 0.83 | 0.0% | 80 |
| NB | 0.66 | 0.0% | 37 |
| SB | 0.00 | 0.0% | 0 |
| Intersection | 0.85 | 0.4% | 249 |

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(603) 833-2740



**Peak Hour Summary
7:05 AM to 8:05 AM**

Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

**5-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:55 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:05 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:10 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:20 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:25 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:35 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:40 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:50 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:55 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

**15-Minute Interval Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:45 AM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

**Peak Hour Summary
7:05 AM to 8:05 AM**

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 16 | 108 | 124 | 0 | 33 | 54 | 87 | 0 | 137 | 24 | 161 | 0 | 186 | 0 | 0 | 0 | 0 |
| %HV | | | | | | | 12.5% | | | | | | | | | | | | | | |
| PHF | | | | | | | 0.67 | | | | | | | | | | | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | | | | |
|-------------|---------------------|----|----|--|---------------------|-------|------|------|----------------------|------|-------|----|----------------------|----|------|------|-------|------|--|--|--|
| | | | | | | | | | | | | | | | | | | | | | |
| Volume | | | | | 0 | 10 | 6 | 16 | 19 | 14 | 33 | | | | | | | | | | |
| %HV | NA | NA | NA | | 0.0% | 20.0% | NA | 0.0% | 12.5% | 0.0% | 14.3% | NA | 6.1% | NA | 2.1% | 1.1% | 1.5% | 3.2% | | | |
| PHF | | | | | 0.00 | 0.50 | 0.30 | 0.67 | 0.59 | 0.70 | 0.63 | | | | 0.75 | 0.77 | 0.76 | 0.89 | | | |

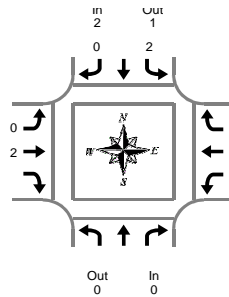
**Rolling Hour Summary
7:00 AM to 9:00 AM**

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 7:00 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:15 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:30 AM | | | | | | | | | | | | | | | | | | | | | |
| 7:45 AM | | | | | | | | | | | | | | | | | | | | | |
| 8:00 AM | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Ruben Ln & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 7:10 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 7:20 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:05 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:35 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:50 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 8:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Total Survey | | | 0 | 2 | 0 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 |
| 7:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 3 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Total Survey | | | 0 | 2 | 0 | 2 | 0 | 2 | 2 | 2 | 4 | 6 | 10 |

Heavy Vehicle Peak Hour Summary 7:05 AM to 8:05 AM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 2 | 1 | 3 | 2 | 1 | 3 | 2 | 4 | 6 | 6 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.25 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|------|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 | 2 | 1 | 1 | 2 | 6 |
| PHF | 0.00 | 0.25 | | 0.00 | 0.25 | 0.00 | 0.25 | 0.00 | 0.25 | 0.25 | 0.25 | 0.25 | 0.50 |

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 7:00 AM | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 | 2 | 1 | 2 | 3 | 7 |
| 7:15 AM | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 4 |
| 7:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 2 |
| 7:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 8:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 |

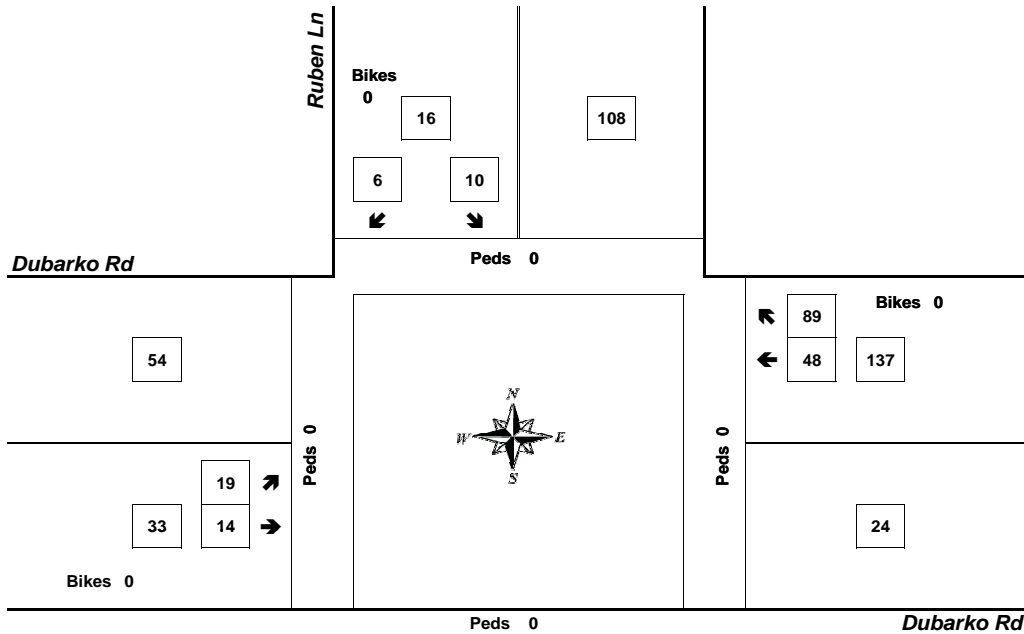
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

7:05 AM to 8:05 AM
Thursday, May 23, 2019



Bikes
0

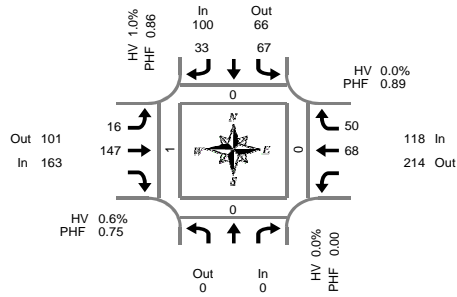
| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.63 | 6.1% | 33 |
| WB | 0.76 | 1.5% | 137 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.67 | 12.5% | 16 |
| Intersection | 0.89 | 3.2% | 186 |

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:25 PM to 5:25 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:05 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:10 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:20 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:25 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:35 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:40 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:50 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:55 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:05 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:10 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:20 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:25 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:35 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:40 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:50 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:55 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

15-Minute Interval Summary

4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:45 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

Peak Hour Summary

4:25 PM to 5:25 PM

| By Approach | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|---------------------|------|-------|-------|---------------------|------|-------|-------|----------------------|------|-------|-------|----------------------|------|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 0 | 0 | 0 | 0 | 100 | 66 | 166 | 0 | 163 | 101 | 264 | 0 | 118 | 214 | 332 | 0 | 381 | 0 | 0 | 0 | 1 |
| %HV | | 0.0% | | | | 1.0% | | | | 0.6% | | | | 0.0% | | | 0.5% | | | | |
| PHF | | 0.00 | | | | 0.86 | | | | 0.75 | | | | 0.89 | | | 0.89 | | | | |

| By Movement | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total |
|-------------|---------------------|------|-------|-------|---------------------|------|-------|-------|----------------------|------|-------|-------|----------------------|------|-------|-------|-------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | |
| Volume | 0 | 67 | 33 | 100 | 16 | 147 | 163 | 0 | 68 | 50 | 118 | 0 | 68 | 50 | 118 | 0 | |
| %HV | NA | NA | NA | 0.0% | 0.0% | NA | 3.0% | 1.0% | 6.3% | 0.0% | NA | 0.6% | NA | 0.0% | 0.0% | 0.0% | 0.5% |
| PHF | | 0.00 | 0.80 | | 0.75 | 0.86 | | | 0.57 | 0.75 | | | 0.75 | 0.89 | 0.83 | 0.89 | 0.89 |

Rolling Hour Summary

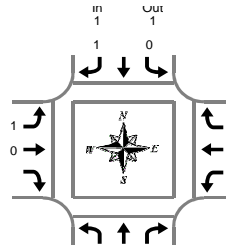
4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | | Southbound Ruben Ln | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|---------------------|-----|-------|-------|---------------------|-----|-------|-------|----------------------|---|-------|-------|----------------------|---|-------|-------|----------------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | L | T | Total | Bikes | T | R | Total | Bikes | | North | South | East | West |
| 4:00 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:30 PM | | | | | | | | | | | | | | | | | | | | | |
| 4:45 PM | | | | | | | | | | | | | | | | | | | | | |
| 5:00 PM | | | | | | | | | | | | | | | | | | | | | |
| Total Survey | | | | | | | | | | | | | | | | | | | | | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 1
In 1

Peak Hour Summary
4:25 PM to 5:25 PM

Ruben Ln & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:35 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 4:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:20 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| 5:55 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| 5:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 2 |
| Total Survey | 0 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 0 | 1 | 1 | 1 | 8 |

Heavy Vehicle Peak Hour Summary 4:25 PM to 5:25 PM

| By Approach | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|-----|-------|---------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | | | 0.25 | | | 0.25 | | | 0.00 | | | 0.50 |

| By Movement | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|---------------------|------|-------|---------------------|------|-------|----------------------|---|-------|----------------------|------|-------|-------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| Volume | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| PHF | 0.00 | 0.00 | | 0.25 | 0.25 | 0.25 | 0.00 | | 0.25 | 0.00 | 0.00 | 0.00 | 0.50 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound Ruben Ln | | | Southbound Ruben Ln | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|---------------------|-----|-------|---------------------|---|-------|----------------------|---|-------|----------------------|---|-------|----------------|
| | In | Out | Total | L | R | Total | L | T | Total | T | R | Total | |
| 4:00 PM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4:15 PM | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| 4:30 PM | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 3 |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 3 |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 1 | 4 |

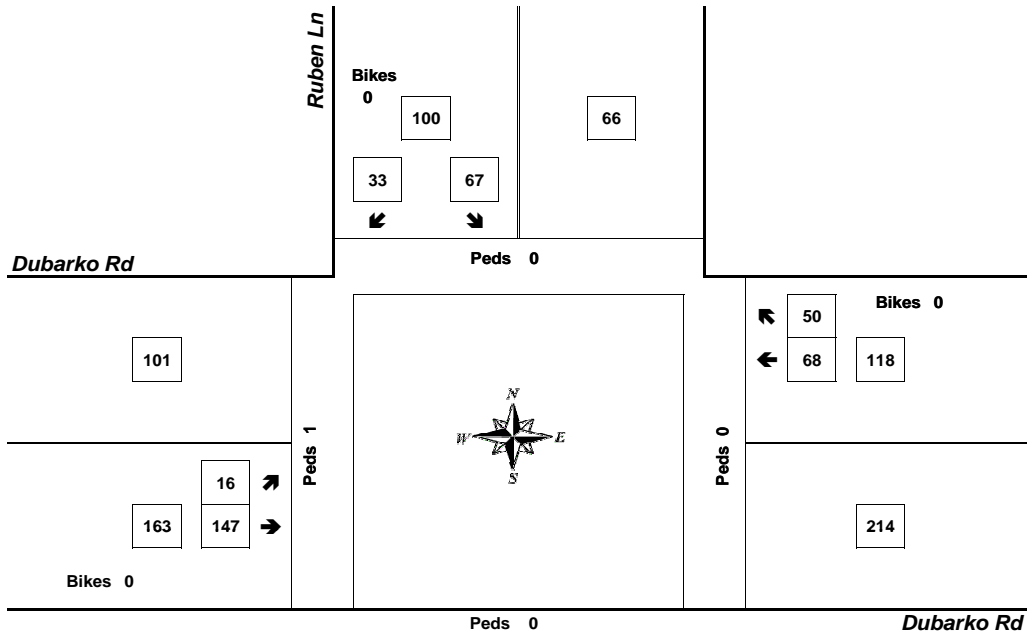
Peak Hour Summary



Clay Carney
(503) 833-2740

Ruben Ln & Dubarko Rd

4:25 PM to 5:25 PM
Wednesday, May 22, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.75 | 0.6% | 163 |
| WB | 0.89 | 0.0% | 118 |
| NB | 0.00 | 0.0% | 0 |
| SB | 0.86 | 1.0% | 100 |
| Intersection | 0.89 | 0.5% | 381 |

Count Period: 4:00 PM to 6:00 PM

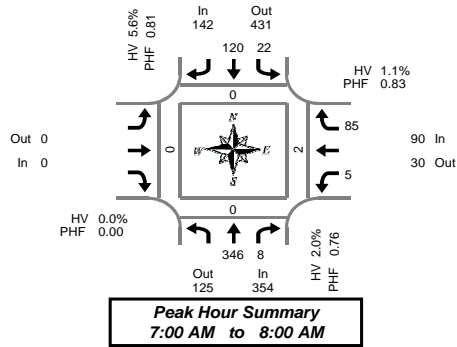
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM



5-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 33 | 0 | 0 | 0 | 10 | 0 | | 0 | 1 | 11 | 0 | 55 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 50 | 1 | 0 | 1 | 7 | 0 | | 0 | 0 | 8 | 0 | 67 | 0 | 0 | 0 | 0 | |
| 7:10 AM | 32 | 0 | 0 | 3 | 9 | 0 | | 0 | 1 | 6 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 34 | 0 | 0 | 3 | 6 | 0 | | 0 | 0 | 9 | 0 | 52 | 0 | 0 | 1 | 0 | |
| 7:20 AM | 32 | 1 | 0 | 4 | 13 | 0 | | 0 | 0 | 6 | 0 | 56 | 0 | 0 | 0 | 0 | |
| 7:25 AM | 25 | 1 | 0 | 1 | 12 | 0 | | 0 | 0 | 9 | 0 | 48 | 0 | 0 | 1 | 0 | |
| 7:30 AM | 21 | 0 | 0 | 2 | 12 | 0 | | 0 | 1 | 7 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 7:35 AM | 24 | 1 | 0 | 4 | 8 | 0 | | 0 | 0 | 7 | 0 | 44 | 0 | 0 | 0 | 0 | |
| 7:40 AM | 34 | 0 | 0 | 1 | 8 | 0 | | 0 | 2 | 4 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 26 | 2 | 0 | 1 | 17 | 0 | | 0 | 0 | 5 | 0 | 51 | 0 | 0 | 0 | 0 | |
| 7:50 AM | 17 | 2 | 0 | 2 | 11 | 0 | | 0 | 0 | 10 | 0 | 42 | 0 | 0 | 0 | 0 | |
| 7:55 AM | 18 | 0 | 0 | 0 | 7 | 0 | | 0 | 0 | 3 | 0 | 28 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 26 | 0 | 0 | 4 | 7 | 0 | | 0 | 1 | 8 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:05 AM | 27 | 2 | 0 | 2 | 15 | 0 | | 0 | 1 | 4 | 0 | 51 | 0 | 0 | 1 | 0 | |
| 8:10 AM | 33 | 0 | 0 | 1 | 6 | 0 | | 0 | 1 | 0 | 0 | 41 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 24 | 2 | 0 | 4 | 16 | 0 | | 0 | 0 | 3 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:20 AM | 29 | 0 | 0 | 4 | 6 | 0 | | 0 | 1 | 6 | 0 | 46 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 33 | 1 | 0 | 3 | 7 | 0 | | 0 | 0 | 4 | 0 | 48 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 21 | 2 | 0 | 3 | 11 | 0 | | 0 | 0 | 6 | 0 | 43 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 24 | 2 | 0 | 2 | 15 | 0 | | 0 | 0 | 6 | 0 | 49 | 0 | 0 | 0 | 0 | |
| 8:40 AM | 21 | 2 | 0 | 1 | 12 | 0 | | 0 | 1 | 2 | 0 | 39 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 21 | 2 | 0 | 5 | 16 | 0 | | 0 | 1 | 7 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:50 AM | 26 | 2 | 0 | 5 | 16 | 0 | | 0 | 0 | 3 | 0 | 52 | 0 | 0 | 0 | 0 | |
| 8:55 AM | 16 | 1 | 0 | 1 | 18 | 0 | | 0 | 1 | 5 | 0 | 42 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

