Burlington Creek Forest Nature Park

Road Rules Design Exception
(Variance from Sight Distance Standards)

Submitted by:
METRO

December 2018

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Section I: Application Summary

Proposal: Road Rules Design Exception - Variance from County Standards and Requirements to address limitations on sight distance for the proposed access driveway from NW McNamee Road

Site Location: Burlington Creek Forest is in the North Tualatin Mountains, north of Forest Park, south of Cornelius Pass Road, and west of U.S. Highway 30, in unincorporated Multnomah County

Subject Parcels: Upon which the access intersection is located: 2N1W20BC-01200

Permit Approval: Variance from County Standards and Requirements to address limitations on sight distance

Application Type: Type II - being processed in conjunction with applicant's Type I, II, and III land use applications, which are being processed in conjunction with applicant's Type IV Comprehensive Plan Amendment (text)

Comprehensive Plan Map Designation: West Hills Rural

Zoning: CFU-1 (Commercial Forest Use – 1)

Property Owner and Applicant:
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Portland, Oregon 97232

Applicant's Representatives:
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Metro Parks and Nature
Senior Regional Parks Planner

Traffic Engineering:
Nemariam Engineers & Associates
KPFF
Kittelson and Associates

Section II: Introduction

In an associated land use application, Metro is proposing visitor access improvements at its Burlington Creek Forest property. The existing access driveway is a forest practice road located east of NW McNamee Road. *See* Figure 1.

Figure 1 Existing Access driveway

Applicant proposes improvements to the access driveway and intersection with NW McNamee Drive to support visitor use. The existing access driveway does not meet sight distance standards given topographical and site limitations. As such, applicant respectfully requests a Design Exception/Road Rules Variance as permitted by County Code.

The design exception/variance request is based on the transportation and traffic engineering analysis and work performed by Nemariam Engineers & Associates, KPFF, and Kittelson and Associates, whose reports, studies, and analysis are included or otherwise summarized below in response to applicable criteria.

Section III: Applicable Criteria

Below are the applicable review criteria.

Multnomah County Design and Construction Manual (DCM)

DCM	*Section 2.1.3*	*Design Standard Variance Process (1-9)*

Multnomah County Road Rules (MCRR)

MCRR	*Section 16.100*	*Variance Requirements*
MCRR	*Section 16.200*	*General Variance Criteria (A-D)*
MCRR	*Section 16.225*	*Access Variance Standards (A-C)*
MCRR	*Section 16.300*	*Variance Procedures (A-L)*

Section IV: Compliance with Applicable Review Criteria

County Design Standards:
Multnomah County Design and Construction Manual
AASHTO Standards

Finding: Multnomah County Design and Construction Manual (MCDCM) and the current American Association of State Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets* provide sight distance standards, including Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD) guidelines. NW McNamee Road currently has no posted speed limit, and is subject to the "Oregon Basic Rule" of 55 mph. Of note, motorists do not travel 55 mph through this access intersection as road conditions (including curves) and topography greatly restrict travel speeds.

Intersection Sight Distance (ISD):

Under the MCDCM standards (table 2.3.2), the 55 mph speed correlates to a 250 foot ISD design guideline for both the north bound (NB) and south bound (SB) directions. *See* Exhibit 1, KPFF 2018 report. Table 1 of the 2018 KPFF report confirms that existing conditions do meet MCDCM ISD standards for a 55 mph design speed for all cases.

While the proposed access and current conditions provide sight distances meeting the County's design standards, KPFF also conducted an evaluation utilizing AASHTO standards.

Under the AASHTO standards, the 55 mph speed correlates to ISD design guidelines between 530 feet and 610 feet at different measurement points. *See* Exhibit 1, table 2 of KPFF 2018 report. The existing condition and measured sight distances do not meet ISD standards for a 55 mph design speed. Sight distance is currently restricted to the south at approximately 300 feet due to a horizontal curve in the road and a hillside on the west side of the roadway. Sight distance is currently restricted to the north at approximately 293 feet, due to roadside trees and vegetation on the east side of the roadway.

Recognizing those ISD distances do not reflect actual driving practices and therefore true sight distance needs, as anticipated by the AASHTO guidelines, and to assist in the sight distance evaluation, Kittelson and Associates performed a speed study to determine the 85th percentile speed in each direction of travel at the access point. The 85th percentile of the distribution of observed speed is the most frequently used descriptive statistic for the operating speed associated with a particular location or geometric feature. The data indicated 85th percentile speeds of 38 mph for the NB direction and 35 mph for the SB direction. *See* Exhibit 2, KPFF 2014 report.

Stopping Sight Distance (SSD):

As a matter of safety, the minimum sight distance should be no less than the stopping sight distance. The AASHTO design stopping sight distance for a design speed of 55 mph (and not accounting for grade) is 495 feet. NB measured average slope is -12.5%, while the southbound measured average slope is 12.8% (Table 2 from KPFF's 2018 report). Adjusting for grade, the SSD in the NB direction (downhill) would be approximately 600 feet and approximately 425 feet in the SB direction. Please note, ISD standards exceed SSD standards.

