



Cumulus Avenue Zone Change & Apartments

Traffic Impact Analysis
McMinnville, Oregon

Date:

June 28, 2017

Prepared for:

Denny Elmer

Prepared by:

William R. Farley, PE



LANCASTER
ENGINEERING

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Executive Summary

1. A zone change in conformance with the Comprehensive Plan is proposed for a 5.3-acre property located northeast of the intersection of NE Cumulus Avenue at NE Fircrest Drive in McMinnville, Oregon. Following a change in zoning designation from *Agricultural Holding* (AH) to *Multiple Family Residential* (R-4), an apartment complex with up to 95 dwelling units is planned for construction.
2. Under the proposed R-4 zoning and accounting for environmental constraints restricting development to approximately 3.8 acres, a maximum of 95 apartment units can be accommodated. The development of up to 95 apartment units will generate a total of 48 trips during the morning peak and 59 trips during the evening peak hours.
3. A detailed analysis of the crash history at the study intersections shows no trends that are indicative of safety issues that need to be addressed. No safety mitigations are recommended.
4. Traffic signal warrants were not projected to be met for the intersection of NE Cumulus Avenue at the Salmon River Highway connection road under any of the analysis scenarios.
5. The study intersections are projected to operate within the performance standards established by the Oregon Department of Transportation and the City of McMinnville, regardless of the zone change or additional trips from the development of up to 95 apartment units. No operational mitigations are recommended.
6. Full development under the proposed zoning will not significantly affect existing or planned transportation facilities as defined under Oregon's Transportation Planning Rule.

Introduction

A zone change in conformance with the Comprehensive Plan is proposed for a property located northeast of the intersection of NE Cumulus Avenue at NE Fircrest Drive in McMinnville, Oregon. Subsequent to the approval of the zone change, an apartment complex is proposed for development on the subject site.

This report analyzes and addresses the potential traffic impacts of the proposed zone change as well as traffic impacts associated with the development of up to 95 apartment units. The purpose of this report is to provide both a short-term and long-term analysis that addresses the operation of the nearby transportation system in order to ensure safe and efficient performance.

Based on the location of the property and conversations with Mike Bisset with the City, the following intersection were identified for analysis of impacts related to the proposed zone change and subsequent development:

- Oregon Highway 18 at Cumulus Avenue (Salmon River Highway connection road)
- NE Cumulus Avenue at Cumulus Avenue (Salmon River Highway connection road)

All supporting data including traffic counts and detailed traffic analysis calculations are included in the appendix to this report.

Location Description

The subject property is identified as Tax Lot R442300900 and is located northeast of the intersection of NE Cumulus Avenue at NE Fircrest Drive. The 5.3-acre property is currently zoned *Agricultural Holding (AH)* by the City of McMinnville and is designated as Residential on the City's 2014 Comprehensive Plan Map. Due to environmental constraints on the property, only 3.8 acres of the property are identified as developable.

Vicinity Streets

Oregon Highway 18, also known as the Salmon River Highway, is under the jurisdiction of the Oregon Department of Transportation (ODOT) and is classified as a Statewide Expressway. The highway is a freight route and a federally designated truck route on the National Highway System. It has a five-lane cross section that includes a center two-way left-turn lane and has a speed limit of 55 mph. Curbs and sidewalks are not installed on either side of the facility in the vicinity of the site.

NE Cumulus Avenue is classified by the City of McMinnville as a Minor Collector and serves as a frontage road for homes and businesses located on the north side of Oregon Highway 18, including the Evergreen Air and Space Museums. It has a two-lane cross-section and has a posted speed limit of 35 mph. Curbs are installed on both sides of the roadway and sidewalks are installed on the north side west of the Salmon River Highway connection road. Bike lanes are provided on both sides of the roadway west of the Salmon River Highway connection road.

The Salmon River connection road spans approximately 370 feet between NE Cumulus Avenue to Oregon Highway 18. The roadway's cross-section is between three and four lanes to serve intersections on both ends. Curbs and sidewalks are installed on the western side of the roadway.

Study Intersections

The intersection of Oregon Highway 18 at Cumulus Avenue (Salmon River Highway connection road) is a four-legged intersection operating under the control of a traffic signal. The eastbound approach on Oregon Highway 18 has a dedicated left-turn lane served by protected phasing, a through lane, and a shared through/left-turn lane, while the westbound approach has a dedicated left-turn lane served by protected phasing, two through lanes, and a dedicated right-turn lane. The southbound approach at the intersection has a dedicated left-turn lane, a through lane, and a dedicated right-turn lane operating concurrently with the northbound single-lane approach. Crosswalks are provided along each leg of the intersection and are served by pedestrian pushbuttons and signals.

The intersection of NE Cumulus Avenue at the Salmon River Highway connection road is a three-legged intersection operating under all-way stop control. The eastbound and westbound approaches on NE Cumulus Avenue each have a single, shared lane serving all turning movements. The northbound approach has dedicated left- and right-turn lanes with the channelized right-turn lane operating under yield control. A crosswalk is provided along the western leg of the intersection.





Figure 1 on page four provides a vicinity map showing the existing lane configurations and traffic control devices at the study intersections.