15-Minute Interval Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 115 | 1 | 0 | 4 | 26 | 0 | | 0 | 2 | 25 | 0 | 173 | 0 | 0 | 0 | 0 | |
| 7:15 AM | 91 | 2 | 0 | 8 | 31 | 0 | | 0 | 0 | 24 | 0 | 156 | 0 | 0 | 2 | 0 | |
| 7:30 AM | 79 | 1 | 0 | 7 | 28 | 0 | | 0 | 3 | 18 | 0 | 136 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 61 | 4 | 0 | 3 | 35 | 0 | | 0 | 0 | 18 | 0 | 121 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 86 | 2 | 0 | 7 | 28 | 0 | | 0 | 3 | 12 | 0 | 138 | 0 | 0 | 1 | 0 | |
| 8:15 AM | 86 | 3 | 0 | 11 | 29 | 0 | | 0 | 1 | 13 | 0 | 143 | 0 | 0 | 0 | 0 | |
| 8:30 AM | 66 | 6 | 0 | 6 | 38 | 0 | | 0 | 1 | 14 | 0 | 131 | 0 | 0 | 0 | 0 | |
| 8:45 AM | 63 | 5 | 0 | 11 | 50 | 0 | | 0 | 2 | 15 | 0 | 146 | 0 | 0 | 0 | 0 | |
| Total Survey | 647 | 24 | 0 | 57 | 265 | 0 | | 0 | 12 | 139 | 0 | 1,144 | 0 | 0 | 3 | 0 | |

Peak Hour Summary 7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | | North | South | East | West |
| Volume | 354 | 125 | 479 | 0 | 142 | 431 | 573 | 0 | 0 | 0 | 0 | 90 | 30 | 120 | 0 | 586 | |
| %HV | 2.0% | | | 5.6% | | | 0.0% | | | 1.1% | | | 2.7% | | | | |
| PHF | 0.76 | | | 0.81 | | | 0.00 | | | 0.83 | | | 0.85 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|-------|-------|----------------------|-------|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | | Total | L | R | Total | | |
| Volume | 346 | 8 | 354 | 22 | 120 | 142 | | 0 | 5 | 85 | 90 | 586 | |
| %HV | NA | 2.0% | 0.0% | 2.0% | 13.6% | 4.2% | NA | 5.6% | NA | NA | NA | 2.7% | |
| PHF | 0.75 | 0.50 | 0.76 | 0.55 | 0.81 | 0.81 | | 0.00 | 0.42 | 0.85 | 0.83 | 0.85 | |

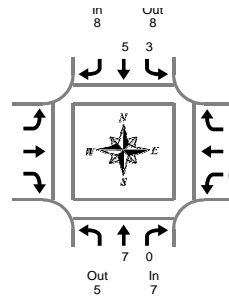
Rolling Hour Summary 7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|---|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 7:00 AM | 346 | 8 | 0 | 22 | 120 | 0 | | 0 | 5 | 85 | 0 | 586 | 0 | 0 | 2 | 0 | |
| 7:15 AM | 317 | 9 | 0 | 25 | 122 | 0 | | 0 | 6 | 72 | 0 | 551 | 0 | 0 | 3 | 0 | |
| 7:30 AM | 312 | 10 | 0 | 28 | 120 | 0 | | 0 | 7 | 61 | 0 | 538 | 0 | 0 | 1 | 0 | |
| 7:45 AM | 299 | 15 | 0 | 27 | 130 | 0 | | 0 | 5 | 57 | 0 | 533 | 0 | 0 | 1 | 0 | |
| 8:00 AM | 301 | 16 | 0 | 35 | 145 | 0 | | 0 | 7 | 54 | 0 | 558 | 0 | 0 | 1 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

Peak Hour Summary
7:00 AM to 8:00 AM

SE 362nd Ave & Dubarko Rd

Thursday, May 23, 2019
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|---|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 7:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:05 AM | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | |
| 7:10 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:15 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 7:20 AM | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 3 | |
| 7:25 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:30 AM | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | |
| 7:35 AM | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 7:40 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | |
| 7:50 AM | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | |
| 7:55 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:00 AM | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | |
| 8:05 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:10 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 5 | |
| 8:20 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:25 AM | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 3 | |
| 8:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 8:35 AM | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 2 | |
| 8:40 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:45 AM | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 8:50 AM | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 8:55 AM | 6 | 0 | 6 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 8 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 16 | 0 | 0 | 3 | 3 | 40 | |

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|---|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 7:00 AM | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | |
| 7:15 AM | 2 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 4 | |
| 7:30 AM | 1 | 0 | 1 | 2 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 5 | |
| 7:45 AM | 1 | 0 | 1 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 4 | |
| 8:00 AM | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | |
| 8:15 AM | 3 | 1 | 4 | 0 | 3 | 3 | 3 | 0 | 0 | 1 | 1 | 8 | |
| 8:30 AM | 1 | 0 | 1 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | |
| 8:45 AM | 8 | 0 | 8 | 0 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 11 | |
| Total Survey | 20 | 1 | 21 | 3 | 13 | 16 | 16 | 0 | 0 | 3 | 3 | 40 | |

Heavy Vehicle Peak Hour Summary

7:00 AM to 8:00 AM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 7 | 5 | 12 | 8 | 8 | 16 | 0 | 0 | 0 | 1 | 3 | 4 | 16 |
| PHF | 0.44 | | | 0.50 | | | 0.00 | | | 0.25 | | | 0.67 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|------|----------------------|------|----|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| Volume | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 0 | 1 | 1 | 16 | |
| PHF | 0.44 | 0.00 | 0.44 | 0.38 | 0.42 | 0.50 | 0.00 | 0.00 | 0.25 | 0.25 | 0.67 | | |

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|---|----------------------|---|----|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | | | |
| 7:00 AM | 7 | 0 | 7 | 3 | 5 | 8 | 0 | 0 | 0 | 1 | 1 | 16 | |
| 7:15 AM | 5 | 0 | 5 | 3 | 6 | 9 | 0 | 0 | 0 | 1 | 1 | 15 | |
| 7:30 AM | 6 | 1 | 7 | 2 | 9 | 11 | 0 | 0 | 0 | 1 | 1 | 19 | |
| 7:45 AM | 6 | 1 | 7 | 0 | 9 | 9 | 0 | 0 | 0 | 1 | 1 | 17 | |
| 8:00 AM | 13 | 1 | 14 | 0 | 8 | 8 | 0 | 0 | 0 | 2 | 2 | 24 | |

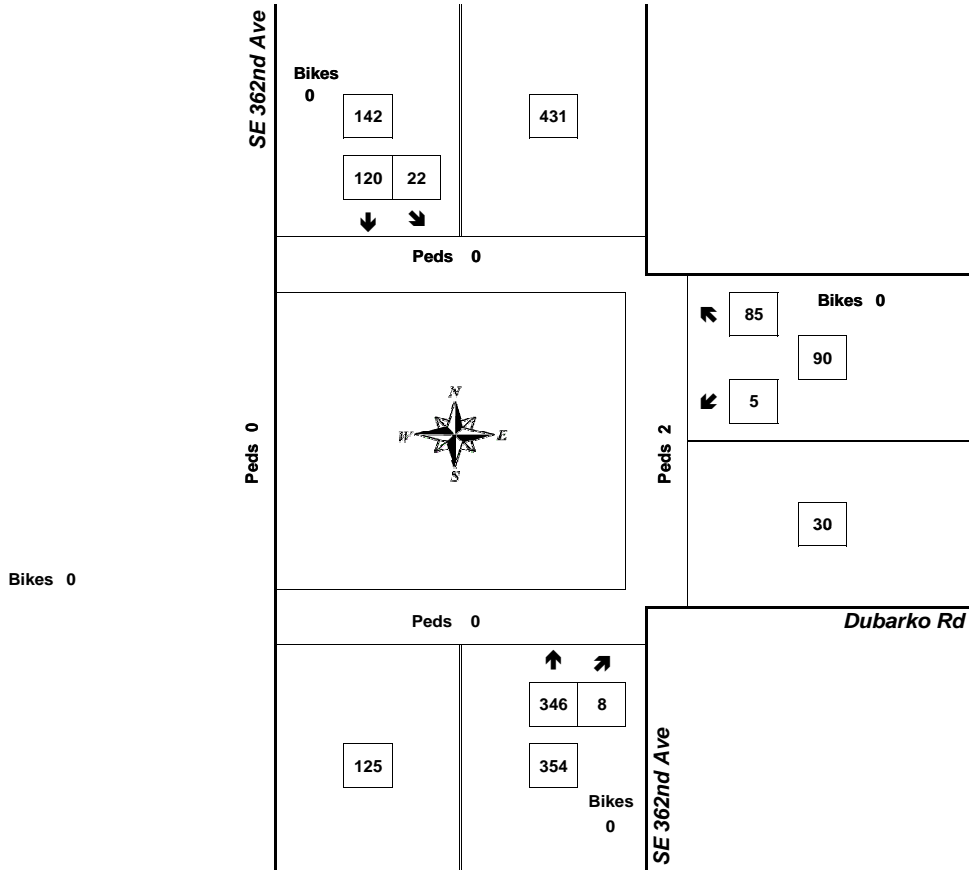
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

7:00 AM to 8:00 AM
Thursday, May 23, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.83 | 1.1% | 90 |
| NB | 0.76 | 2.0% | 354 |
| SB | 0.81 | 5.6% | 142 |
| Intersection | 0.85 | 2.7% | 586 |

Count Period: 7:00 AM to 9:00 AM

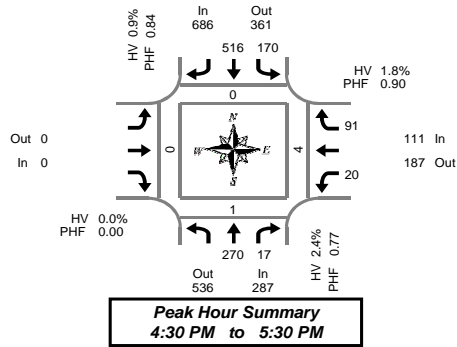
Total Vehicle Summary



Clay Carney
(603) 833-2740

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM



5-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 25 | 0 | 0 | 11 | 35 | 0 | | 0 | 1 | 6 | 0 | 78 | 1 | 0 | 3 | 0 | |
| 4:05 PM | 21 | 2 | 0 | 7 | 36 | 0 | | 0 | 1 | 5 | 0 | 72 | 0 | 0 | 0 | 0 | |
| 4:10 PM | 19 | 2 | 0 | 8 | 36 | 0 | | 0 | 1 | 6 | 0 | 72 | 0 | 0 | 0 | 0 | |
| 4:15 PM | 26 | 3 | 0 | 8 | 32 | 0 | | 0 | 0 | 4 | 0 | 73 | 0 | 0 | 1 | 0 | |
| 4:20 PM | 22 | 1 | 0 | 14 | 45 | 0 | | 0 | 3 | 4 | 0 | 89 | 0 | 0 | 0 | 0 | |
| 4:25 PM | 21 | 2 | 0 | 15 | 34 | 0 | | 0 | 0 | 5 | 0 | 77 | 0 | 0 | 0 | 0 | |
| 4:30 PM | 19 | 2 | 0 | 18 | 30 | 0 | | 0 | 1 | 8 | 0 | 78 | 0 | 0 | 2 | 0 | |
| 4:35 PM | 27 | 0 | 0 | 9 | 42 | 0 | | 0 | 0 | 9 | 0 | 87 | 0 | 0 | 0 | 0 | |
| 4:40 PM | 17 | 3 | 0 | 12 | 33 | 0 | | 0 | 2 | 9 | 0 | 76 | 0 | 0 | 0 | 0 | |
| 4:45 PM | 28 | 0 | 0 | 7 | 46 | 0 | | 0 | 1 | 6 | 0 | 88 | 0 | 0 | 0 | 0 | |
| 4:50 PM | 28 | 2 | 0 | 14 | 33 | 0 | | 0 | 3 | 7 | 0 | 87 | 0 | 0 | 0 | 0 | |
| 4:55 PM | 30 | 2 | 0 | 10 | 51 | 0 | | 0 | 4 | 3 | 0 | 100 | 0 | 0 | 0 | 0 | |
| 5:00 PM | 30 | 1 | 0 | 15 | 42 | 0 | | 0 | 3 | 11 | 0 | 102 | 0 | 0 | 0 | 0 | |
| 5:05 PM | 21 | 4 | 0 | 16 | 45 | 0 | | 0 | 0 | 7 | 0 | 93 | 0 | 0 | 0 | 0 | |
| 5:10 PM | 21 | 1 | 0 | 20 | 49 | 0 | | 0 | 2 | 6 | 0 | 99 | 0 | 0 | 0 | 0 | |
| 5:15 PM | 16 | 1 | 0 | 14 | 60 | 0 | | 0 | 1 | 7 | 0 | 99 | 0 | 0 | 0 | 0 | |
| 5:20 PM | 17 | 1 | 0 | 19 | 42 | 0 | | 0 | 2 | 12 | 0 | 93 | 0 | 1 | 0 | 0 | |
| 5:25 PM | 16 | 0 | 0 | 16 | 43 | 0 | | 0 | 1 | 6 | 0 | 82 | 0 | 0 | 2 | 0 | |
| 5:30 PM | 19 | 0 | 0 | 16 | 24 | 0 | | 0 | 2 | 4 | 0 | 65 | 0 | 0 | 0 | 0 | |
| 5:35 PM | 16 | 1 | 0 | 12 | 33 | 0 | | 0 | 2 | 7 | 0 | 71 | 0 | 0 | 0 | 0 | |
| 5:40 PM | 26 | 0 | 0 | 9 | 39 | 0 | | 0 | 1 | 6 | 0 | 81 | 0 | 0 | 0 | 0 | |
| 5:45 PM | 18 | 2 | 0 | 13 | 36 | 0 | | 0 | 2 | 5 | 0 | 76 | 0 | 0 | 0 | 0 | |
| 5:50 PM | 19 | 2 | 0 | 17 | 43 | 0 | | 0 | 1 | 7 | 0 | 89 | 0 | 0 | 0 | 0 | |
| 5:55 PM | 17 | 3 | 0 | 17 | 29 | 0 | | 0 | 1 | 7 | 0 | 74 | 0 | 0 | 0 | 0 | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | |

