

MEMORANDUM

DATE: December 2, 2019
TO: Steve Miller, Emerio Design
FROM: Dana Beckwith, PE, PTOE
 Richard Martin, EIT

SUBJECT: 23000 & 23010 SW Bland Circle Trip Generation and Safety Evaluation

This memorandum summarizes the existing conditions, trip generation, crash and sight distance evaluation for the proposed development located at 23000 and 23010 SW Bland Circle in West Linn, Oregon. The evaluation is done in support of a new 15-lot subdivision.

The trip generation is based on the current Institute of Transportation Engineer’s (ITE) *Trip Generation Manual, 10th Edition*. Crash data was obtained from the Oregon Department of Transportation’s Online Crash Data Reporting website. The sight distance evaluation is based on the American Association of State Highway and Transportation Official’s (AASHTO) *Geometric Design of Highway and Streets, 2011*.

PROJECT DESCRIPTION

The proposed subdivision at 23000 and 23010 SW Bland Circle is located with an area of West Linn zoned as R-7 single family residential detach and attached housing. Figure 1 shows the proposed site plan for the development. The development is a conforming land use per the City of West Linn Municipal Code Section 12 and consists of 14 new and one existing single-family dwelling units. The new subdivision will have a single access point onto Bland Circle, north of Fircrest Drive until such time further development occurs and a future internal roadway access can be created.

EXISTING CONDITIONS

An inventory of the existing transportation conditions was conducted along Salamo Road and Bland Circle within the project vicinity. All modes of travel including pedestrians, bicycles, transit, and motor vehicles were included. The Salamo Road / Bland Circle intersections is both stop controlled and provides full access onto Bland Circle.

Table 1: Existing Study Area Roadway Conditions

Roadway	Roadway Functional Class ¹	Posted Speed Limit	Sidewalks	Bike Facilities	Road Geometry	On-Street Parking	Transit Route
Salamo Road	Minor Arterial	35 mph	Both sides	Both sides	One lane in each direction, separated by a 20’ wide median. (≈18’ travel lane)	No	No
Bland Circle	Neighborhood Route	25 mph	South side	No	One lane in each direction. (≈32’ total cross section)	No	No

¹ Based on the City of West Linn Transportation System Plan.



Figure 1: Site Vicinity

Bland Circle is improved where recent development has improved roadways to meet City standards. Approximately 155 feet north of the site access, beyond the site boundaries, Bland Circle is essentially an unimproved one-lane roadway with speeds anticipated to be well below 25 mph.

TRIP GENERATION

Trip rates presented in the Institute of Transportation Engineer’s (ITE) *Trip Generation Manual, Tenth Edition*, were utilized to estimate the number of vehicle trips per dwelling unit that are anticipated to be generated by the site. The trip generation is based on the ITE Single-Family Detached Housing land use (ITE Code 210) for weekdays during the peak hour of adjacent street traffic. Table 2 summarizes the estimated trip generation for the site.

Table 2: Trip Generation Summary

Land Use	Dwelling Units	Weekday						
		ADT ²	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
<i>Single-Family Detached Housing (ITE 210)</i>								
Generation Rate Per Dwelling Units ¹	Each	9.44	0.74	25%	75%	0.99	63%	37%
Existing Site Trips	1	9	1	0	1	1	1	0
New Site Trips	14	133	10	2	8	14	9	5
Total Trips	15	142	11	2	9	15	10	5

¹ Source: *Trip Generation Manual, Tenth Edition*, ITE, 2017, Average Rates.

² Average Daily Trips

As summarized in Table 2, it is estimated that 133 new daily trips including 10 AM peak hour trips and 14 PM peak hour trips will be added to the local street network due to the proposed development. Based on the current roadway network, traffic patterns and location of commercial, retail and institutional (schools and public offices) development to the north and south, it is reasonable to anticipate traffic will distribute evenly along Bland Circle to access Salamo Road to points north and along Tannler Road to Blankenship Road to points south.

