

EXHIBIT L

REPLINGER & ASSOCIATES LLC TRANSPORTATION ENGINEERING

October 19, 2021

Ms. Shelley Denison
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

**SUBJECT: REVIEW OF TRANSPORTATION IMPACT STUDY – THE PAD
TOWNHOME APARTMENT DEVELOPMENT**

Dear Shelley:

In response to your request, I have reviewed materials submitted in support of The Pad Townhome Apartment Development on Highway 211 in the south part of Sandy. The Transportation Impact Study (TIS), dated August 25, 2020, was prepared under the direction of Michael Ard, PE of Ard Engineering. A plan set, dated 7/16/2021, was also provided.

The site, with approximately 0.59 acres, is on the east side of Highway 211 between Pioneer Boulevard and opposite Tupper Road. According to the TIS, the property is zoned R-3 (High-Density Residential).

Overall

TIS addresses the city's requirements and provides adequate information to assess the impacts of the proposed development.

Comments

1. Study Area. The study includes analyses of:

- Pioneer Boulevard at Highway 211;
- Highway 211 at City Hall/Joe's Donuts driveway; and
- Highway 211 at Tupper Road/proposed site driveway.

The study addresses the appropriate intersections.

2. Traffic Counts. The AM and PM peak hour traffic counts at the study area intersections were developed from historical counts conducted on US 26 and on

Highway 211 during 2019. These historical counts were utilized because current counts were thought to be unrepresentative of actual conditions due to the COVID-19 pandemic and altered travel. The engineer developed 30th highest hour traffic volumes at the subject intersections.

The traffic counts used in the analysis appear reasonable.

- 3. Trip Generation.** The TIS uses trip generation for multi-family dwellings (land use code 220) from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The engineer calculates that the 12-townhome development would produce 6 AM peak hour trips; 7 PM peak hour trips; and 88 total daily trips. The calculation of trips generated by the residential development appears reasonable.
- 4. Trip Distribution.** The TIS provided information about trip distribution from the site. The engineer assumed 55 percent of the traffic would travel to and from the west on US 26; 25 percent would travel to and from the east on US 26; and 20 percent would travel to and from the south on Highway 211. Because the site access is anticipated to be restricted to right-in, right-out movements, the engineer indicates some traffic will pass through the study area intersections more than once to accomplish their trips. The trip distribution appears reasonable.
- 5. Traffic Growth.** The TIS utilizes traffic volumes for 2020 and 2022 developed for the Bull Run Terrace TIS. That TIS use a 1.96 percent annual increase for US 26 and 3.16 percent for Highway 211. The assumptions used in the referenced study 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. The intersection of Pioneer Boulevard and Highway 211 is signalized; the other two intersections are stop-controlled. The analyses were conducted for existing 2020 conditions, 2022 background conditions, and 2022 with the development.

The engineer calculates that the signalized intersection of Pioneer Boulevard and Highway 211 meets the v/c standards specified by ODOT under all scenarios. The intersections of Highway 211 with the City Hall/Joe's Donuts driveway and with Tupper Road/proposed site access are calculated to operate at LOS B under existing conditions. The performance is calculated to deteriorate slightly with background traffic growth and with the development, but both intersections are calculated to

operate at LOS B or C during all scenarios, meeting the city's operational standards. The engineer correctly concludes that the intersections will operate acceptably and meet applicable standards with or without the development.

The engineer also conducted a queuing analysis focused on the intersection of Pioneer Boulevard and Highway 211, a signalized intersection. He reports that both the City Hall/Joe's Donuts driveway and the intersection of Highway 211 and Tupper Road fall within the 95th percentile queue for northbound traffic at the intersection during both the AM and PM peak hours. He also reports that the Tupper Road intersection is outside the average queue for the peak hours.

The engineer discusses the use of a median barrier on the major street to prevent turning movements across the centerline and the use of "pork-chop" islands to direct traffic to permissible movements from the side street approaches.