15-Minute Interval Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 65 | 4 | 0 | 26 | 107 | 0 | | 0 | 3 | 17 | 0 | 222 | 1 | 0 | 3 | 0 | |
| 4:15 PM | 69 | 6 | 0 | 37 | 111 | 0 | | 0 | 3 | 13 | 0 | 239 | 0 | 0 | 1 | 0 | |
| 4:30 PM | 63 | 5 | 0 | 39 | 105 | 0 | | 0 | 3 | 26 | 0 | 241 | 0 | 0 | 2 | 0 | |
| 4:45 PM | 86 | 4 | 0 | 31 | 130 | 0 | | 0 | 8 | 16 | 0 | 275 | 0 | 0 | 0 | 0 | |
| 5:00 PM | 72 | 6 | 0 | 51 | 136 | 0 | | 0 | 5 | 24 | 0 | 294 | 0 | 0 | 0 | 0 | |
| 5:15 PM | 49 | 2 | 0 | 49 | 145 | 0 | | 0 | 4 | 25 | 0 | 274 | 0 | 1 | 2 | 0 | |
| 5:30 PM | 61 | 1 | 0 | 37 | 96 | 0 | | 0 | 5 | 17 | 0 | 217 | 0 | 0 | 0 | 0 | |
| 5:45 PM | 54 | 7 | 0 | 47 | 108 | 0 | | 0 | 4 | 19 | 0 | 239 | 0 | 0 | 0 | 0 | |
| Total Survey | 519 | 35 | 0 | 317 | 938 | 0 | | 0 | 35 | 157 | 0 | 2,001 | 1 | 1 | 8 | 0 | |

Peak Hour Summary
4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | | Southbound SE 362nd Ave | | | | Eastbound Dubarko Rd | | | | Westbound Dubarko Rd | | | | Total | Pedestrians Crosswalk | | | |
|-------------|-------------------------|-----|-------|-------|-------------------------|-----|-------|-------|----------------------|-----|-------|-------|----------------------|-----|-------|-------|-------|-----------------------|-------|------|------|
| | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | In | Out | Total | Bikes | | North | South | East | West |
| Volume | 287 | 536 | 823 | 0 | 686 | 361 | 1,047 | 0 | 0 | 0 | 0 | 0 | 111 | 187 | 298 | 0 | 1,084 | 0 | 1 | 4 | 0 |
| %HV | 2.4% | | | | 0.9% | | | | 0.0% | | | | 1.8% | | | | 1.4% | | | | |
| PHF | 0.77 | | | | 0.84 | | | | 0.00 | | | | 0.90 | | | | 0.92 | | | | |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total | |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|------|-------|----------------------|------|-------|-------|------|
| | T | R | Total | L | T | Total | | | Total | L | R | Total | | |
| Volume | 270 | 17 | 287 | 170 | 516 | 686 | | | 0 | 20 | 91 | 111 | 1,084 | |
| %HV | NA | 2.6% | 0.0% | 2.4% | 1.2% | 0.8% | NA | 0.9% | NA | NA | NA | 1.1% | 1.8% | 1.4% |
| PHF | 0.77 | 0.61 | 0.77 | 0.80 | 0.84 | 0.84 | | | 0.00 | 0.50 | 0.88 | 0.90 | 0.92 | |

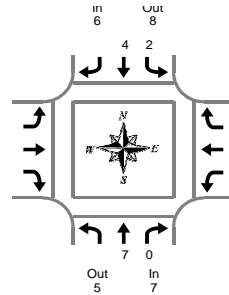
Rolling Hour Summary
4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total | Pedestrians Crosswalk | | | |
|---------------------|-------------------------|----|-------|-------------------------|-----|-------|----------------------|-------|----|----------------------|-------|-------|----------------|-----------------------|------|------|--|
| | T | R | Bikes | L | T | Bikes | | Bikes | L | R | Bikes | North | | South | East | West | |
| 4:00 PM | 283 | 19 | 0 | 133 | 453 | 0 | | 0 | 17 | 72 | 0 | 977 | 1 | 0 | 6 | 0 | |
| 4:15 PM | 290 | 21 | 0 | 158 | 482 | 0 | | 0 | 19 | 79 | 0 | 1,049 | 1 | 0 | 3 | 0 | |
| 4:30 PM | 270 | 17 | 0 | 170 | 516 | 0 | | 0 | 20 | 91 | 0 | 1,084 | 0 | 1 | 4 | 0 | |
| 4:45 PM | 268 | 13 | 0 | 168 | 507 | 0 | | 0 | 22 | 82 | 0 | 1,060 | 0 | 1 | 2 | 0 | |
| 5:00 PM | 236 | 16 | 0 | 184 | 485 | 0 | | 0 | 18 | 85 | 0 | 1,024 | 0 | 1 | 2 | 0 | |

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Out 0
In 0

SE 362nd Ave & Dubarko Rd

Wednesday, May 22, 2019
4:00 PM to 6:00 PM

Peak Hour Summary
4:30 PM to 5:30 PM

Heavy Vehicle 5-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 4:00 PM | 2 | 0 | 2 | 0 | 1 | 1 | | | 0 | 0 | 0 | 3 | |
| 4:05 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 1 | 1 | |
| 4:10 PM | 2 | 0 | 2 | 0 | 1 | 1 | | | 0 | 0 | 0 | 3 | |
| 4:15 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 2 | |
| 4:20 PM | 0 | 0 | 0 | 0 | 1 | 1 | | | 0 | 0 | 0 | 1 | |
| 4:25 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 4:30 PM | 0 | 0 | 0 | 0 | 3 | 3 | | | 0 | 0 | 0 | 3 | |
| 4:35 PM | 1 | 0 | 1 | 0 | 0 | 0 | | | 0 | 0 | 0 | 1 | |
| 4:40 PM | 0 | 0 | 0 | 1 | 0 | 1 | | | 0 | 1 | 0 | 2 | |
| 4:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 4:50 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 4:55 PM | 0 | 0 | 0 | 0 | 1 | 1 | | | 0 | 0 | 0 | 1 | |
| 5:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:05 PM | 2 | 0 | 2 | 0 | 0 | 0 | | | 0 | 0 | 0 | 2 | |
| 5:10 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:15 PM | 1 | 0 | 1 | 0 | 0 | 0 | | | 0 | 0 | 0 | 1 | |
| 5:20 PM | 1 | 0 | 1 | 0 | 0 | 0 | | | 0 | 0 | 1 | 2 | |
| 5:25 PM | 2 | 0 | 2 | 1 | 0 | 1 | | | 0 | 0 | 0 | 3 | |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 2 | |
| 5:35 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:40 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | |
| 5:50 PM | 0 | 0 | 0 | 1 | 0 | 1 | | | 0 | 0 | 0 | 1 | |
| 5:55 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 2 | |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle 15-Minute Interval Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|----|-------|----------------------|---|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 4:00 PM | 4 | 0 | 4 | 0 | 2 | 2 | | | 0 | 0 | 1 | 1 | 7 |
| 4:15 PM | 1 | 0 | 1 | 0 | 2 | 2 | | | 0 | 0 | 0 | 0 | 3 |
| 4:30 PM | 1 | 0 | 1 | 1 | 3 | 4 | | | 0 | 1 | 0 | 1 | 6 |
| 4:45 PM | 0 | 0 | 0 | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 1 |
| 5:00 PM | 2 | 0 | 2 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 2 |
| 5:15 PM | 4 | 0 | 4 | 1 | 0 | 1 | | | 0 | 0 | 1 | 1 | 6 |
| 5:30 PM | 1 | 0 | 1 | 0 | 1 | 1 | | | 0 | 0 | 0 | 0 | 2 |
| 5:45 PM | 1 | 0 | 1 | 1 | 1 | 2 | | | 0 | 0 | 0 | 0 | 3 |
| Total Survey | 14 | 0 | 14 | 3 | 10 | 13 | | | 0 | 1 | 2 | 3 | 30 |

Heavy Vehicle Peak Hour Summary 4:30 PM to 5:30 PM

| By Approach | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|-----|-------|-------------------------|-----|-------|----------------------|-----|-------|----------------------|-----|-------|-------|
| | In | Out | Total | In | Out | Total | In | Out | Total | In | Out | Total | |
| Volume | 7 | 5 | 12 | 6 | 8 | 14 | 0 | 0 | 0 | 2 | 2 | 4 | 15 |
| PHF | 0.44 | | | 0.38 | | | 0.00 | | | 0.50 | | | 0.63 |

| By Movement | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Total |
|-------------|-------------------------|------|-------|-------------------------|------|-------|----------------------|---|------|----------------------|-------|------|-------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| Volume | 7 | 0 | 7 | 2 | 4 | 6 | | | 0 | 1 | 1 | 2 | 15 |
| PHF | 0.44 | 0.00 | 0.44 | 0.50 | 0.33 | 0.38 | | | 0.00 | 0.25 | 0.25 | 0.50 | 0.63 |

Heavy Vehicle Rolling Hour Summary 4:00 PM to 6:00 PM

| Interval Start Time | Northbound SE 362nd Ave | | | Southbound SE 362nd Ave | | | Eastbound Dubarko Rd | | | Westbound Dubarko Rd | | | Interval Total |
|---------------------|-------------------------|---|-------|-------------------------|---|-------|----------------------|---|---|----------------------|-------|---|----------------|
| | T | R | Total | L | T | Total | Total | L | R | Total | Total | | |
| 4:00 PM | 6 | 0 | 6 | 1 | 8 | 9 | | | 0 | 1 | 1 | 2 | 17 |
| 4:15 PM | 4 | 0 | 4 | 1 | 6 | 7 | | | 0 | 1 | 0 | 1 | 12 |
| 4:30 PM | 7 | 0 | 7 | 2 | 4 | 6 | | | 0 | 1 | 1 | 2 | 15 |
| 4:45 PM | 7 | 0 | 7 | 1 | 2 | 3 | | | 0 | 0 | 1 | 1 | 11 |
| 5:00 PM | 8 | 0 | 8 | 2 | 2 | 4 | | | 0 | 0 | 1 | 1 | 13 |

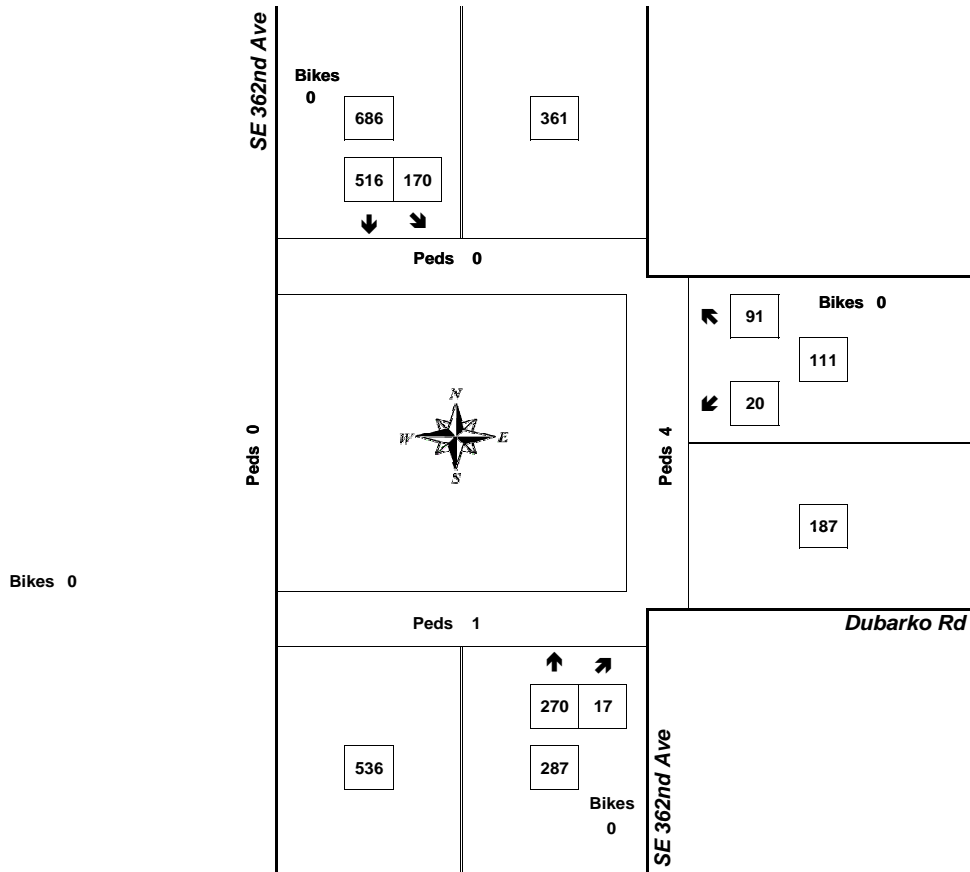
Peak Hour Summary



Clay Carney
(503) 833-2740

SE 362nd Ave & Dubarko Rd

4:30 PM to 5:30 PM
Wednesday, May 22, 2019



| Approach | PHF | HV% | Volume |
|---------------------|-------------|-------------|--------------|
| EB | 0.00 | 0.0% | 0 |
| WB | 0.90 | 1.8% | 111 |
| NB | 0.77 | 2.4% | 287 |
| SB | 0.84 | 0.9% | 686 |
| Intersection | 0.92 | 1.4% | 1,084 |