CRASH DATA

Reported crash data summarized by the State of Oregon for local roadways was reviewed for the Bland Circle / Salamo Road intersection. Crash data from January 1, 2013 to December 31, 2018 was reviewed. It was found that three crashes have occurred at the intersection. One rear end crash for northbound traveling vehicles, one angle crash with a vehicle turning north from Bland Circle and a third fixed object crash. No apparent pattern (repeat crashes) are present based on the evaluation. The three crashes over the evaluation period do not indicate there is an on-going safety issue at the intersection. Detailed crash data has been attached in Appendix A.

SIGHT DISTANCE EVALUATION

This sight distance evaluation was conducted to verify the stopping sight distance for traffic approaching the intersection of Bland Circle at Salamo Road and intersection sight distance for traffic turning out of the proposed site onto Bland Circle.

Intersection sight distance is the minimum clear distance needed for drivers to anticipate and avoid collisions while determining whether to proceed through an intersection. The intersection sight distance evaluation assumes vehicles traveling at 40 mph along Salamo Road based on a speed survey¹ and 25 mph along Bland Circle based on the posted speed limit and the proposed site plan frontage improvements. For both analyses, the driver's eye is measured at a height of 3.5 feet, an approaching object height of 3.5 feet, and a driver setback of 14.5 feet from the existing traveled way. Intersection sight distance was compared to the AASHTO design intersection sight distance for the following cases:

- Case B1, Left Turn from the Minor Road²
- Case B2, Right Turn from the Minor Road³

Stopping sight distance for each intersection was also compared to the AASHTO Design Standards⁴. The sight distance evaluation is summarized in Table 3.

¹ Based on 85th percentile speed determined in tube counts, attached in the Appendix.

² AASHTO, Case B1 – Intersections with stop control on the minor road (AASHTO, Case B1, Table 9-6).

³ AASHTO, Case B2 – Intersections with stop control on the minor road (AASHTO, Case B2, Table 9-8).

⁴ AASHTO Stopping Sight Distance, Exhibit 3-1.

Table 3: Sight Distance Evaluation

Sight Distance Evaluated	Available Sightline (ft)		Sight Distance Standard (ft)	Meets Standard?
Bland Circle at Salamo Road				
Case B1: Left-turn	To the right	400	390	Yes
	To the left	680	390	Yes
Case B2: Right-turn	400		335	Yes
SSD Northbound Vehicle	680		250	Yes
SSD Southbound Vehicle	390		250	Yes
Bland Circle at Site Access				
Case B1: Left-turn	To the right	260	280	No
	To the left	240	280	No
Case B2: Right-turn	240		240	Yes
SSD Northbound Vehicle	>155		155	Yes
SSD Southbound Vehicle	>155		155	Yes

As summarized in Table 1, intersection sight distance is met for both left- and right-turning vehicles at the Bland Circle / Salamo Road intersection. Figures 2 and 3 show the existing view from the driver’s eye location on the Bland Circle approach. ISD to the left was found to just meet the standard, so maintenance of vegetation around the roadway curve should be made a priority by the City to continue meeting the standard.

Figures 4 and 5 show the existing view from the driver’s eye location at the proposed Site Access. The driver’s eye location was estimated in the field due to embankments. Intersection sight distance at the site access is not met for Case B1 (left-turn from the minor side street). However, stopping sight distance is met for both directions based on the current plans. Although intersection sight distance is not met, it is anticipated that with further development, sight lines will be improved as roadways are constructed to meet City standards.

FINDINGS

The current site evaluation identifies that the proposed development will generate an estimated 142 average daily trips, of which 9 are existing today. These trips are forecasted to utilize the intersections of Bland Circle / Salamo Road and Tannler Road / Blankenship Road to access commercial, retail and educational facilities beyond the neighborhood.

A safety evaluation consisting of a crash data review and a sight distance evaluation did not identify areas of concern at the Bland Circle / Salamo Road intersection. A sight distance evaluation at the Bland Circle / Site Access intersection identified that intersection sight distance for a left turning vehicle from the side street is not met but is anticipated to improve as new development occurs to the north and as Bland Circle is improved to meet City standards. All other sight distance measures were met.



Figure 2: View North from Bland Circle Approach



Figure 3: View south from Bland Circle approach



Figure 4: View North from Site Access



Figure 5: View South from Site Access

Appendix

Appendix A: Crash Data