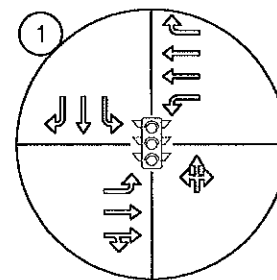
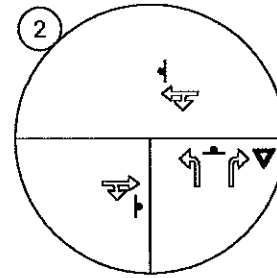
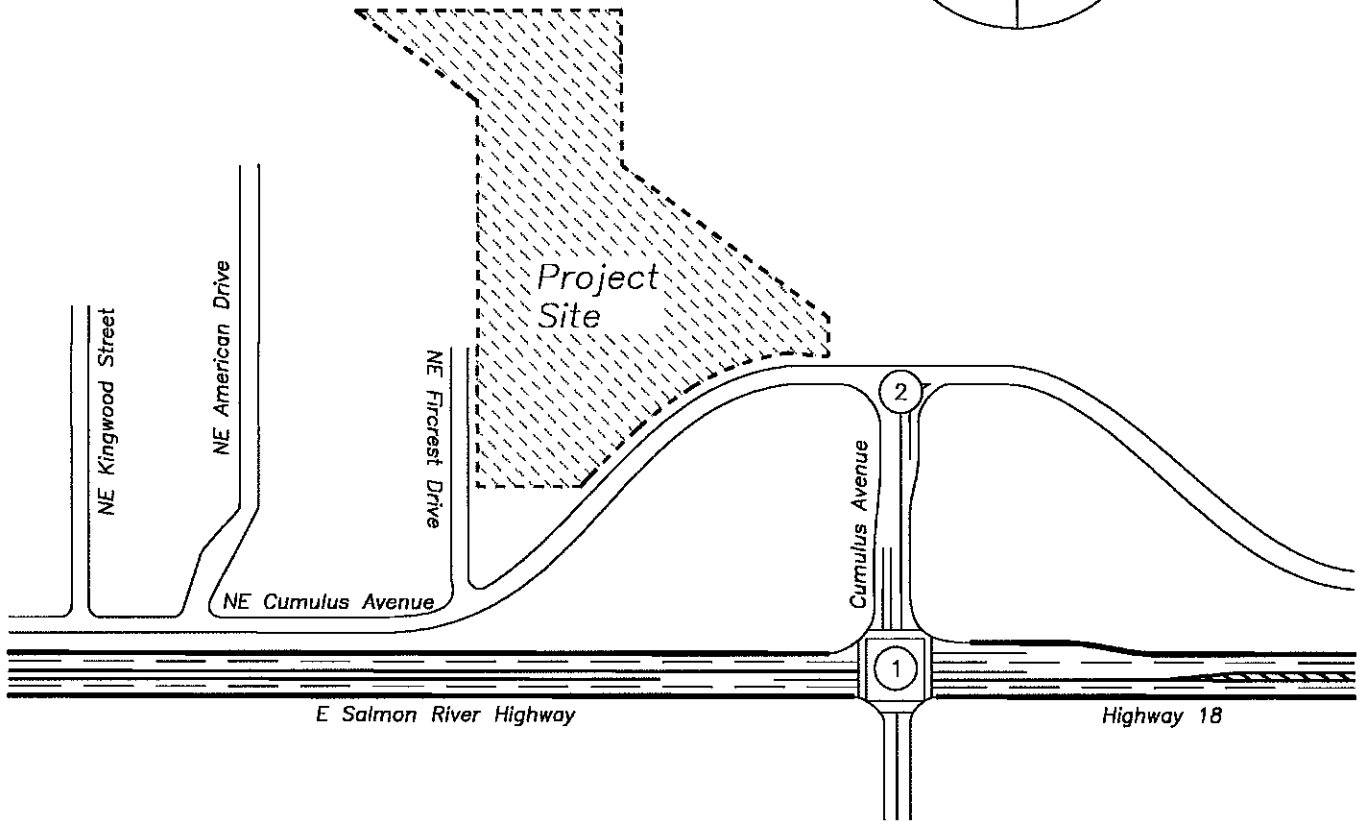
Traffic Counts

Traffic movement counts were collected at each of the study intersections on Tuesday, June 6th, 2017, from 4:00 PM to 6:00 PM to capture the evening peak hour and on Wednesday, June 7th, 2017, from 7:00 AM to 9:00 AM to capture the morning peak hour. Data corresponding to a system peak hour from 7:25 AM to 8:25 AM for the morning peak and from 4:25 PM to 5:25 PM for the evening peak were used for analysis.

Figure 2 on page five shows the existing traffic volumes occurring at each of the study intersections for both the morning and evening peak hours.