Count Period: 4:00 PM to 6:00 PM

CDS380
05/17/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
362ND DR at DUBARKO RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

CDS380
05/12/2019

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

CITY OF SANDY, CLACKAMAS COUNTY

| SER# | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | PRTC | INJ | G | E | LICNS | PED | UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE |
|------|---|---|---|---|---|------|-------|-------------|---------|----------|-------|------|-------|----------|------|---|---|--------|---|---|---|---|---|---|------|------|---------------|--------|------|-------|-------|------|------|-------|------|------|-----|---|---|-------|-----|--------|---|---|---|---|---|---|-----|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---|---|-----|-----|-------|-----|-------|-------|
|------|---|---|---|---|---|------|-------|-------------|---------|----------|-------|------|-------|----------|------|---|---|--------|---|---|---|---|---|---|------|------|---------------|--------|------|-------|-------|------|------|-------|------|------|-----|---|---|-------|-----|--------|---|---|---|---|---|---|-----|------|-----|-------|----------|-------|-------|-------|-------|----|------|----|----|------|-------|---|---|-----|-----|-------|-----|-------|-------|

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at BLUFF RD, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CITY OF SANDY, CLACKAMAS COUNTY

DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

1 - 2 of 2 Crash records shown.

| SER# | S | D | M | P | R | J | S | W | DATE | CLASS | CITY STREET | RD CHAR | INT-TYPE | OFFRD | WTHR | CRASH | SPCL USE | MOVE | A | S | INJ | G | E | LICNS | PED | ACT | EVENT | CAUSE | | |
|--------|---|---|---|---|---|---|----------------------|----------------------|---------------|---------|-------------|-----------|----------|-------|----------|-----------|----------|------|--------|-------|-------|-------|-----|-------|-------|-------|-------|-------|-------|--|
| INVEST | E | A | U | I | C | O | DAY | DIST | FIRST STREET | RD CHAR | (MEDIAN) | INT-REL | OFFRD | WTHR | CRASH | TRLR QTY | MOVE | PRTC | INJ | G | E | LICNS | PED | ACT | EVENT | CAUSE | | | | |
| RD DPT | E | L | G | N | H | R | TIME | FROM | SECOND STREET | DIRECT | LEGS | TRAF- | RNDBT | SURF | COLL | OWNER | FROM | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE | | |
| UNLOC? | D | C | S | V | L | K | LAT | LONG | LRS | LOCTN | (#LANES) | CONTL | DRVWY | LIGHT | SVRTY | V# | TYPE | TO | P# | TYPE | SVRTY | E | X | RES | LOC | ERROR | ACT | EVENT | CAUSE | |
| 00557 | N | N | N | | | | 02/07/2014 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | SNOW | ANGL-STP | 01 | NONE | 0 | TURN-L | | | | | | | 124 | 08 | | | |
| NONE | | | | | | | FR | 0 | MELISSA AVE | S | | STOP SIGN | N | ICE | TURN | PRVTE | SE-S | | | | | | | | 000 | 124 | 00 | | | |
| N | | | | | | | 3P | | | 06 | 0 | | N | DAY | PDO | PSNGR CAR | | | 01 | DRVR | NONE | 59 | M | OR-Y | 002 | 017 | 08 | | | |
| N | | | | | | | 45 23 30.2562959 | -122 16 36.081048 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | 02 | NONE | 0 | STOP | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | PRVTE | S -N | | | 01 | DRVR | NONE | 57 | F | OR-Y | 000 | 011 | 00 | | |
| | | | | | | | | | | | | | | | | PSNGR CAR | | | | | | | | | | 000 | 000 | 00 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01045 | N | N | N | | | | 03/26/2015 | 16 | DUBARKO RD | INTER | 3-LEG | N | N | CLR | ANGL-OTH | 01 | NONE | 0 | STRGHT | | | | | | | | 02 | | | |
| NONE | | | | | | | TH | 0 | MELISSA AVE | CN | | STOP SIGN | N | DRY | TURN | PRVTE | NW-SE | | | | | | | | 000 | 00 | | | | |
| N | | | | | | | 8A | | | 04 | 0 | | N | DAWN | PDO | PSNGR CAR | | | 01 | DRVR | NONE | 23 | F | OR-Y | 000 | 000 | 00 | | | |
| N | | | | | | | 45 23 30.26 36.08 | -122 16 36.08 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | 02 | NONE | 0 | TURN-L | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | PRVTE | S -NW | | | | | | | | | 015 | 00 | | | |
| | | | | | | | | | | | | | | | | PSNGR CAR | | | 01 | DRVR | NONE | 00 | F | UNK | 028 | 000 | 02 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at MELISSA AVE, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

Page: 2

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CDS380
05/12/2019

CITY OF SANDY, CLACKAMAS COUNTY

OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING
DUBARKO RD at RUBEN LN, City of Sandy, Clackamas County, 01/01/2012 to 12/31/2016

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Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 538 PM Peak Hour Volumes: 103

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 5,380 | 8,850 | |
| Minor Street* | 1,030 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 5,380 | 13,300 | |
| Minor Street* | 1,030 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 5,380 | 10,640 | |
| Minor Street* | 1,030 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 248 PM Peak Hour Volumes: 19

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,480 | 8,850 | |
| Minor Street* | 190 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,480 | 13,300 | |
| Minor Street* | 190 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,480 | 10,640 | |
| Minor Street* | 190 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 84 PM Peak Hour Volumes: 113

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 840 | 8,850 | |
| Minor Street* | 1,130 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 840 | 13,300 | |
| Minor Street* | 1,130 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 840 | 10,640 | |
| Minor Street* | 1,130 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Morning Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 164 PM Peak Hour Volumes: 36

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 1,640 | 8,850 | |
| Minor Street* | 360 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 1,640 | 13,300 | |
| Minor Street* | 360 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 1,640 | 10,640 | |
| Minor Street* | 360 | 2,120 | No |

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: SE 362nd Drive Minor Street: Dubarko Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 1073 PM Peak Hour Volumes: 114

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 10,730 | 8,850 | |
| Minor Street* | 1,140 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 10,730 | 13,300 | |
| Minor Street* | 1,140 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 10,730 | 10,640 | |
| Minor Street* | 1,140 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Ruben Lane
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 374 PM Peak Hour Volumes: 116

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| Condition A: Minimum Vehicular Volume | | | |
| Major Street | 3,740 | 8,850 | |
| Minor Street* | 1,160 | 2,650 | No |
| Condition B: Interruption of Continuous Traffic | | | |
| Major Street | 3,740 | 13,300 | |
| Minor Street* | 1,160 | 1,350 | No |
| Combination Warrant | | | |
| Major Street | 3,740 | 10,640 | |
| Minor Street* | 1,160 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Melissa Avenue
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 287 PM Peak Hour Volumes: 68

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,870 | 8,850 | |
| Minor Street* | 680 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,870 | 13,300 | |
| Minor Street* | 680 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,870 | 10,640 | |
| Minor Street* | 680 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis

Project: 18197 - Ponder Subdivision
 Date: 6/20/2019
 Scenario: Year 2021 Buildout Conditions - Evening Peak Hour

Major Street: Dubarko Road Minor Street: Bluff Road
 Number of Lanes: 1 Number of Lanes: 1
 PM Peak Hour Volumes: 220 PM Peak Hour Volumes: 61

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

| Number of Lanes for Moving Traffic on Each Approach: | | ADT on Major St. (total of both approaches) | | ADT on Minor St. (higher-volume approach) | |
|--|-----------|---|--------------|---|--------------|
| Major St. | Minor St. | 100% Warrants | 70% Warrants | 100% Warrants | 70% Warrants |
| WARRANT 1, CONDITION A | | | | | |
| 1 | 1 | 8,850 | 6,200 | 2,650 | 1,850 |
| 2 or more | 1 | 10,600 | 7,400 | 2,650 | 1,850 |
| 2 or more | 2 or more | 10,600 | 7,400 | 3,550 | 2,500 |
| 1 | 2 or more | 8,850 | 6,200 | 3,550 | 2,500 |
| WARRANT 1, CONDITION B | | | | | |
| 1 | 1 | 13,300 | 9,300 | 1,350 | 950 |
| 2 or more | 1 | 15,900 | 11,100 | 1,350 | 950 |
| 2 or more | 2 or more | 15,900 | 11,100 | 1,750 | 1,250 |
| 1 | 2 or more | 13,300 | 9,300 | 1,750 | 1,250 |

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

| | Approach Volumes | Minimum Volumes | Is Signal Warrant Met? |
|--|------------------|-----------------|------------------------|
| Warrant 1 | | | |
| <i>Condition A: Minimum Vehicular Volume</i> | | | |
| Major Street | 2,200 | 8,850 | |
| Minor Street* | 610 | 2,650 | No |
| <i>Condition B: Interruption of Continuous Traffic</i> | | | |
| Major Street | 2,200 | 13,300 | |
| Minor Street* | 610 | 1,350 | No |
| <i>Combination Warrant</i> | | | |
| Major Street | 2,200 | 10,640 | |
| Minor Street* | 610 | 2,120 | No |

* Minor street right-turning traffic volumes reduced by 25%.

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout AM

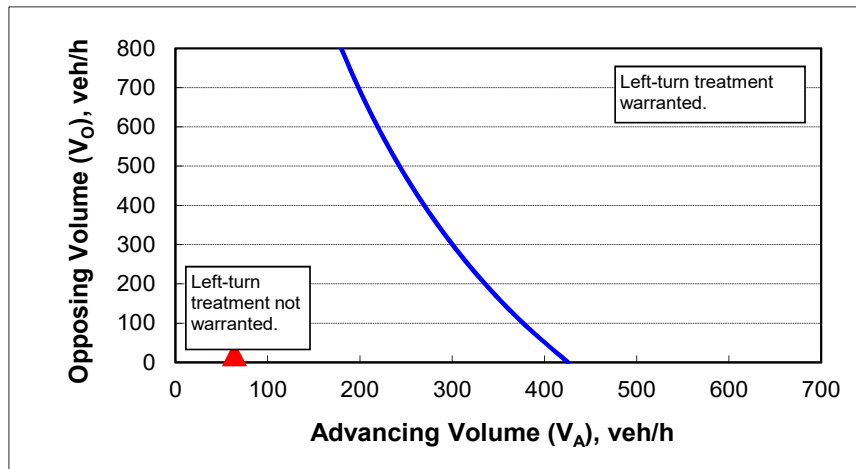
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 23 |
| Advancing volume (V_A), veh/h: | 64 |
| Opposing volume (V_O), veh/h: | 20 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 415 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

Left-Turn Lane Warrant Analysis

Project: 18197 - Ponder Subdivision
 Intersection: Melissa Avenue at Dubarko Road
 Date: 6/20/2019
 Scenario: 2021 Buildout PM

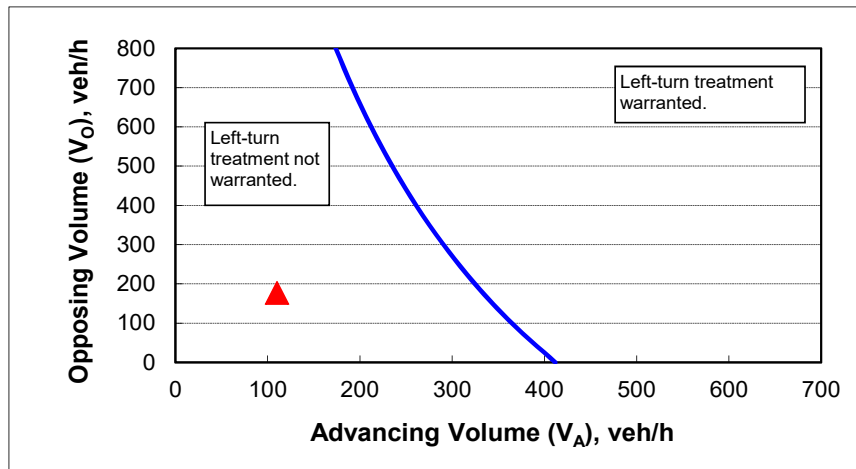
2-lane roadway (English)

INPUT

| Variable | Value |
|---|-------|
| 85 th percentile speed, mph: | 25 |
| Left-turns in advancing volume (V_A), veh/hr: | 48 |
| Advancing volume (V_A), veh/h: | 110 |
| Opposing volume (V_O), veh/h: | 177 |

OUTPUT

| Variable | Value |
|--|-------|
| Limiting advancing volume (V_A), veh/h: | 333 |
| Guidance for determining the need for a major-road left-turn bay: | |
| Left-turn treatment NOT warranted. | |



CALIBRATION CONSTANTS (2-Lane Roadway)

| Variable | Value |
|--|-------|
| Average time for making left-turn, s: | 3.0 |
| Critical headway, s: | 5.0 |
| Average time for left-turn vehicle to clear the advancing lane, s: | 1.9 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.1

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Future Vol, veh/h | 5 | 85 | 346 | 8 | 22 | 120 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 6 | 100 | 407 | 9 | 26 | 141 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 605 | 412 | 0 | 0 | 416 | 0 |
| Stage 1 | 412 | - | - | - | - | - |
| Stage 2 | 193 | - | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 | - |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 | - |
| Pot Cap-1 Maneuver | 462 | 642 | - | - | 1122 | - |
| Stage 1 | 671 | - | - | - | - | - |
| Stage 2 | 842 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 451 | 642 | - | - | 1122 | - |
| Mov Cap-2 Maneuver | 451 | - | - | - | - | - |
| Stage 1 | 671 | - | - | - | - | - |
| Stage 2 | 822 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 11.9 | 0 | 1.3 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 627 | 1122 | - |
| HCM Lane V/C Ratio | - | - | 0.169 | 0.023 | - |
| HCM Control Delay (s) | - | - | 11.9 | 8.3 | - |
| HCM Lane LOS | - | - | B | A | - |
| HCM 95th %tile Q(veh) | - | - | 0.6 | 0.1 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