Figure 2 AASHTO Stopping Sight Distance and Design Speeds

Speed	Stopping Sight Distance, (ft.)	
Design Speed (mph)	Calculated (2.5^s, a=11.2 FPS^2)	Design (2.5^s, a)
20	111.9	115
25	151.9	155
30	196.7	200
35	246.2	250
40	300.6	305
45	359.8	360
50	423.8	425
55	492.4	495
60	566.0	570
65	644.4	645
70	727.6	730

The existing condition and measured sight distances of 290 feet in the NB direction and 330 feet in the SB direction do not meet SSD standards for a 55 mph design speed.

85th Percentile Speed:

Recognizing those SSDs do not reflect actual driving practices and therefore true stopping distance needs, as anticipated by the AASHTO guidelines, KPFF performed a SSD analysis

based on the 85th percentile speed data (38 mph for NB/downhill traffic and 35 mph for SB/uphill traffic) with required adjustments for grade.

- For the NB direction, and based on the measured average slope of -12.5% (downhill), the AASHTO recommended SSD is 360 feet. The existing measured sight distance of less than 300 feet does not meet that standard.

- For the SB direction, and based on the measured average slope of 12.8% (uphill), the AASHTO recommended SSD is 215 feet. The existing sight distance of more than 300 feet does meet that standard. *See* Exhibit 2.

Improvements to meet sight distance standards for a 55 mph design speed:

The following improvements would be required to achieve ISD requirements for a 55 mph design speed based on AASHTO. *See* Exhibit 1.

- Removing roadside trees and vegetation north of the proposed access.
- Significant excavation, grading, and construction south of the proposed access.

Metro and its traffic engineers are of the opinion that making sight distance improvements to achieve standards associated with a 55 mph design speed would require a cost prohibitive public expenditure and substantial disturbance to trees and slopes that are not necessary to achieve safe operating conditions given actual operational speeds and conditions at and near the subject access driveway intersection.

Based on the above and as detailed below, Metro requests a design exception/variance for:

Intersection Sight Distance – AASHTO guidelines
Stopping Sight Distance – AASHTO guidelines

As proposed below in the mitigation section, measures can be taken to either reduce speeds or improve sight lines to meet AASHTO sight distance guidelines and promote safety.

2.1.3 Design Standard Variance Process

Requests for variance from design standards with justification and mitigation shall be submitted to the County Engineer as required in Rule 4.100 and approved in writing prior to incorporation of design features into project plans and/or other documents. Requests for design variances must be accompanied by justification documentation and should include mitigation. The request for variances shall consist of a completed application form and supporting documentation submitted to the County Engineer. The supporting documentation should include:

1) Summary of the proposed exception

Finding: Multnomah County Design and Construction Manual (MCDCM) and AASHTO Standards provide sight distance standards, including Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD) guidelines. NW McNamee currently has no posted speed limit, and as such a 55 mph speed is assumed.

Intersection Sight Distance (ISD):

Under the MCDCM standards (table 2.3.2), the 55 mph speed correlates to a 250 foot ISD design guideline for both the north bound (NB) and south bound (SB) directions. *See* Exhibit 1, KPFF 2018 report. Table 1 of the 2018 report confirms that existing conditions do meet MCDCM ISD standards for a 55 mph design speed for all cases.

Under the AASHTO standards, the 55 mph speed correlates to ISD design guidelines between 530 feet and 610 feet at different measurement points. *See* Exhibit 1, table 2 of KPFF 2018 report. The existing condition and measured sight distances do not meet ISD standards for a 55 mph design speed. Sight distance is currently restricted to the south at approximately 300 feet due to a horizontal curve in the road and a hillside on the west side of the roadway. Sight distance is currently restricted to the north at approximately 293 feet, due to roadside trees and vegetation on the east side of the roadway.

Stopping Sight Distance (SSD):

As a matter of safety, the minimum sight distance should be no less than the stopping sight distance. The AASHTO design stopping sight distance for a design speed of 55 mph (and not accounting for grade) is 495 feet. Adjusting for grade, the SSD in the NB direction (downhill) would be approximately 600 feet and the SB direction approximately 425 feet. Please note, ISD standards exceed SSD standards. The existing condition and measured sight distances do not meet SSD standards for a 55 mph design speed.

Improvements to meet sight distance standard for a 55 mph design speed:

The following improvements would be required to achieve sight distance requirements for a 55 mph design speed based on AASHTO. *See* Exhibit 1.

- Removing roadside trees and vegetation north of the proposed access.
- Significant excavation, grading, and construction south of the proposed access.

Metro and its traffic engineers are of the opinion that making sight distance improvements to achieve standards associated with a 55 mph design speed would require a cost prohibitive public expenditure and substantial disturbance to trees and slopes that are not necessary to achieve safe operating conditions given actual operational speeds and conditions at and near the subject access driveway intersection.

Based on the above and as detailed below, Metro requests a design exception/variance for:

Intersection Sight Distance – AASHTO guidelines
Stopping Sight Distance – AASHTO guidelines

2) Project description/purpose

Finding: The purpose of the project is to improve the access intersection to support visitor, staff, emergency, and recreational access improvements at Burlington Creek Forest. Metro desires to provide a functionally safe access intersection with improvements and design features that are consistent with existing operating conditions, road conditions, and topographical limitations.