LEGEND

-  STUDY INTERSECTION
-  STOP SIGN
-  TRAFFIC SIGNAL
-  PROJECT SITE



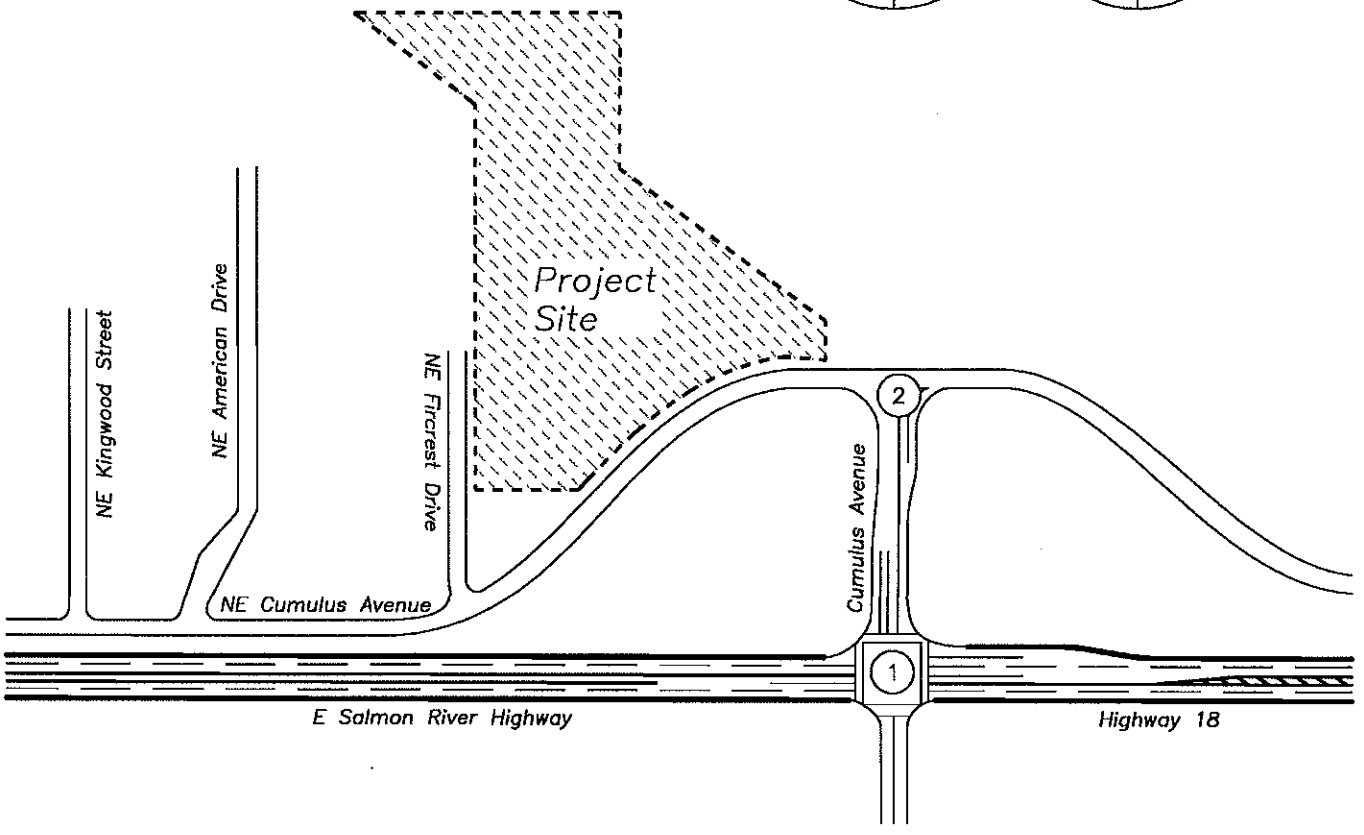
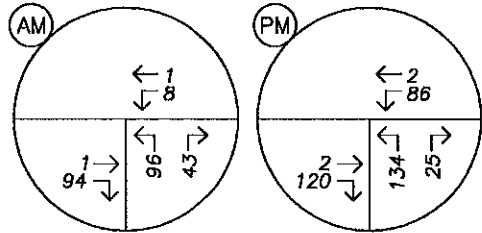
VICINITY MAP



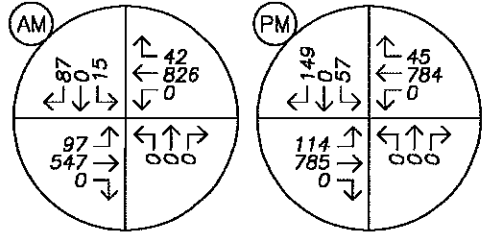
FIGURE 1

PAGE 4

INTERSECTION #2



INTERSECTION #1



TRAFFIC VOLUMES
Existing Conditions
AM & PM Peak Hour



Site Trips

Trip Generation

A change in zoning designation from *Agricultural Holding* (AH) to *Multiple Family Residential* (R-4), in conformance with the City's Comprehensive Plan, is proposed for the 5.3-acre property. To evaluate the traffic impacts resulting from the proposed zone change, the reasonable worst-case development scenario for the existing and proposed zoning was evaluated. Under the current AH zoning, only one single-family dwelling would be permitted. The proposed zone change to R-4 would permit the property to accommodate residential uses at densities no less than 1,500 square feet per family. Based on the developable area of 3.8 acres, and assuming a 20 percent reduction to developable area for transportation and circulation facilities, the property could accommodate up to 95 apartment units.

To estimate the trip generation of the property, trip rates from the *TRIP GENERATION MANUAL*¹ were used. To project traffic for full build-out of the property under the proposed zoning, as well as the subsequent development of an apartment complex, data corresponding to land-use code 220, *Apartment*, was referenced based on the number of dwelling units.

The trip generation calculations show that the reasonable worst-case development scenario of 95 apartment units under the proposed R-4 zoning will generate 48 trips during the morning peak hour with 10 trips entering the site and 38 exiting. During the evening peak hour, the site is projected to generate 59 trips with 38 entering and 21 exiting the site. A total of 632 daily trips are projected with half entering and half exiting the site. Detailed trip generation calculations are included in the appendix to this report.

Trip Distribution

The subject property is located northeast of the intersection of NE Cumulus Avenue at NE Fircrest Drive. NE Cumulus Avenue does not provide any connections to areas outside the surrounding residential area and the Evergreen Air and Space Museum to the east. To reach employment and commercial destinations, people would need to use Oregon Highway 18 and travel to/from the west to the City of McMinnville or to/from the east towards Oregon Highway 99W and the cities of Newberg, Sherwood, and the Portland Metropolitan Area.

Based on the location of the property in addition to current travel trends, it is anticipated that majority of the trips associated with the property (70 percent) would arrive and depart in the direction of the City of McMinnville, with the remaining trips (30 percent) traveling to/from the east to other destinations.