Intersection

Int Delay, s/veh 1.6

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Future Vol, veh/h | 19 | 14 | 48 | 89 | 10 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 21 | 16 | 54 | 100 | 11 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 154 | 0 | - | 0 | 162 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 58 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1402 | - | - | - | 804 | 922 |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 937 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1402 | - | - | - | 792 | 922 |
| Mov Cap-2 Maneuver | - | - | - | - | 792 | - |
| Stage 1 | - | - | - | - | 893 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|-----|
| HCM Control Delay, s | 4.4 | 0 | 9.4 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1402 | - | - | - | 836 |
| HCM Lane V/C Ratio | 0.015 | - | - | - | 0.022 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 9.4 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

05/28/2019

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 5.5 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | |
| Traffic Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Future Vol, veh/h | 8 | 1 | 14 | 39 | 40 | 27 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 18 | 49 | 51 | 34 |

| Major/Minor | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 96 |
| Stage 1 | - | - | - | - | 11 |
| Stage 2 | - | - | - | - | 85 |
| Critical Hdwy | - | - | 4.12 | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 903 |
| Stage 1 | - | - | - | - | 1012 |
| Stage 2 | - | - | - | - | 938 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 892 |
| Mov Cap-2 Maneuver | - | - | - | - | 892 |
| Stage 1 | - | - | - | - | 1012 |
| Stage 2 | - | - | - | - | 927 |

| Approach | EB | WB | NB |
|----------------------|----|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.1 |
| HCM LOS | | | A |

| Minor Lane/Major Mvmt | NBLn1 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 956 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.089 | - | - | 0.011 | - |
| HCM Control Delay (s) | 9.1 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Future Vol, veh/h | 25 | 9 | 12 | 11 | 40 | 55 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 36 | 13 | 17 | 16 | 57 | 79 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.7 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 42% | 0% | 52% |
| Vol Thru, % | 0% | 74% | 48% |
| Vol Right, % | 58% | 26% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 95 | 34 | 23 |
| LT Vol | 40 | 0 | 12 |
| Through Vol | 0 | 25 | 11 |
| RT Vol | 55 | 9 | 0 |
| Lane Flow Rate | 136 | 49 | 33 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.145 | 0.057 | 0.04 |
| Departure Headway (Hd) | 3.844 | 4.21 | 4.435 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 927 | 844 | 801 |
| Service Time | 1.892 | 2.267 | 2.495 |
| HCM Lane V/C Ratio | 0.147 | 0.058 | 0.041 |
| HCM Control Delay | 7.6 | 7.5 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.2 | 0.1 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Future Vol, veh/h | 20 | 91 | 270 | 17 | 170 | 516 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 22 | 99 | 293 | 18 | 185 | 561 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1233 | 303 | 0 | 0 | 312 | 0 |
| Stage 1 | 303 | - | - | - | - | - |
| Stage 2 | 930 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 195 | 737 | - | - | 1254 | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 384 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 166 | 737 | - | - | 1254 | - |
| Mov Cap-2 Maneuver | 166 | - | - | - | - | - |
| Stage 1 | 749 | - | - | - | - | - |
| Stage 2 | 327 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 15.7 | 0 | 2.1 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 455 | 1254 | - |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.147 | - |
| HCM Control Delay (s) | - | - | 15.7 | 8.4 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.5 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

05/28/2019

Intersection

Int Delay, s/veh 3.1

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Future Vol, veh/h | 16 | 147 | 68 | 50 | 67 | 33 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 18 | 165 | 76 | 56 | 75 | 37 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 133 | 0 | - | 0 | 305 | 104 |
| Stage 1 | - | - | - | - | 104 | - |
| Stage 2 | - | - | - | - | 201 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1458 | - | - | - | 689 | 953 |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 835 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1458 | - | - | - | 679 | 953 |
| Mov Cap-2 Maneuver | - | - | - | - | 679 | - |
| Stage 1 | - | - | - | - | 923 | - |
| Stage 2 | - | - | - | - | 823 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.7 | 0 | 10.6 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1458 | - | - | - | 750 |
| HCM Lane V/C Ratio | 0.012 | - | - | - | 0.15 |
| HCM Control Delay (s) | 7.5 | 0 | - | - | 10.6 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.5 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

05/28/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Future Vol, veh/h | 85 | 47 | 22 | 58 | 21 | 16 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 100 | 55 | 26 | 68 | 25 | 19 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 155 | 0 | 248 | 128 |
| Stage 1 | - | - | - | - | 128 | - |
| Stage 2 | - | - | - | - | 120 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1438 | - | 745 | 927 |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 910 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1438 | - | 731 | 927 |
| Mov Cap-2 Maneuver | - | - | - | - | 731 | - |
| Stage 1 | - | - | - | - | 903 | - |
| Stage 2 | - | - | - | - | 893 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 2.1 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 805 | - | - | 1438 | - |
| HCM Lane V/C Ratio | 0.054 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.5 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

05/28/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.4 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Future Vol, veh/h | 19 | 89 | 23 | 16 | 56 | 24 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 22 | 105 | 27 | 19 | 66 | 28 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.2 | 7.6 | 7.7 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 70% | 0% | 59% |
| Vol Thru, % | 0% | 18% | 41% |
| Vol Right, % | 30% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 80 | 108 | 39 |
| LT Vol | 56 | 0 | 23 |
| Through Vol | 0 | 19 | 16 |
| RT Vol | 24 | 89 | 0 |
| Lane Flow Rate | 94 | 127 | 46 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.109 | 0.127 | 0.055 |
| Departure Headway (Hd) | 4.175 | 3.606 | 4.282 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 853 | 983 | 829 |
| Service Time | 2.228 | 1.668 | 2.345 |
| HCM Lane V/C Ratio | 0.11 | 0.129 | 0.055 |
| HCM Control Delay | 7.7 | 7.2 | 7.6 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.4 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 2.5 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Future Vol, veh/h | 9 | 101 | 367 | 9 | 27 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 11 | 119 | 432 | 11 | 32 | 149 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---------------|---|-------|
| | Minor1 | Major1 | Major2 | | |
| Conflicting Flow All | 650 | 437 | 0 | 0 | 442 |
| Stage 1 | 437 | - | - | - | - |
| Stage 2 | 213 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 435 | 622 | - | - | 1097 |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 825 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 422 | 622 | - | - | 1097 |
| Mov Cap-2 Maneuver | 422 | - | - | - | - |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 801 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 12.7 | 0 | 1.5 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 599 | 1097 |
| HCM Lane V/C Ratio | - | - | 0.216 | 0.029 |
| HCM Control Delay (s) | - | - | 12.7 | 8.4 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 0.8 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.5

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Future Vol, veh/h | 20 | 20 | 66 | 101 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 22 | 74 | 113 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 188 | 0 | - | 0 | 198 | 131 |
| Stage 1 | - | - | - | - | 131 | - |
| Stage 2 | - | - | - | - | 67 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1362 | - | - | - | 766 | 890 |
| Stage 1 | - | - | - | - | 869 | - |
| Stage 2 | - | - | - | - | 929 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1362 | - | - | - | 754 | 890 |
| Mov Cap-2 Maneuver | - | - | - | - | 754 | - |
| Stage 1 | - | - | - | - | 869 | - |
| Stage 2 | - | - | - | - | 914 | - |

Approach EB WB SB

HCM Control Delay, s 3.8 0 9.7
HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1362 | - | - | - | 790 |
| HCM Lane V/C Ratio | 0.016 | - | - | - | 0.028 |
| HCM Control Delay (s) | 7.7 | 0 | - | - | 9.7 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 5.6

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Future Vol, veh/h | 8 | 1 | 15 | 41 | 42 | 29 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 1 | 19 | 52 | 53 | 37 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|-------|---|-------|-------|
| Conflicting Flow All | 0 | 0 | 11 | 0 | 101 | 11 |
| Stage 1 | - | - | - | - | 11 | - |
| Stage 2 | - | - | - | - | 90 | - |
| Critical Hdwy | - | - | 4.12 | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 | 3.318 |
| Pot Cap-1 Maneuver | - | - | 1608 | - | 898 | 1070 |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 934 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1608 | - | 887 | 1070 |
| Mov Cap-2 Maneuver | - | - | - | - | 887 | - |
| Stage 1 | - | - | - | - | 1012 | - |
| Stage 2 | - | - | - | - | 923 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|-----|
| HCM Control Delay, s | 0 | 1.9 | 9.2 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 954 | - | - | 1608 | - |
| HCM Lane V/C Ratio | 0.094 | - | - | 0.012 | - |
| HCM Control Delay (s) | 9.2 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.3 | - | - | 0 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Future Vol, veh/h | 27 | 10 | 19 | 12 | 42 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 39 | 14 | 27 | 17 | 60 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.6 | 7.8 | 7.6 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 41% | 0% | 61% |
| Vol Thru, % | 0% | 73% | 39% |
| Vol Right, % | 59% | 27% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 102 | 37 | 31 |
| LT Vol | 42 | 0 | 19 |
| Through Vol | 0 | 27 | 12 |
| RT Vol | 60 | 10 | 0 |
| Lane Flow Rate | 146 | 53 | 44 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.156 | 0.062 | 0.055 |
| Departure Headway (Hd) | 3.864 | 4.233 | 4.475 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 919 | 838 | 794 |
| Service Time | 1.923 | 2.299 | 2.54 |
| HCM Lane V/C Ratio | 0.159 | 0.063 | 0.055 |
| HCM Control Delay | 7.6 | 7.6 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.2 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

| Intersection | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh | 3.4 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Future Vol, veh/h | 23 | 105 | 287 | 22 | 191 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 25 | 114 | 312 | 24 | 208 | 596 |

| Major/Minor | Minor1 | Major1 | Major2 | | |
|----------------------|--------|--------|--------|---|-------|
| Conflicting Flow All | 1335 | 324 | 0 | 0 | 336 |
| Stage 1 | 324 | - | - | - | - |
| Stage 2 | 1011 | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 |
| Pot Cap-1 Maneuver | 169 | 717 | - | - | 1229 |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 352 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 140 | 717 | - | - | 1229 |
| Mov Cap-2 Maneuver | 140 | - | - | - | - |
| Stage 1 | 733 | - | - | - | - |
| Stage 2 | 292 | - | - | - | - |

| Approach | WB | NB | SB |
|----------------------|------|----|-----|
| HCM Control Delay, s | 18.1 | 0 | 2.2 |
| HCM LOS | C | | |

| Minor Lane/Major Mvmt | NBT | NBRWBLn1 | SBL | SBT |
|-----------------------|-----|----------|-------|-------|
| Capacity (veh/h) | - | - | 412 | 1229 |
| HCM Lane V/C Ratio | - | - | 0.338 | 0.169 |
| HCM Control Delay (s) | - | - | 18.1 | 8.5 |
| HCM Lane LOS | - | - | C | A |
| HCM 95th %tile Q(veh) | - | - | 1.5 | 0.6 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

| Intersection | | | | | | |
|--------------------------|--------|--------|--------|------|-------|-------|
| Int Delay, s/veh | 3.2 | | | | | |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Future Vol, veh/h | 17 | 171 | 82 | 57 | 78 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 192 | 92 | 64 | 88 | 39 |
| Major/Minor | Major1 | Major2 | Minor2 | | | |
| Conflicting Flow All | 156 | 0 | - | 0 | 354 | 124 |
| Stage 1 | - | - | - | - | 124 | - |
| Stage 2 | - | - | - | - | 230 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1430 | - | - | - | 646 | 929 |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 811 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1430 | - | - | - | 636 | 929 |
| Mov Cap-2 Maneuver | - | - | - | - | 636 | - |
| Stage 1 | - | - | - | - | 904 | - |
| Stage 2 | - | - | - | - | 799 | - |
| Approach | EB | WB | SB | | | |
| HCM Control Delay, s | 0.7 | 0 | 11.2 | | | |
| HCM LOS | | | B | | | |
| Minor Lane/Major Mvmt | EBL | EBT | WBT | WBR | SBLn1 | |
| Capacity (veh/h) | 1430 | - | - | - | - | 705 |
| HCM Lane V/C Ratio | 0.013 | - | - | - | - | 0.18 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | - | 11.2 |
| HCM Lane LOS | A | A | - | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | - | 0.7 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 2.1

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Future Vol, veh/h | 90 | 50 | 23 | 62 | 22 | 17 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 59 | 27 | 73 | 26 | 20 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 165 | 0 | 262 | 135 |
| Stage 1 | - | - | - | - | 135 | - |
| Stage 2 | - | - | - | - | 127 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1426 | - | 731 | 919 |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 904 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1426 | - | 716 | 919 |
| Mov Cap-2 Maneuver | - | - | - | - | 716 | - |
| Stage 1 | - | - | - | - | 896 | - |
| Stage 2 | - | - | - | - | 886 | - |

Approach EB WB NB

| | | | |
|----------------------|---|---|-----|
| HCM Control Delay, s | 0 | 2 | 9.8 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 792 | - | - | 1426 | - |
| HCM Lane V/C Ratio | 0.058 | - | - | 0.019 | - |
| HCM Control Delay (s) | 9.8 | - | - | 7.6 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.2 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.6 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↷ | |
| Traffic Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Future Vol, veh/h | 20 | 94 | 28 | 17 | 59 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 24 | 111 | 33 | 20 | 69 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.3 | 7.7 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 66% | 0% | 62% |
| Vol Thru, % | 0% | 18% | 38% |
| Vol Right, % | 34% | 82% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 90 | 114 | 45 |
| LT Vol | 59 | 0 | 28 |
| Through Vol | 0 | 20 | 17 |
| RT Vol | 31 | 94 | 0 |
| Lane Flow Rate | 106 | 134 | 53 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.122 | 0.135 | 0.063 |
| Departure Headway (Hd) | 4.162 | 3.631 | 4.314 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 854 | 975 | 822 |
| Service Time | 2.222 | 1.7 | 2.385 |
| HCM Lane V/C Ratio | 0.124 | 0.137 | 0.064 |
| HCM Control Delay | 7.8 | 7.3 | 7.7 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.4 | 0.5 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 3 | | | | | |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Y | | T | | T | T |
| Traffic Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Future Vol, veh/h | 15 | 117 | 367 | 11 | 33 | 127 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 2 | 2 | 6 | 6 |
| Mvmt Flow | 18 | 138 | 432 | 13 | 39 | 149 |