The engineer makes the following recommendation:

If sufficient width can be made available to accommodate a raised center median within Highway 211, it is recommended that the median be installed in conjunction with the proposed development. If a center median cannot be constructed within Highway 211, it is recommended that the site access be limited to right-in, right-out only through the installation of a "pork-chop" diverter within the new driveway approach.

I agree with the engineer's conclusion about the operation of the intersections meeting applicable standards and think his recommendation for restricting turns at the unsignalized intersections is well-founded. I have no information about the right-of-way or other issues associated with implementing a barrier median along Highway 211 from Pioneer Boulevard to south of Tupper Road.

- 7. *Analysis of Local Street Impacts.*** The TIS did not address the impact on local streets since the only connection proposed for the development is to Highway 211, which is not a local street.
- 8. *Crash Information.*** The TIA provides information on crashes for the most recent available five-year period covering 2013 through 2017.

At the intersection of Pioneer Boulevard and Highway 211, there were ten reported and a relatively low crash rate (0.256 crashes per million entering vehicles). There

were no reported crashes at other study area intersections. The engineer did not identify any safety concerns and did not recommend safety mitigations.

9. Site Plan and Access. The TIS provided a detailed analysis of three alternatives for access to the site. These were: sharing access with the City Hall/Joe's Donuts driveway; a new driveway at the north end of the parcel and adjacent to the City Hall/Joe's Donuts driveway; and an access near the middle of the site opposite the intersection of Tupper Road. He provides an explanation of the attributes, advantages, and disadvantages of each option. He concludes that the access opposite Tupper Road is preferable to the others. I agree that this is the best of the alternatives.

10. Sight Distance. The engineer analyzed sight distance at the proposed site access. For northbound traffic, the posted speed is 40 mph which yields a recommended sight distance of 445 feet. He measured sight distance to be in excess of 600 feet. For southbound traffic, the posted speed is 25 mph which yields a recommended sight distance of 280 feet. He measured sight distance to be 330 feet. He concludes sight distance is adequate.

11. Traffic Signal Warrants. The engineer conducted a traffic signal warrant analysis and concluded that traffic signal warrants were not met at either of the unsignalized locations.

12. Turn Lane Warrants. The engineer analyzed the potential need for left-turn lanes and for right-turn lanes at the unsignalized locations. He concluded that no new turn lanes are recommended in conjunction with the proposed development.

13. Conclusions and Recommendations. The engineer concludes that the study area intersections will operate acceptably and meet applicable operational standards with or without the proposed development.

Because the 95th percentile queue for northbound traffic on Highway 211 at Pioneer Boulevard extends beyond the intersection of Tupper Road and the proposed site access, the engineer recommends installation of a barrier median if sufficient space can be made available to accommodate it. If not, he recommends the site access be restricted to right-in, right-out movements with the installation of a "pork-chop" island at the site access.

Ms. Shelley Denison
October 19, 2021
Page 5

The engineer found low crash rates at study area intersections and identified no safety issues requiring mitigation. He concluded sight distance is adequate.

Of the three access locations he examined, he recommended access be taken opposite Tupper Road.

Conclusion and Recommendations

I concur with the engineer's conclusion that the study area intersections will operate acceptably and meet applicable operational standards with or without the development. I concur with his recommendation that access be taken to Highway 211 opposite Tupper Road and with his conclusion that sight distance is adequate.

I think the engineer makes a good argument for installation of a barrier median to avoid left turns at the intersection of Highway 211 with City Hall/Joe's Donuts driveway and the intersection of Highway 211 with Tupper Road and the proposed site driveway. Having turning movements within the area of queues for a signalized intersection can cause operational and safety problems. As growth occurs within the city, queues can be expected to increase at this location.

As for a barrier median, I have no information about the right-of-way or other issues associated with implementing a barrier median along Highway 211 from Pioneer Boulevard to south of Tupper Road. I think the engineer's alternative solution, the installation of a "pork-chop" island at the site access in lieu of a barrier median, is a reasonable possibility.

I do not see a need for the conditions of approval for the development to include off-site mitigation for operational or safety issues.

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