Figure 3 on page seven provides the morning and evening peak hour trip assignment for both the reasonable worst-case development scenario and the subsequent development of up to 95 apartment units.

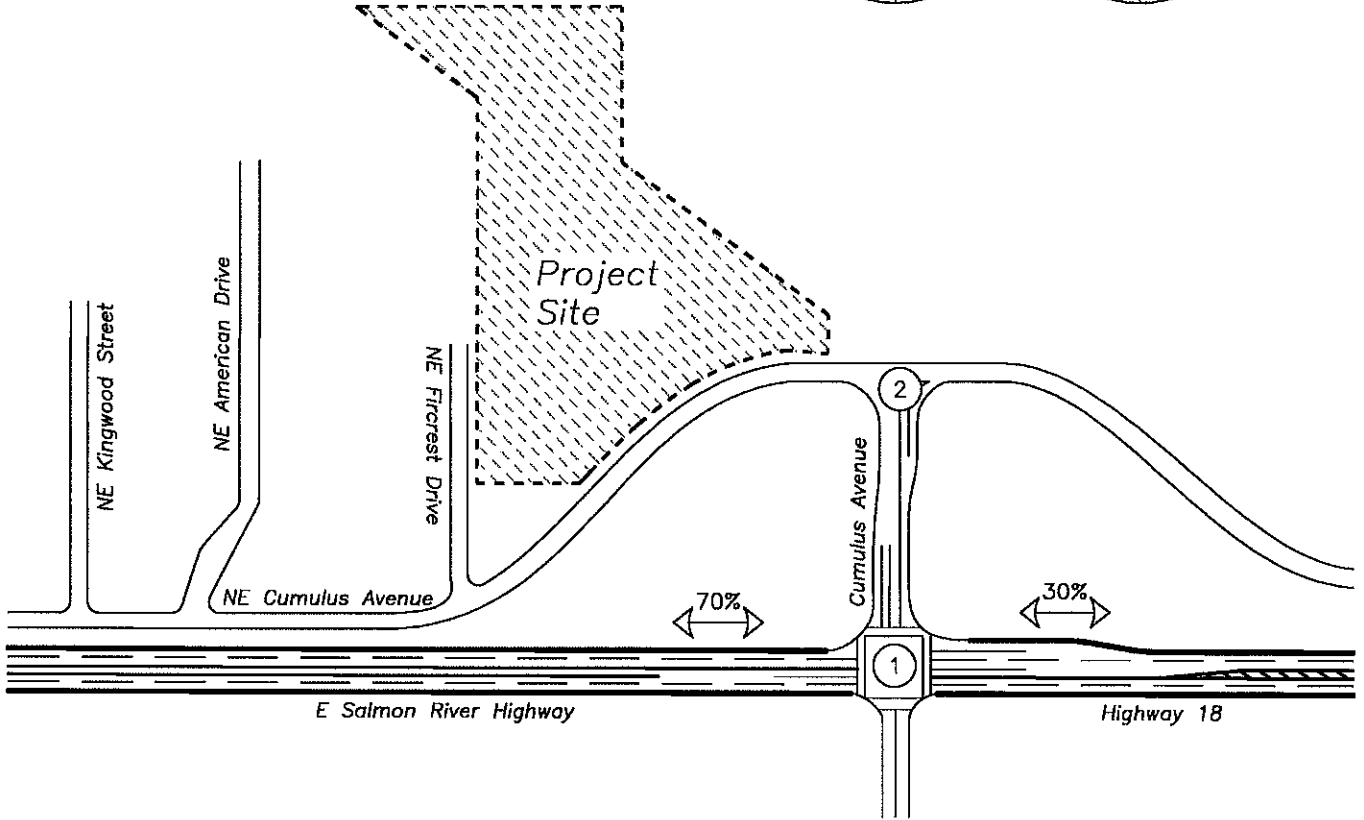
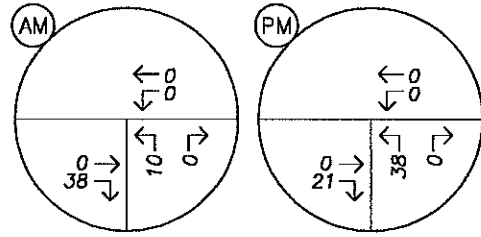
¹ Institute of Transportation Engineers (ITE), *TRIP GENERATION MANUAL 9th Edition*, 2012.

LEGEND

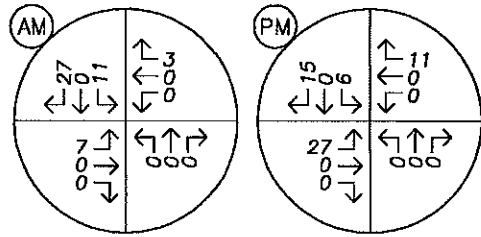
XX% PERCENT OF PROJECT TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	10	38	48
PM	38	21	59

INTERSECTION #2



INTERSECTION #1



SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Zone Change – Site Trips (R-4 Zoning)
 AM & PM Peak Hours



FIGURE 3

PAGE 7

Safety Analysis

Crash Data Review

Using data obtained from the Oregon Department of Transportation's Crash Analysis and Reporting Unit, a review of crashes was performed using the most recent five years of crash data (January of 2011 to December of 2015) at available study intersections. The crash data and existing traffic counts were used to determine a crash rate for the study intersections with the common assumption that traffic counted during the evening peak hour represents ten percent of the average daily traffic (ADT) at the intersection. The crash rate was reported as the number of crashes per million entering vehicles (CMEV). Calculated intersection crash rates for each study intersection were compared against the average and 90th percentile crash rates for intersections with similar settings, approach configurations, and traffic control types in order to determine whether safety mitigation is necessary or appropriate.