Major/Minor

| | | | | | |
|----------------------|---------------|---------------|---|---------------|-------|
| | Minor1 | Major1 | | Major2 | |
| Conflicting Flow All | 665 | 438 | 0 | 0 | 445 |
| Stage 1 | 438 | - | - | - | - |
| Stage 2 | 227 | - | - | - | - |
| Critical Hdwy | 6.41 | 6.21 | - | - | 4.16 |
| Critical Hdwy Stg 1 | 5.41 | - | - | - | - |
| Critical Hdwy Stg 2 | 5.41 | - | - | - | - |
| Follow-up Hdwy | 3.509 | 3.309 | - | - | 2.254 |
| Pot Cap-1 Maneuver | 427 | 621 | - | - | 1094 |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 813 | - | - | - | - |
| Platoon blocked, % | | | - | - | - |
| Mov Cap-1 Maneuver | 412 | 621 | - | - | 1094 |
| Mov Cap-2 Maneuver | 412 | - | - | - | - |
| Stage 1 | 653 | - | - | - | - |
| Stage 2 | 784 | - | - | - | - |

Approach

| | | | |
|----------------------|-----------|-----------|-----------|
| | WB | NB | SB |
| HCM Control Delay, s | 13.3 | 0 | 1.7 |
| HCM LOS | B | | |

Minor Lane/Major Mvmt

| | | | | |
|-----------------------|------------|-----------------|------------|------------|
| | NBT | NBRWBLn1 | SBL | SBT |
| Capacity (veh/h) | - | - | 587 | 1094 |
| HCM Lane V/C Ratio | - | - | 0.265 | 0.035 |
| HCM Control Delay (s) | - | - | 13.3 | 8.4 |
| HCM Lane LOS | - | - | B | A |
| HCM 95th %tile Q(veh) | - | - | 1.1 | 0.1 |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 1.3

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Future Vol, veh/h | 20 | 28 | 88 | 112 | 14 | 6 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 6 | 6 | 2 | 2 | 13 | 13 |
| Mvmt Flow | 22 | 31 | 99 | 126 | 16 | 7 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 225 | 0 | - | 0 | 238 | 162 |
| Stage 1 | - | - | - | - | 162 | - |
| Stage 2 | - | - | - | - | 76 | - |
| Critical Hdwy | 4.16 | - | - | - | 6.53 | 6.33 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.53 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.53 | - |
| Follow-up Hdwy | 2.254 | - | - | - | 3.617 | 3.417 |
| Pot Cap-1 Maneuver | 1320 | - | - | - | 727 | 855 |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 920 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1320 | - | - | - | 715 | 855 |
| Mov Cap-2 Maneuver | - | - | - | - | 715 | - |
| Stage 1 | - | - | - | - | 841 | - |
| Stage 2 | - | - | - | - | 904 | - |

Approach EB WB SB

HCM Control Delay, s 3.2 0 9.9
HCM LOS A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|------|
| Capacity (veh/h) | 1320 | - | - | - | 752 |
| HCM Lane V/C Ratio | 0.017 | - | - | - | 0.03 |
| HCM Control Delay (s) | 7.8 | 0 | - | - | 9.9 |
| HCM Lane LOS | A | A | - | - | A |
| HCM 95th %tile Q(veh) | 0.1 | - | - | - | 0.1 |

HCM 2010 TWSC
3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

| | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| Int Delay, s/veh | 6.6 | | | | | |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Future Vol, veh/h | 8 | 12 | 23 | 41 | 75 | 51 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 79 | 79 | 79 | 79 | 79 | 79 |
| Heavy Vehicles, % | 22 | 22 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 10 | 15 | 29 | 52 | 95 | 65 |

Major/Minor

| | Major1 | Major2 | Minor1 | Minor2 | Minor3 |
|----------------------|--------|--------|--------|--------|--------|
| Conflicting Flow All | 0 | 0 | 25 | 0 | 128 |
| Stage 1 | - | - | - | - | 18 |
| Stage 2 | - | - | - | - | 110 |
| Critical Hdwy | - | - | 4.12 | - | 6.42 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.42 |
| Critical Hdwy Stg 2 | - | - | - | - | 5.42 |
| Follow-up Hdwy | - | - | 2.218 | - | 3.518 |
| Pot Cap-1 Maneuver | - | - | 1589 | - | 866 |
| Stage 1 | - | - | - | - | 1005 |
| Stage 2 | - | - | - | - | 915 |
| Platoon blocked, % | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1589 | - | 850 |
| Mov Cap-2 Maneuver | - | - | - | - | 850 |
| Stage 1 | - | - | - | - | 1005 |
| Stage 2 | - | - | - | - | 898 |

Approach

| | EB | WB | NB |
|----------------------|----|-----|-----|
| HCM Control Delay, s | 0 | 2.6 | 9.7 |
| HCM LOS | | | A |

Minor Lane/Major Mvmt

| | NBLn1 | EBT | EBR | WBL | WBT |
|-----------------------|-------|-----|-----|-------|-----|
| Capacity (veh/h) | 924 | - | - | 1589 | - |
| HCM Lane V/C Ratio | 0.173 | - | - | 0.018 | - |
| HCM Control Delay (s) | 9.7 | - | - | 7.3 | 0 |
| HCM Lane LOS | A | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.6 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.8 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Future Vol, veh/h | 41 | 18 | 19 | 17 | 45 | 60 |
| Peak Hour Factor | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |
| Heavy Vehicles, % | 12 | 12 | 9 | 9 | 4 | 4 |
| Mvmt Flow | 59 | 26 | 27 | 24 | 64 | 86 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|-----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.8 | 7.9 | 7.8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 43% | 0% | 53% |
| Vol Thru, % | 0% | 69% | 47% |
| Vol Right, % | 57% | 31% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 105 | 59 | 36 |
| LT Vol | 45 | 0 | 19 |
| Through Vol | 0 | 41 | 17 |
| RT Vol | 60 | 18 | 0 |
| Lane Flow Rate | 150 | 84 | 51 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.164 | 0.099 | 0.064 |
| Departure Headway (Hd) | 3.944 | 4.224 | 4.488 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 897 | 838 | 788 |
| Service Time | 2.024 | 2.302 | 2.572 |
| HCM Lane V/C Ratio | 0.167 | 0.1 | 0.065 |
| HCM Control Delay | 7.8 | 7.8 | 7.9 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.6 | 0.3 | 0.2 |

HCM 2010 TWSC
1: SE 362nd Drive & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.9

Movement WBL WBR NBT NBR SBL SBT

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | Y | | Y | | Y | Y |
| Traffic Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Future Vol, veh/h | 27 | 116 | 287 | 28 | 210 | 548 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Stop | Stop | Free | Free | Free | Free |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 0 | - | - | - | 115 | - |
| Veh in Median Storage, # | 0 | - | 0 | - | - | 0 |
| Grade, % | 0 | - | 0 | - | - | 0 |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 1 | 1 |
| Mvmt Flow | 29 | 126 | 312 | 30 | 228 | 596 |

Major/Minor Minor1 Major1 Major2

| | | | | | | |
|----------------------|-------|-------|---|---|-------|---|
| Conflicting Flow All | 1379 | 327 | 0 | 0 | 342 | 0 |
| Stage 1 | 327 | - | - | - | - | - |
| Stage 2 | 1052 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.11 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.209 | - |
| Pot Cap-1 Maneuver | 159 | 714 | - | - | 1223 | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 336 | - | - | - | - | - |
| Platoon blocked, % | | | - | - | - | - |
| Mov Cap-1 Maneuver | 129 | 714 | - | - | 1223 | - |
| Mov Cap-2 Maneuver | 129 | - | - | - | - | - |
| Stage 1 | 731 | - | - | - | - | - |
| Stage 2 | 273 | - | - | - | - | - |

Approach WB NB SB

| | | | |
|----------------------|------|---|-----|
| HCM Control Delay, s | 20.5 | 0 | 2.4 |
| HCM LOS | C | | |

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

| | | | | | |
|-----------------------|---|---|-------|-------|---|
| Capacity (veh/h) | - | - | 385 | 1223 | - |
| HCM Lane V/C Ratio | - | - | 0.404 | 0.187 | - |
| HCM Control Delay (s) | - | - | 20.5 | 8.6 | - |
| HCM Lane LOS | - | - | C | A | - |
| HCM 95th %tile Q(veh) | - | - | 1.9 | 0.7 | - |

HCM 2010 TWSC
2: Dubarko Road & Ruben Lane

06/06/2019

Intersection

Int Delay, s/veh 3.2

Movement EBL EBT WBT WBR SBL SBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | | ↕ | ↕ | | ↕ | |
| Traffic Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Future Vol, veh/h | 17 | 196 | 97 | 64 | 90 | 35 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | - | 0 | 0 | - | 0 | - |
| Grade, % | - | 0 | 0 | - | 0 | - |
| Peak Hour Factor | 89 | 89 | 89 | 89 | 89 | 89 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 19 | 220 | 109 | 72 | 101 | 39 |

Major/Minor Major1 Major2 Minor2

| | | | | | | |
|----------------------|-------|---|---|---|-------|-------|
| Conflicting Flow All | 181 | 0 | - | 0 | 403 | 145 |
| Stage 1 | - | - | - | - | 145 | - |
| Stage 2 | - | - | - | - | 258 | - |
| Critical Hdwy | 4.11 | - | - | - | 6.41 | 6.21 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.41 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.41 | - |
| Follow-up Hdwy | 2.209 | - | - | - | 3.509 | 3.309 |
| Pot Cap-1 Maneuver | 1400 | - | - | - | 605 | 905 |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 787 | - |
| Platoon blocked, % | | - | - | - | | |
| Mov Cap-1 Maneuver | 1400 | - | - | - | 596 | 905 |
| Mov Cap-2 Maneuver | - | - | - | - | 596 | - |
| Stage 1 | - | - | - | - | 885 | - |
| Stage 2 | - | - | - | - | 775 | - |

Approach EB WB SB

| | | | |
|----------------------|-----|---|------|
| HCM Control Delay, s | 0.6 | 0 | 11.9 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

| | | | | | |
|-----------------------|-------|---|---|---|-------|
| Capacity (veh/h) | 1400 | - | - | - | 659 |
| HCM Lane V/C Ratio | 0.014 | - | - | - | 0.213 |
| HCM Control Delay (s) | 7.6 | 0 | - | - | 11.9 |
| HCM Lane LOS | A | A | - | - | B |
| HCM 95th %tile Q(veh) | 0 | - | - | - | 0.8 |

HCM 2010 TWSC
 3: Melissa Avenue & Dubarko Road

06/06/2019

Intersection

Int Delay, s/veh 3.3

Movement EBT EBR WBL WBT NBL NBR

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| Lane Configurations | ↶ | | | ↷ | ↶ | ↷ |
| Traffic Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Future Vol, veh/h | 90 | 87 | 48 | 62 | 44 | 32 |
| Conflicting Peds, #/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, # | 0 | - | - | 0 | 0 | - |
| Grade, % | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 85 | 85 | 85 | 85 | 85 | 85 |
| Heavy Vehicles, % | 1 | 1 | 0 | 0 | 0 | 0 |
| Mvmt Flow | 106 | 102 | 56 | 73 | 52 | 38 |

Major/Minor Major1 Major2 Minor1

| | | | | | | |
|----------------------|---|---|------|---|-----|-----|
| Conflicting Flow All | 0 | 0 | 208 | 0 | 343 | 157 |
| Stage 1 | - | - | - | - | 157 | - |
| Stage 2 | - | - | - | - | 186 | - |
| Critical Hdwy | - | - | 4.1 | - | 6.4 | 6.2 |
| Critical Hdwy Stg 1 | - | - | - | - | 5.4 | - |
| Critical Hdwy Stg 2 | - | - | - | - | 5.4 | - |
| Follow-up Hdwy | - | - | 2.2 | - | 3.5 | 3.3 |
| Pot Cap-1 Maneuver | - | - | 1375 | - | 657 | 894 |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 851 | - |
| Platoon blocked, % | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | - | - | 1375 | - | 629 | 894 |
| Mov Cap-2 Maneuver | - | - | - | - | 629 | - |
| Stage 1 | - | - | - | - | 876 | - |
| Stage 2 | - | - | - | - | 815 | - |

Approach EB WB NB

| | | | |
|----------------------|---|-----|------|
| HCM Control Delay, s | 0 | 3.4 | 10.7 |
| HCM LOS | | | B |

Minor Lane/Major Mvmt NBLn1 EBT EBR WBL WBT

| | | | | | |
|-----------------------|-------|---|---|-------|---|
| Capacity (veh/h) | 719 | - | - | 1375 | - |
| HCM Lane V/C Ratio | 0.124 | - | - | 0.041 | - |
| HCM Control Delay (s) | 10.7 | - | - | 7.7 | 0 |
| HCM Lane LOS | B | - | - | A | A |
| HCM 95th %tile Q(veh) | 0.4 | - | - | 0.1 | - |

HCM 2010 AWSC
4: Dubarko Road & Bluff Road

06/06/2019

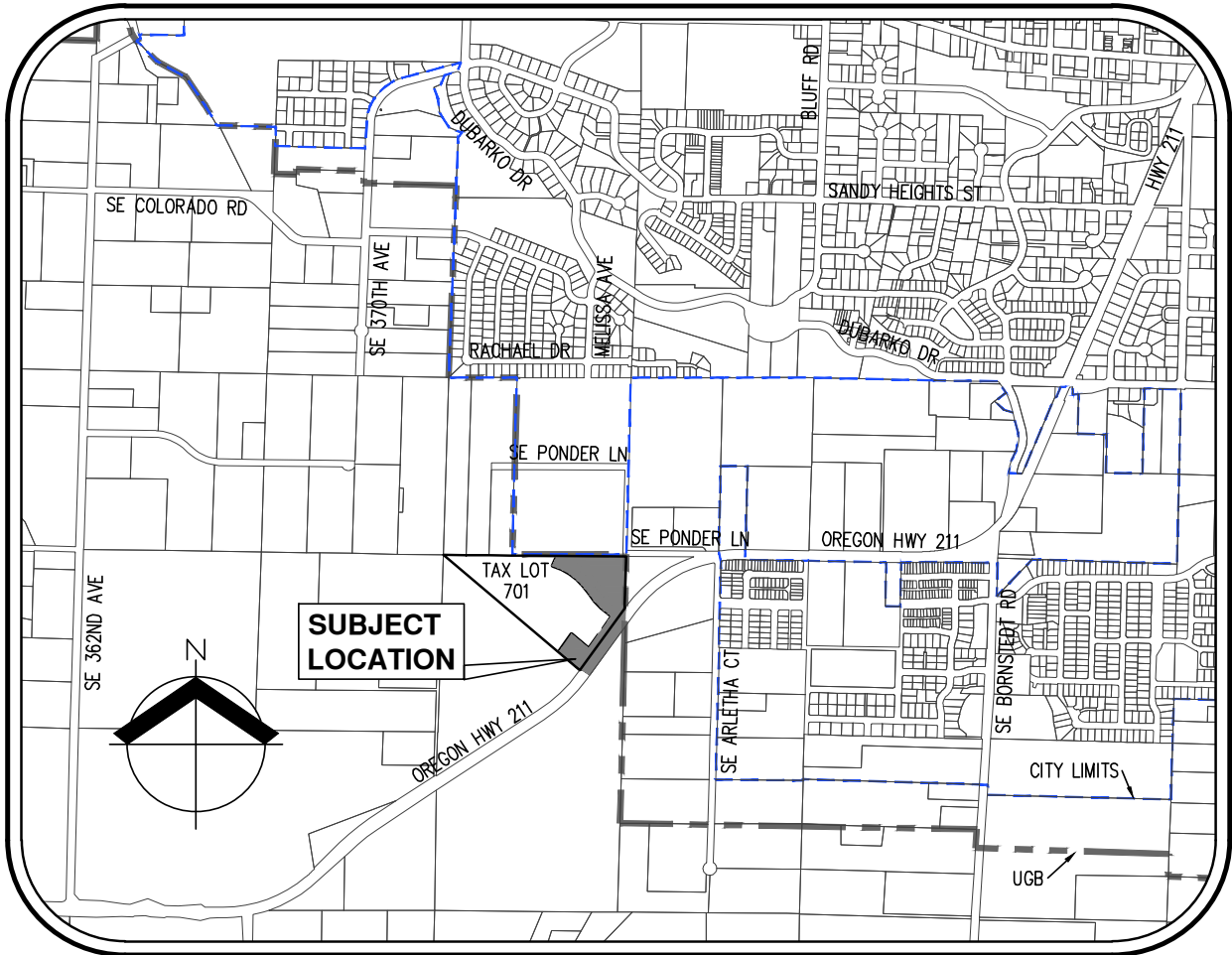
| Intersection | |
|---------------------------|-----|
| Intersection Delay, s/veh | 7.7 |
| Intersection LOS | A |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---------------------|------|------|------|------|------|------|
| Lane Configurations | ↔ | | | ↔ | ↔ | |
| Traffic Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Future Vol, veh/h | 29 | 100 | 28 | 33 | 68 | 31 |
| Peak Hour Factor | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Heavy Vehicles, % | 0 | 0 | 0 | 0 | 1 | 1 |
| Mvmt Flow | 34 | 118 | 33 | 39 | 80 | 36 |
| Number of Lanes | 1 | 0 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB |
|----------------------------|-----|-----|----|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | | NB | EB |
| Conflicting Lanes Left | 0 | 1 | 1 |
| Conflicting Approach Right | NB | | WB |
| Conflicting Lanes Right | 1 | 0 | 1 |
| HCM Control Delay | 7.5 | 7.8 | 8 |
| HCM LOS | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 |
|------------------------|-------|-------|-------|
| Vol Left, % | 69% | 0% | 46% |
| Vol Thru, % | 0% | 22% | 54% |
| Vol Right, % | 31% | 78% | 0% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 99 | 129 | 61 |
| LT Vol | 68 | 0 | 28 |
| Through Vol | 0 | 29 | 33 |
| RT Vol | 31 | 100 | 0 |
| Lane Flow Rate | 116 | 152 | 72 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.137 | 0.156 | 0.086 |
| Departure Headway (Hd) | 4.249 | 3.695 | 4.316 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 833 | 955 | 819 |
| Service Time | 2.33 | 1.78 | 2.401 |
| HCM Lane V/C Ratio | 0.139 | 0.159 | 0.088 |
| HCM Control Delay | 8 | 7.5 | 7.8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.6 | 0.3 |

EXHIBIT D



VICINITY MAP
NOT TO SCALE



AKS ENGINEERING & FORESTRY, LLC
12965 SW Herman Road, Suite 100, Tualatin, OR 97062
P: (503) 563-6151 | www.aks-eng.com

AKS Job #7107

OFFICES IN: BEND, OR - KEIZER, OR - TUALATIN, OR - VANCOUVER, WA

EXHIBIT A

Legal Description

A tract of land, and a portion of right-of-way, located in the Northeast One-Quarter of Section 23, Township 2 South, Range 4 East, Willamette Meridian, Clackamas County, Oregon, and being more particularly described as follows:

Commencing at the northeast corner of Parcel 1 of Partition Plat 2018-030, Clackamas County Plat Records; thence along the north line of Document Number 93-28438, Clackamas County Deed Records, South 89°52'25" East 823.67 feet to the Point of Beginning; thence continuing along said north line, South 89°52'25" East 495.53 feet to the northeast corner of said deed; thence along the east line of said deed and the southerly extension thereof, South 01°24'04" West 532.91 feet to the southeasterly right-of-way line of Woodburn-Sandy Highway (40.00 feet from centerline); thence along said southeasterly right-of-way line, South 35°02'39" West 438.40 feet; thence leaving said southeasterly right-of-way line, North 54°57'21" West 80.00 feet to the northwesterly right-of-way line of Woodburn-Sandy Highway (40.00 feet from centerline), also being the southwesterly corner of said deed; thence along the southwesterly line of said deed, North 49°21'56" West 200.96 feet; thence leaving said southwesterly line, North 35°02'39" East 150.72 feet; thence South 49°21'56" East 160.76 feet to a line which is parallel with and 40.00 feet northwesterly of, when measured at right angles to, said northwesterly right-of-way line; thence along said parallel line, North 35°02'39" East 295.25 feet; thence leaving said parallel line, North 54°57'21" West 25.00 feet; thence along a curve to the right with a Radius of 533.00 feet, a Delta of 23°05'54", a Length of 214.88 feet, and a Chord of North 43°24'23" West 213.42 feet; thence along a curve to the left with a Radius of 467.00 feet, a Delta of 41°16'55", a Length of 336.48 feet, and a Chord of North 52°29'54" West 329.25 feet to a point of non-tangency (Radial Bearing of South 16°51'38" West); thence North 23°37'27" East 93.53 feet to the Point of Beginning.

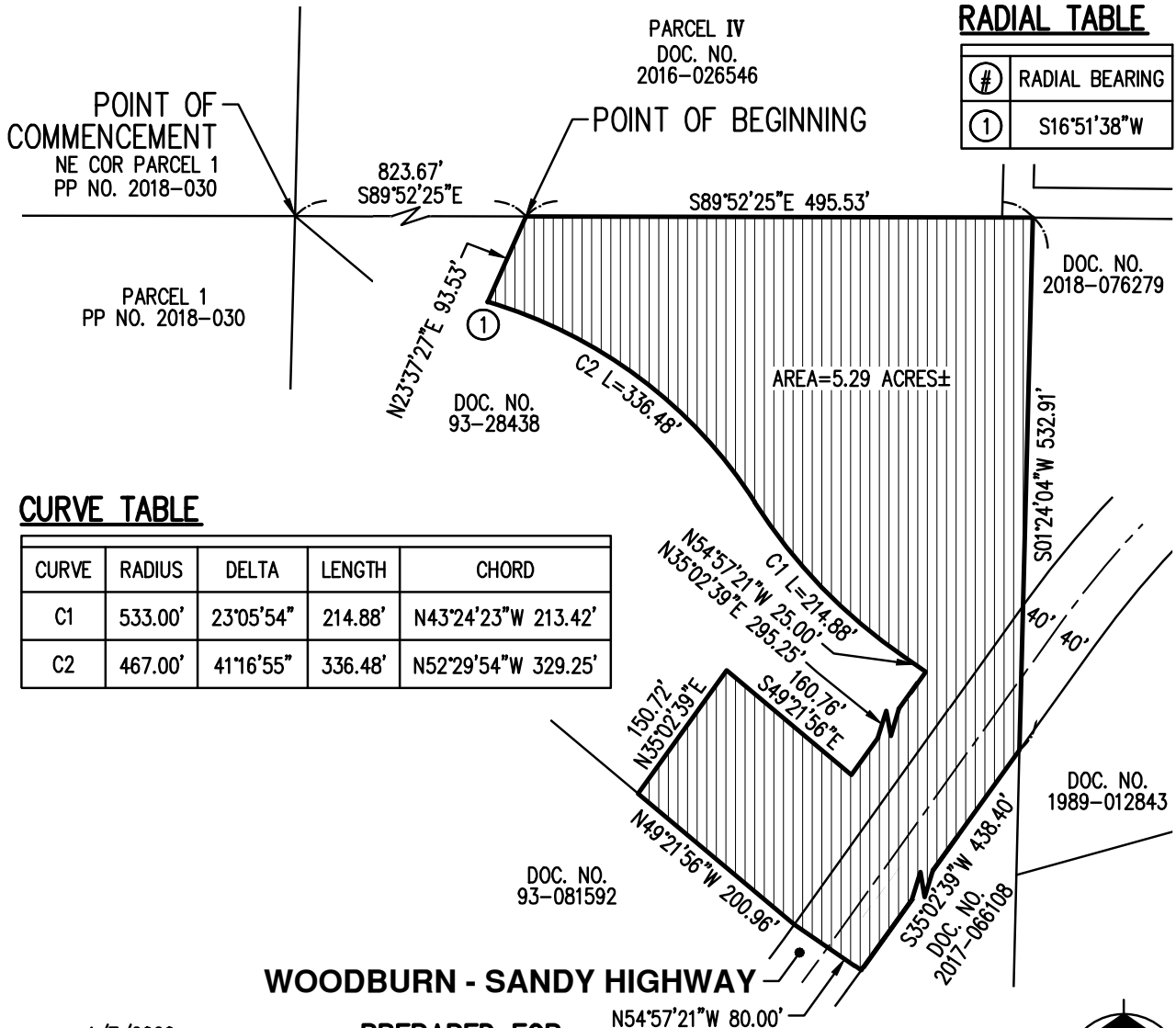
The above described tract of land contains 5.29 acres, more or less.

1/7/2020



EXHIBIT B

A TRACT OF LAND, AND A PORTION OF RIGHT-OF-WAY,
 LOCATED IN THE NORTHEAST 1/4 OF SECTION 23,
 TOWNSHIP 2 SOUTH, RANGE 4 EAST, WILLAMETTE MERIDIAN,
 CLACKAMAS COUNTY, OREGON



RADIAL TABLE

| # | RADIAL BEARING |
|---|----------------|
| ① | S16°51'38"W |

CURVE TABLE

| CURVE | RADIUS | DELTA | LENGTH | CHORD |
|-------|---------|-----------|---------|---------------------|
| C1 | 533.00' | 23°05'54" | 214.88' | N43°24'23"W 213.42' |
| C2 | 467.00' | 41°16'55" | 336.48' | N52°29'54"W 329.25' |

1/7/2020

REGISTERED
 PROFESSIONAL
 LAND SURVEYOR

Benjamin R Huff

OREGON
 MARCH 14, 2017
 BENJAMIN R HUFF
 84738PLS

RENEWS: 6/30/21

PREPARED FOR

ALLIED HOMES & DEVELOPMENT
 12042 SE SUNNYSIDE ROAD, SUITE 706
 CLACKAMAS, OR 97015

N54°57'21"W 80.00'

SCALE: 1" = 150 FEET

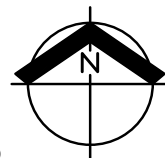
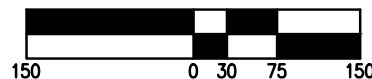