The intersection of Oregon Highway 18 at Cumulus Avenue had eight reported crashes during the five-year analysis period. The crashes consisted of six rear-end collisions (including one involving a bicyclist) and two involving a turning maneuver. Of these, one crash resulted in a non-incapacitating injury (*Injury-B*), five resulted in possible injuries or complaints of pain (*Injury-C*), and two resulted in only property damage (*PDO*). The crash rate at the intersection was calculated to be 0.227 CMEV. The average crash rate for a rural four-legged intersection operating under signal control in Oregon was 0.324 CMEV with a 90th percentile crash rate of 0.579 CMEV.

No crashes were found to be reported at the intersection of NE Cumulus Avenue at the Salmon River Highway connection road during the analysis period.

Crash reports for the study intersections are included in the appendix to this report.

Warrant Analysis

Traffic signal warrants were examined for the intersection of NE Cumulus Avenue at the Salmon River Highway connection road to determine whether the installation of a new traffic signal will be warranted at any point through the planning horizon.

Low volumes are projected for both the minor and major street approaches at the intersection of NE Cumulus Avenue at the Salmon River Highway connection road. By examination, traffic signal warrants are not projected to be met under any of the analysis scenarios. No new installation of a traffic signal is recommended.

Operational Analysis

Background Traffic

To provide analysis of the impact of the proposed zone change in conformance with the Comprehensive Plan as well as the development of up to 95 apartment units, an estimate of future traffic volumes is required. In order to calculate the future volumes, a compounded growth rate of two percent per year was applied to the measured existing volumes on local streets to approximate future traffic volumes at the year 2037 planning horizon as well as year 2019 when the apartments are assumed to be constructed and occupied.

Future traffic volumes for through traffic on Oregon Highway 18 were projected in conformance with the requirements established in ODOT's Analysis Procedures Manual. This included the determination of the 30th-highest hour volumes based on seasonal trend variations of highways with commuter trends.

In addition to the seasonal adjustments, annual growth factors for the through traffic on Oregon Highway 18 were determined based on data from ODOT's Future Volumes Tables.

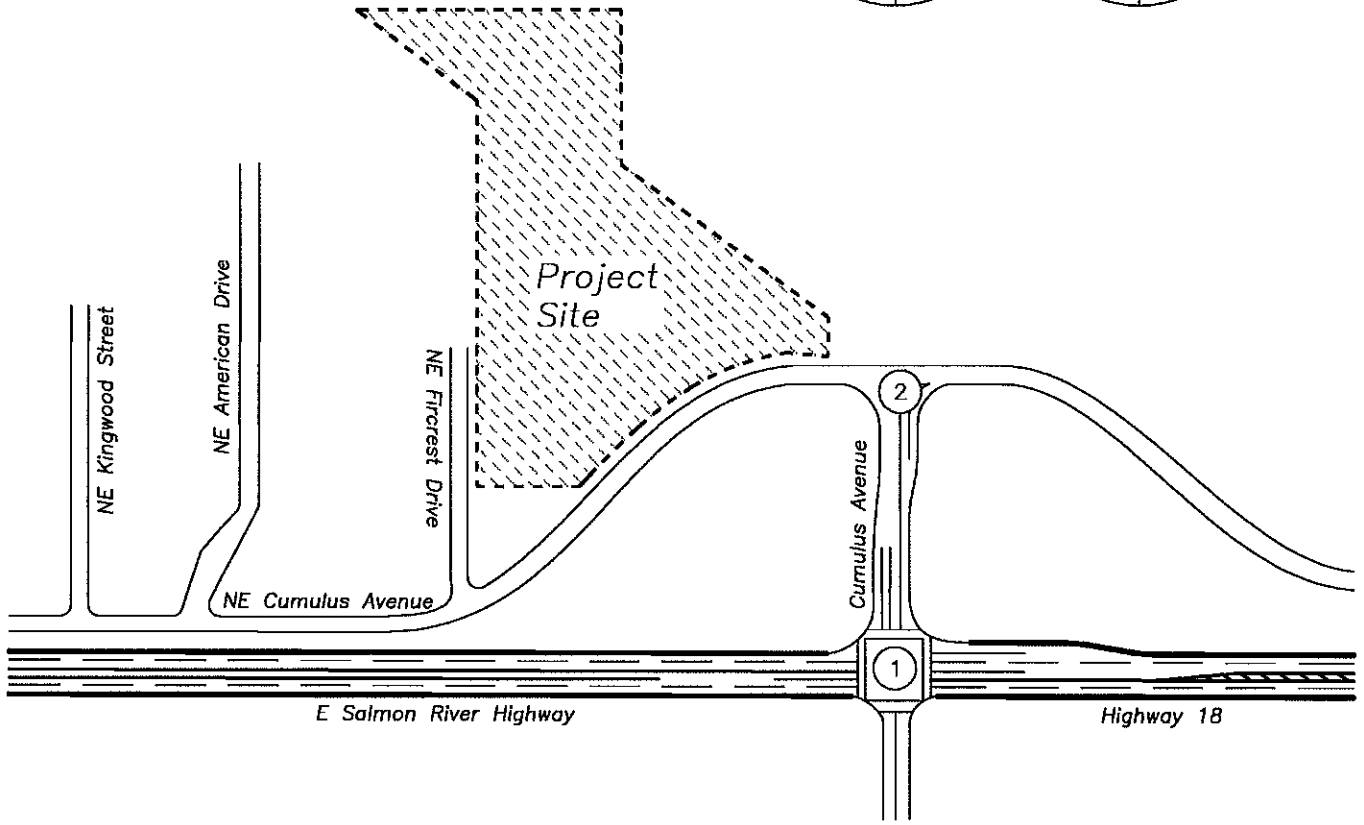
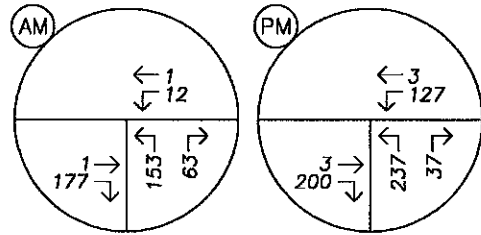
Background Plus Site Trip Volumes