EXHIBIT MAP

AKS ENGINEERING & FORESTRY, LLC
 12965 SW HERMAN RD, STE 100
 TUALATIN, OR 97062
 503.563.6151 WWW.AKS-ENG.COM



EXHIBIT
B

DRWN: WCB
 CHKD: BRH

AKS JOB:
 7107

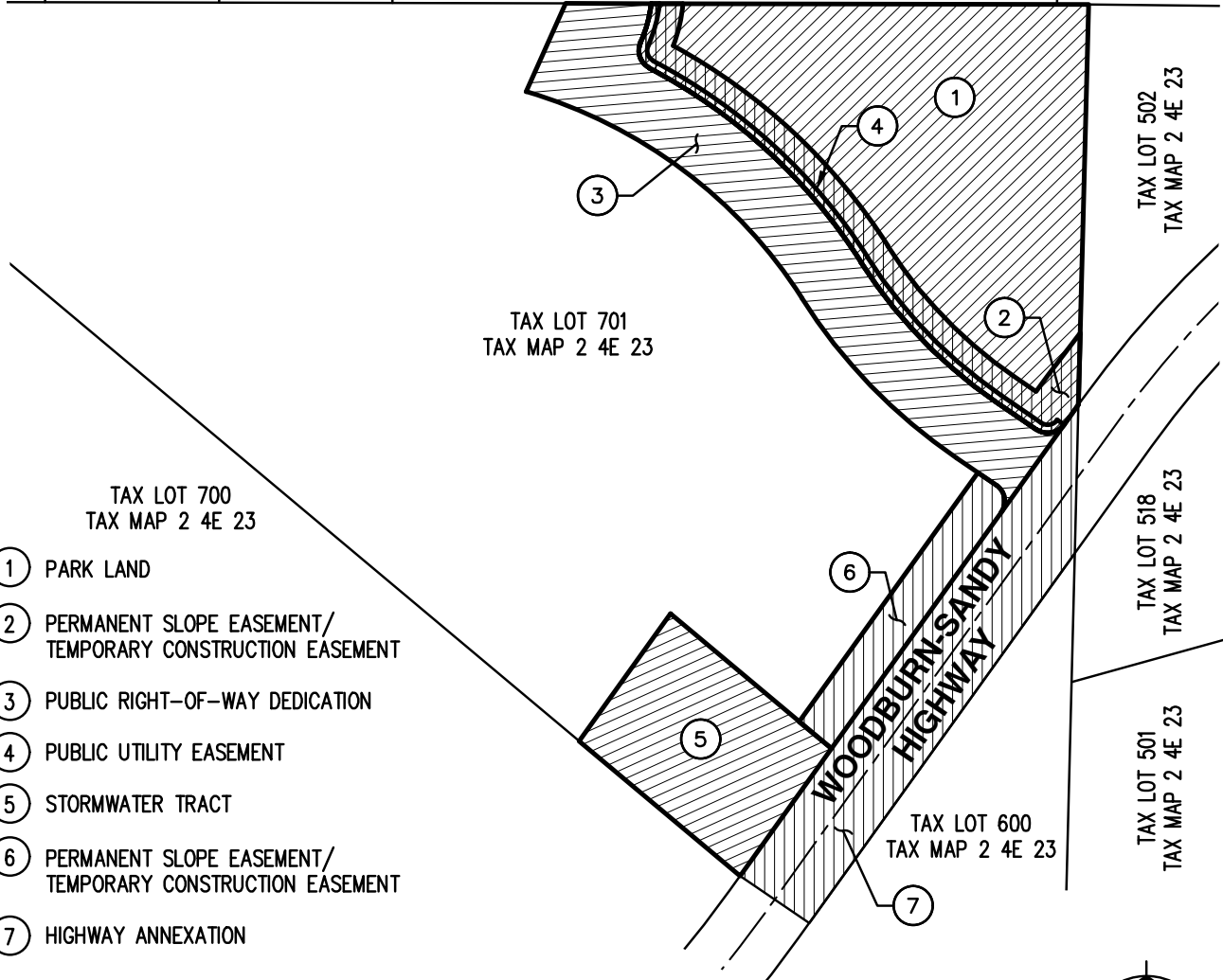
EXHIBIT KEY MAP

TAX LOT 807
TAX MAP 2 4E 23

TAX LOT 800
TAX MAP 2 4E 23

TAX LOT 803
TAX MAP 2 4E 23

PONDER LANE



TAX LOT 502
TAX MAP 2 4E 23

TAX LOT 701
TAX MAP 2 4E 23

TAX LOT 700
TAX MAP 2 4E 23

TAX LOT 518
TAX MAP 2 4E 23

TAX LOT 501
TAX MAP 2 4E 23

TAX LOT 600
TAX MAP 2 4E 23

- ① PARK LAND
- ② PERMANENT SLOPE EASEMENT/
TEMPORARY CONSTRUCTION EASEMENT
- ③ PUBLIC RIGHT-OF-WAY DEDICATION
- ④ PUBLIC UTILITY EASEMENT
- ⑤ STORMWATER TRACT
- ⑥ PERMANENT SLOPE EASEMENT/
TEMPORARY CONSTRUCTION EASEMENT
- ⑦ HIGHWAY ANNEXATION

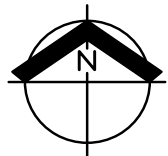
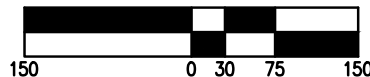
1/7/2020

REGISTERED
PROFESSIONAL
LAND SURVEYOR

PREPARED FOR

ALLIED HOMES & DEVELOPMENT
12042 SE SUNNYSIDE ROAD, SUITE 706
CLACKAMAS, OR 97015

SCALE: 1" = 150 FEET



Benjamin R Huff
OREGON
MARCH 14, 2017
BENJAMIN R HUFF
84738PLS

RENEWS: 6/30/21

SE PONDER LANE - SANDY

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD, STE 100
TUALATIN, OR 97062
503.563.6151 WWW.AKS-ENG.COM



EXHIBIT
KEY

DRWN: WCB
CHKD: BRH
AKS JOB:
7107

1. Existing Intersection Location



- Intersection not usable for new development given available width, very flat skew angle of approach, and topography.
- Rebuilding a new street and intersection in this location would involve properties that are not under control of the applicant or the City of Sandy

3. Proposed Alignment



Looking South



Looking North

- Location is far enough south to have adequate sight distance looking back to the north toward the curve. Excellent sight lines looking south.
- Superelevation is minimal due to location south of curve.

2. TSP-Identified Alignment



Looking North



Looking South



- Sight distance limited by horizontal and vertical curves in both directions. Sight distance is particularly poor for the future south leg, which would connect to Cascadia Village Drive.
- Superelevation (banking of the roadway around the curve) is very steep and makes this location problematic for an intersection due to difficult turning and crossing movements across the steep curve.

EXHIBIT E

REPLINGER & ASSOCIATES LLC TRANSPORTATION ENGINEERING

January 20, 2020

Mr. Kelly O'Neill
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

**SUBJECT: REVIEW OF TRANSPORTATION IMPACT ANALYSIS – BAILEY MEADOWS
SUBDIVISION**

Dear Kelly:

In response to your request, I have reviewed materials submitted in support of the Bailey Meadows Subdivision. The materials consisted of the Transportation Impact Analysis (TIA) for the Bailey Meadows Subdivision and TIA Addendum #1. The TIA is dated June 20, 2019 and Addendum #1 is dated January 6, 2020. Both were prepared under the direction of Todd Mobley, PE of Lancaster Engineering.

The TIA and Addendum describe a proposal to construct a 100-lot subdivision of single-family dwellings. The site is in the southwest part of Sandy, south of Dubarko Road and north of Highway 211. The proposed accesses are Melissa Avenue to the north and a new extension of Gunderson Road to the south. The original TIA evaluated access to the north only; the Addendum provides additional information including an analysis dependent on an extension of Gunderson Road and a new intersection with Highway 211.

The comments below focus on the revised proposal with the new extension of Gunderson Road and the connection with Highway 211 as described in the Addendum.

Overall

I find the TIA and Addendum address the city's requirements and provide an adequate basis to evaluate impacts of the proposed development.

Comments

1. Study Area. The study addresses the appropriate intersections. It includes analyses of:

- SE 362nd Drive at Dubarko Road
- Ruben Lane at Dubarko Road
- Melissa Avenue at Dubarko Road
- Bluff Road at Dubarko Road
- Gunderson Road at Highway 211

- 2. Traffic Counts.** The AM and PM peak hour traffic counts for the first four intersections listed above were conducted on April and May 2019. The counts for Highway 211 were conducted in December 2018. The engineer adjusted the December traffic counts on Highway 211 to account for seasonal variations according to the procedures defined by the Oregon Department of Transportation (ODOT). The Highway 211 counts were also adjusted to reflect 2019 base conditions by applying an annual growth factor of 2.8 percent. The counts and adjustments appear reasonable.
- 3. Trip Generation.** The TIA uses trip generation for single-family houses from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The calculations of trip generation were based on 100 single-family dwellings. The engineer calculates that the 100-unit subdivision would produce 74 new AM peak hour trips; 99 PM new peak hour trips; and 994 new daily trips. The calculation of trips generated by the subdivision appears reasonable.
- 4. Trip Distribution.** The TIA and Addendum provide information about trip distribution from the site. As described above, the original proposal relied upon Melissa Avenue for the exclusive access to the site; the Addendum describes the subdivision with both a north and south access. As described in the Addendum, the engineer assumed 30 percent of the traffic would travel to and from the north on 362nd Drive via Dubarko Road; 20 percent would travel to and from the north on Ruben Lane via Dubarko Road; 25 percent would travel to and from the north on Bluff Road via Dubarko Road; 15 percent would travel to and from the east on Dubarko Road; and 10 percent would travel to and from the southwest on Highway 211.

As described in detail in the Addendum, the engineer also accounted for changes in travel patterns because of the new connection provided using Melissa Avenue and Gunderson Road through the subdivision. Traffic generated by existing developments north of the new subdivision would have the option of connecting with Highway 211 via Melissa Avenue and the new Gunderson Road extension. Likewise, traffic traveling into Sandy from the southwest on Highway 211 could use the new Gunderson Road extension to access Dubarko Road, Ruben Lane and other destinations to the north. The engineer specifically accounts for the rerouting of existing traffic due to the new connections as well as the traffic from the proposed development and use of Melissa Avenue and the new Gunderson Road extension.

The trip distribution and rerouting due to new connections seem reasonable.

- 5. Traffic Growth.** The TIA uses a 2 percent annual increase for facilities under the jurisdiction of the City of Sandy. For Highway 211, the engineer used a 2.8 percent annual growth rate based on ODOT's Future Volume Tables. In addition, the TIA specifically accounts for the recently approved Sandyplace apartment complex on Dubarko Road. Background volumes

Mr. Kelly O'Neill
January 20, 2020
Page 3

were prepared for 2022, the year in which the development is expected to be completed. These assumptions account for future traffic and appear reasonable.

- 6. Analysis.** Traffic volumes were calculated for the intersections cited in #1, above. Intersection level-of-service (LOS) and the volume-to-capacity (v/c) ratio were provided. ODOT uses the v/c ratio for its standard of intersection performance. Performance of the intersections was calculated for existing 2019 conditions; 2022 background conditions; and 2022 conditions with the proposed subdivision.

All five study area intersections are calculated to meet applicable City and ODOT performance standards. The intersections are calculated to operate at level of service (LOS) "C" or better during both the AM and PM peak hours. The new intersection of Gunderson Road at Highway 211 is calculated to operate at LOS "B" with a volume to capacity (v/c) ratio of 0.08 during the AM and PM peak hours. This easily meets ODOT's performance standard.

The engineer recommends no mitigation for traffic from this proposal. I concur.

- 7. Crash Information.** The TIA provides information on crashes for the most recent available five-year period (2012 through 2016). For the five-year period, 1 crash was reported at the SE 362nd Drive/Dubarko Road intersection. Two crashes were reported at the Melissa Avenue /Dubarko Road intersection. The calculated crash rate at both intersections is low and the engineer determined that the crash rates are not indicative of safety deficiencies or design flaws. He did not recommend mitigation for safety issues. I concur.

- 8. Subdivision Access.** The site plan provides for two access points: Melissa Avenue to the north and an extension of Gunderson Road connecting to Highway 211 to the south.

The Addendum provides a detailed discussion of the concept described in the Transportation System Plan (TSP) that provides for an extension of Gunderson Road an intersection with Highway 211 and an extension to the east to connect with Cascadia Village Drive. As described in the Addendum, the TSP "shows a planning-level depiction of the Gunderson Road extension." The Addendum further explains that "upon closer investigation and engineering analysis, it was determined that the alignment shown on the TSP was not feasible for construction of an intersection with Highway 211, primarily due to poor sight distance, the need for a perpendicular intersection, and a very steep super-elevated roadway section."

The Addendum describes the selection of a suitable location for a new intersection on Highway 211 to the southwest that was far enough from the curves on Highway 211 to provide adequate sight distance and avoid the super-elevated roadway section. As noted in the Addendum, the selected location is outside the current City of Sandy urban growth boundary (UGB). The Addendum further describes the proposal to expand the UGB to

Mr. Kelly O'Neill
January 20, 2020
Page 4

include the proposed roadway. The Addendum notes that a remnant parcel of approximately 2.38 acres would thus be included in the UGB. The applicant proposed this remnant be utilized as a neighborhood park with no parking facilities. As such, it would produce no new traffic, but would be accessed by walking and bicycling.

9. Left-Turn Lane and Signal Warrants. The engineer analyzed the subject intersections for left-turn lanes using standard methods based on traffic volumes, travel speeds, and lanes.

For the new, proposed intersection Highway 211 and Gunderson Road, the engineer concludes that a left turn lane was warranted. He notes that a left-turn lane is a safety consideration because it removes left-turning vehicles from the through traffic lane. He recommends that a left-turn lane be constructed in connection with the Gunderson Road/Highway 211 intersection. I concur.

He also analyzed traffic signal warrants at the study area intersections. Traffic signal warrants are not met at any locations including the new, proposed Gunderson Road/Highway 211 intersection.

10. OAR 660-12-0060 Transportation Planning Rule (TPR). The engineer provides a detailed response to the criteria specified in the TPR. He explains that the proposed amendment to expand the UGB does not change the functional classification of any transportation facility and does not increase developable property that will increase trip generation. He concludes that the proposal helps to implement a project specified in the TSP. I think his argument is sound and supported by the analysis.

11. OAR 660-024-0065 Establishment of Study Area to Evaluate Land for Inclusion in the UGB. The Addendum provides a detailed analysis of this section of the OAR's. The engineer argues that the location proposed for the new intersection is "dictated by engineering standards that must be satisfied for a safe and efficient intersection location." I think the engineer provides a reasonable explanation and justification for the UGB expansion.

12. Conclusions and Recommendations. The engineer concludes that traffic operations will be acceptable at all study area intersections. The southern access to the subdivision is dependent on constructing a segment of Gunderson Road, which is specified in the TSP. The engineering analysis described in the Addendum explains why the location for the proposed Gunderson Road/Highway 211 intersection was selected. The Addendum provides justification for an expansion of the UGB and explains that the proposal complies with the TPR. The engineer recommends the installation of a left-turn lane on Highway 211 for the new intersection of Gunderson Road and Highway 211. I concur with these conclusions and the engineer's recommendations.

Mr. Kelly O'Neill
January 20, 2020
Page 5

Conclusion and Recommendations

I find the TIA and Addendum meet City requirements. The TIA and Addendum demonstrate that the development can be accommodated with a north access using Melissa Avenue and a south access using a new extension of Gunderson Road with an intersection with Highway 211.

I recommend approval of the subdivision with conditions that assure the dedication of all appropriate rights-of-way and the construction of the Gunderson Road extension and the intersection of Gunderson Road and Highway 211, with a left-turn lane on Highway 211. Furthermore, all construction involving facilities under the jurisdiction of the Oregon Department of Transportation shall be performed to ODOT standards and specifications.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

A handwritten signature in blue ink that reads "John Replinger". The signature is written in a cursive, flowing style.

John Replinger, PE
Principal

BaileyMeadowsSubdTIA012020

EXHIBIT F

City of Sandy
Planning Division/Commission
Sandy, OR

Date: Feb 2, 2020

Re: UGB Expansion – File No. 20-002 Gunderson Road and Park

I understand one agenda item for the February 11, 2020 Sandy Planning Commission meeting is the Allied Homes and Development proposal to expand the Sandy UGB by approximately 5.29 acres for the purpose of Gunderson road improvements/expansion from HWY 211 into their proposed 100 home Bailey Meadows subdivision plus reserve land for a public park.

I would like to acknowledge my full support of the proposed UGB expansion. This is something that should have been included in the original UGB expansion at this location. The 5.29 acre UGB expansion will help accommodate the additional traffic from the subdivision's 200-250 additional automobiles to help comply with the City of Sandy TSP. The allocation of future acreage for a neighborhood park is also very much needed and appreciated.

Thank you,

Paul Savage
37506 Rachael Drive
Sandy, OR 97055