Peak hour trips calculated to be generated by the assumed reasonable worst-case development scenario under the proposed R-4 zoning designation, as described earlier within the Site Trips section, were added to the calculated 2037 volumes to obtain the expected traffic conditions at the planning horizon with the proposed zone change.

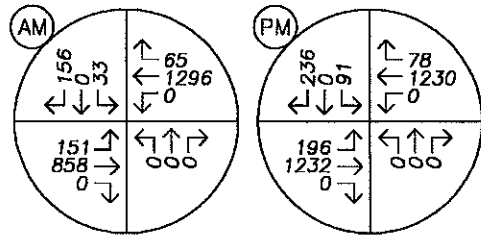
Additionally, site trips from the development of up to 95 apartments were added to year 2019 background volumes to obtain the expected traffic conditions with the completion and occupancy of the site.

Figure 4 on page 10 shows the projected year 2037 planning horizon volumes during the morning and evening peak hours with the proposed zone change on the subject property from AH to R-4. Figure 5 on page 11 shows year 2019 background volumes during both the morning and evening peak hours and Figure 6 on page 12 shows year 2019 background volumes with the addition of trips associated with the development of up to 95 apartment units.

INTERSECTION #2



INTERSECTION #1



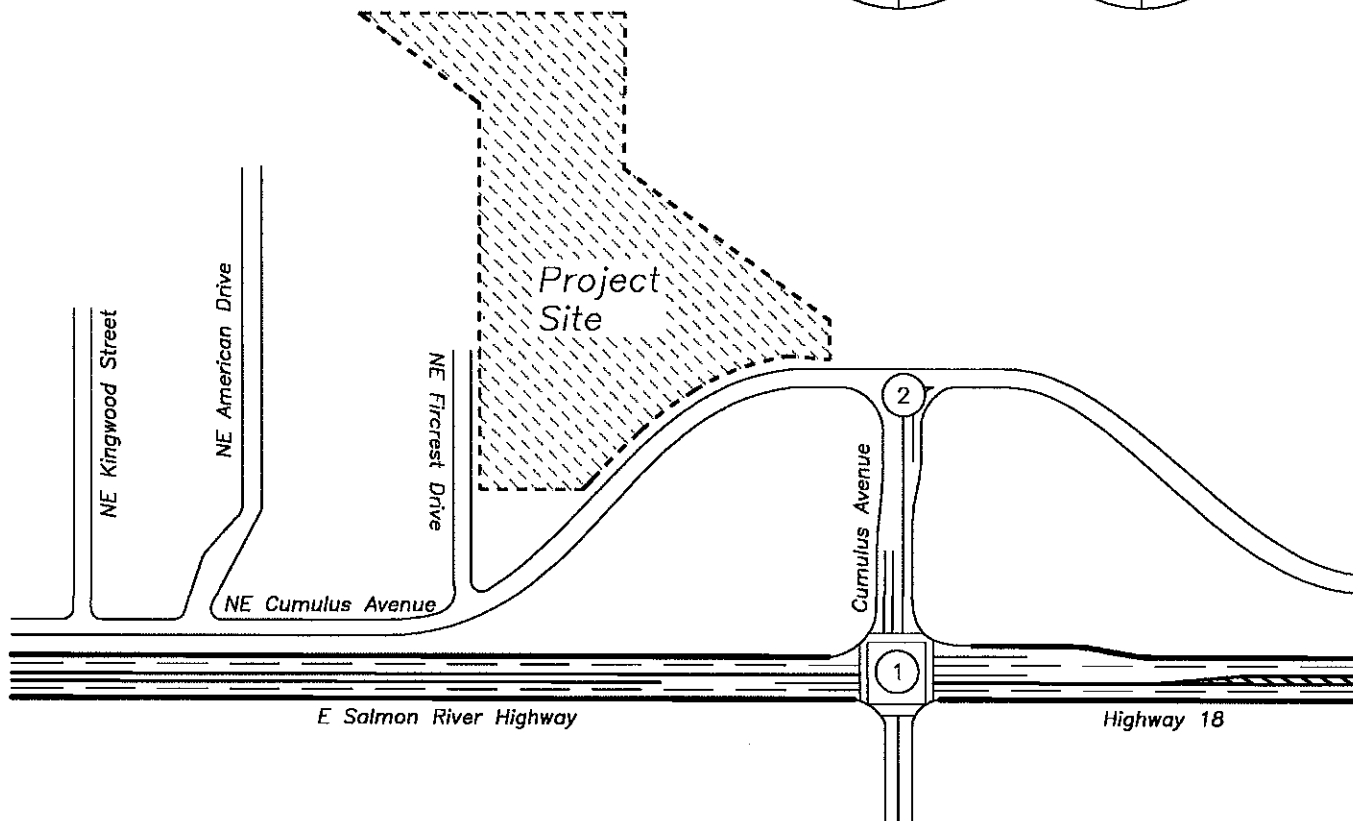
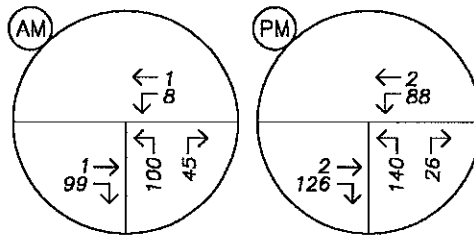
TRAFFIC VOLUMES
 Year 2037 Planning Horizon w/ Proposed Zone Change
 AM & PM Peak Hours



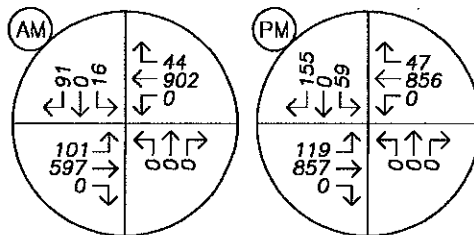
FIGURE 4

PAGE 10

INTERSECTION #2



INTERSECTION #1



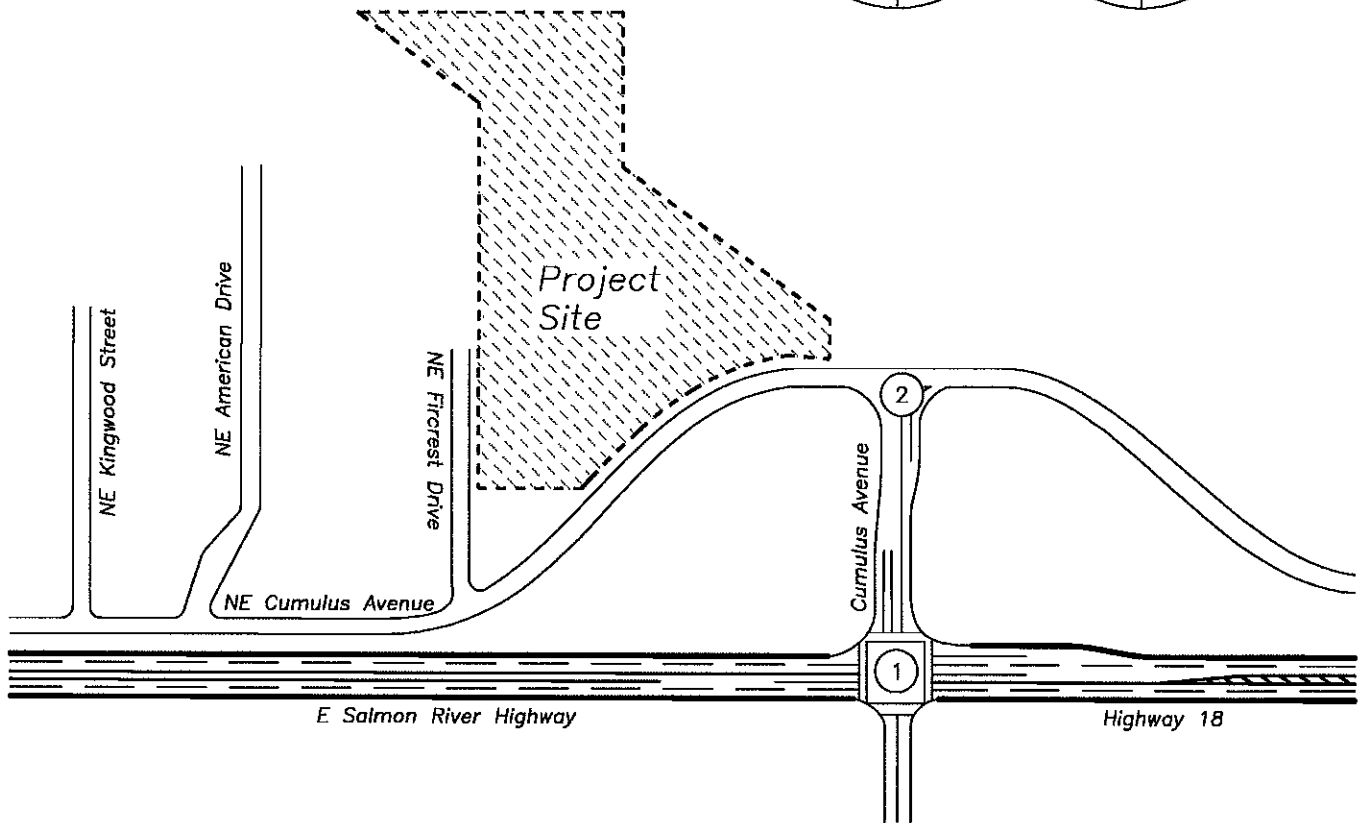
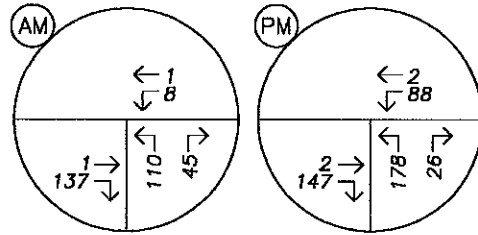
TRAFFIC VOLUMES
 Year 2019 Background Conditions
 AM & PM Peak Hours



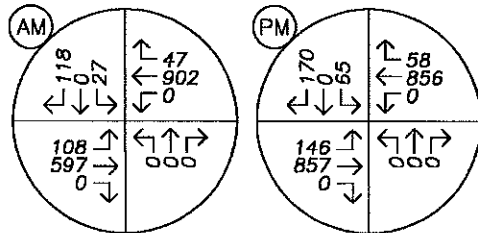
FIGURE
5

PAGE
11

INTERSECTION #2



INTERSECTION #1



TRAFFIC VOLUMES
 Year 2019 Background Conditions plus Site Trips
 AM & PM Peak Hours



FIGURE
6

PAGE
12



Intersection Capacity Analysis

A capacity and delay analysis was conducted for each of the study intersections during the morning and evening peak hours under existing conditions and year 2037 planning horizon conditions with the reasonable worst-case development scenario for the proposed change in zoning from AH to R-4 on the subject property. Additional analysis was conducted for year 2019 to compare background volumes to projected volumes that would be expected with the development of up to 95 apartment units.

The analysis was conducted according to the signalized and unsignalized intersection analysis methodologies in the *Highway Capacity Manual* (HCM). To evaluate an intersection, it is generally graded based on the average delay experienced by vehicles and is assigned a level of service (LOS). The level of service 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.

Both the City of McMinnville and the Oregon Department of Transportation evaluate intersection performance using volume-to-capacity (v/c) ratios instead of average vehicle delay and level of service. The v/c ratio compares the potential capacity to the actual (or demand) volumes to determine the portion of the intersection's capacity that is utilized. A v/c ratio of 1.0 would indicate the intersection is operating at capacity.

The intersection of Oregon Highway 18 at Cumulus Avenue (Salmon River Highway connection road) is within the City of McMinnville's urban growth boundary and is classified by ODOT as a Statewide Expressway with a posted speed limit greater than 45 mph. According to the *1999 Oregon Highway Plan*, the intersection is required to operate with a v/c ratio of 0.80 or less.

The City of McMinnville requires intersections to operate with a v/c ratio of 0.90 or less.

The intersection of Oregon Highway 18 at Cumulus Avenue is currently operating at LOS A during the morning peak hour and LOS B during the evening peak hour with a v/c ratio of 0.54. Under the reasonable worst-case development scenario for the proposed zoning, the intersection would be projected to operate at LOS B with a v/c ratio of 0.79 or less during both peak periods under 2037 planning year conditions. The intersection is also projected to meet ODOT and City standards under year 2019 traffic conditions with the development of up to 95 apartment units.

The intersection of NE Cumulus Avenue at the Salmon River Highway connection road is currently operating at LOS A during both peak periods. The intersection is projected to operate at LOS B or better under all future year analysis scenarios.

The results of the capacity analysis, along with the levels of service, delay, and v/c ratios are shown in Table 1 on the following page. Detailed calculations, as well as tables showing the relationships between delay and level of service, are included in the appendix to this report.

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Table 1 - Intersection Capacity Analysis

Intersection	AM Peak Hour			PM Peak Hour		
	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c
<i>OR Hwy 18 at Cumulus Ave</i>						
2017 Existing	10	A	0.54	11	B	0.54
2019 Background	10	B	0.58	11	B	0.57
2019 Site	11	B	0.59	12	B	0.58
2037 R-4 Zoning	15	B	0.79	16	B	0.77
<i>NE Cumulus Ave at Cumulus Ave</i>						
2017 Existing	8	A	--	9	A	--
2019 Background	8	A	--	9	A	--
2019 Site	9	A	--	9	A	--
2037 R-4 Zoning	10	A	--	11	B	--

Based on the detailed capacity analysis, each of the study intersections will be projected to operate within the performance standards set by ODOT and the City of McMinnville through the year 2037 with the addition of trips from the reasonable worst-case development scenario under the proposed zoning as well as the proposed development of up to 95 apartment units. No mitigations are necessary or recommended.

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Transportation Planning Rule

Oregon's Transportation Planning Rule (TPR) is contained in Section 660-012-0060 of the Oregon Administrative Rules. The TPR is in place to ensure that when an adopted plan or land use regulation is amended, provisions are made to ensure that the transportation system is capable of supporting any potential increase in trip intensity resulting from the amendment. The applicable portions of the TPR are quoted in italics below, with responses directly following.

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);*

Response:

The proposed change in zoning will not change any standards to the functional classification of existing or planned transportation facilities. Accordingly, this section is not triggered.

- (b) *Change standards implementing a functional classification system; or*

Response:

No changes are proposed to any standards implementing the functional classification system. Accordingly, this section is also not triggered.

- (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.*

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Response:

In the case of this report, subsections (A) and (B) are not triggered, since the proposed zone change will not impact or alter the functional classification of any existing or planned facility and the proposal does not include a change to any functional classification standards. Subsection (C) is also not triggered since each of the study intersections will meet applicable performance standards identified in the City of McMinnville's Transportation System Plan through the planning horizon.

Based on the detailed analysis, the proposed zone change of the subject property from *Agricultural Holding* (AH) to *Multiple Family Residential* (R-4) will not degrade the performance of any existing or planned transportation facility. Accordingly, the Transportation Planning Rule is satisfied.

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Conclusions

Full development under the proposed zoning of *Multiple Family Residential* (R-4) will not significantly affect existing or planned transportation facilities as defined under Oregon's Transportation Planning Rule.

The study intersections are projected to operate within the performance standards established by the Oregon Department of Transportation and the City of McMinnville, regardless of the zone change or additional trips from the development of up to 95 apartment units. No operational mitigations are recommended.

Traffic signal warrants were not projected to be met for the intersection of NE Cumulus Avenue at the Salmon River Highway connection road under any of the analysis scenarios.

A detailed analysis of the crash history at the study intersections shows no trends that are indicative of safety issues that need to be addressed. No safety mitigations are recommended.

Based on the detailed analysis, no mitigations are required or recommended for the proposed zone change from *Agricultural Holding* (AH) to *Multiple Family Residential* (R-4) or the subsequent development of up to 95 apartment units.

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Appendix

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