3) Effect on other standards

Finding: The subject property includes CFU, Hillside Development and SEC zoning overlay protections. These standards generally regulate disturbances. The commercial forest regulations seek to conserve and protect designated forest lands for timber projection, wildlife habitats, water quality, and recreational uses. The SEC overlay seeks to protect, conserve, enhance, restore, and maintain significant natural and man-made features of public value. The Hillside Development and Erosion Control overlay seeks to minimize losses due to earth movement hazards and minimize erosion. Making sight distance improvements to achieve standards associated with a 55 mph design speed would require a substantial disturbance to trees and slopes that is not necessary to achieve safe operating conditions given actual operational speeds and conditions at and near the subject access driveway intersection.

4) Cost to build to standard

Finding: The estimated construction cost to achieve the required intersection sight distance, based on a 55 mph design speed in both directions, is approximately $1,550,000. *See* Exhibit 1. This cost includes clearing and grubbing, grading, aggregate base, asphalt paving and other miscellaneous items. This cost estimate does NOT include costs associated with the acquisition of required easements, costs associated with removal of rock or other obstructions that could be encountered with such a significant exception or an escalation for inflation based on year constructed. A concept level costs estimate is provided as Exhibit "B" to Exhibit 1. Please note: Construction costs to achieve the required intersection sight distance based on the 85th percentile design speed in both directions were estimated in 2014 by KPFF as approximately $87,000.

5) Reasons (low benefit/cost, relocations, environment impacts, etc.) for not attaining standard

Finding: Metro and its traffic engineers are of the opinion that making sight distance improvements to achieve standards associated with a 55 mph design speed would require a cost prohibitive public expenditure and substantial disturbance to trees and slopes that are

not necessary to achieve safe operating conditions given actual operational speeds and conditions at and near the subject access driveway intersection.

Road design standards use a designated design speed to establish design features. The higher the speed limit, the more extensive the design features employed, such as increased sight distance, to promote safety.

However, visibility needs are related to the operating environment and actual vehicle speeds. Using a designated design speed of 55 mph to establish design features does not reflect actual operating conditions and speeds associated with the subject intersection. Simply, drivers do not and cannot travel at a 55 mph rate of speed in this location along the local road given topographical limitations, including slopes, road width, road conditions, and curves.

As such, requiring improvements to meet a 55 mph design speed would be unduly burdensome and perform no additional safety function, while disturbing an unnecessary amount of land and slopes.

Under the AASHTO standards, the 55 mph speed correlates to ISD design guidelines between 530 feet and 610 feet at different measurement points. Recognizing that those distances do not reflect actual driving practices and therefore true sight distance needs, as anticipated by the AASHTO guidelines, and to assist in the sight distance evaluation, Kittelson and Associates performed a speed study to determine the 85th percentile speed in each direction of travel at the access point. The 85th percentile of the distribution of observed speed is the most frequently used descriptive statistic for the operating speed associated with a particular location or geometric feature. The data indicated 85th percentile speeds of 38 mph for the NB direction and 35 mph for the SB direction. *See* Exhibit 2, KPFF 2014 report.

6) Compatibility with adjacent sections (route continuity)

Finding: NW McNamee Road can be described as having distinct sections. The route traverses the ridgeline before dropping down the slope to its intersection with Highway 30. The route down the slope heading generally northeast includes several "S" curves before reaching the railroad trestle and shortly thereafter the intersection with Highway 30. The proposed access road is located along a short, relatively straight section sandwiched between "S" curves and just uphill from the railroad trestle crossing. The existing conditions generally represent conditions left after NW McNamee Road was constructed by the County.

7) Accident history and potential (specifically as it applies to the requested exception)

Finding: As part of the traffic safety analysis, Nemariam Engineers & Associates reviewed and reported on crash data for a ten (10) year period at several area intersections. That analysis and data is included in Exhibit 3. Specifically, as it applies to the subject access

intersection and exception request, zero (0) car crashes were reported in the ten (10) year period.

The subject property is currently used for recreation and has been for decades. Visitors park along the gravel access driveway which is gated a short distance from the McNamee Road right of way. Even though the intersection presents challenges given the proximity of the gate on the access road, limited parking area, and maneuverability constraints, no accidents have been reported. Development of intersection and access improvements will create safer conditions and improved sight lines. Based on crash data, there are no existing safety deficiencies along this section of road or for the existing access.

8) Probably time before reconstruction of the section due to traffic increases or changed conditions

Finding: As confirmed by the traffic analysis in Exhibit 3, the increase in road users resulting from the proposed visitor access improvements is minimal. High traffic counts and a large increase in users is generally associated with intensive development. Current zoning and long-range comprehensive planning in the area prohibits the type of intensive development that would trigger the need for road reconstruction. As such, an increase in use or changes in conditions resulting in the need for road reconstruction and related impacts on sight distance is not likely.

9) Mitigation measures to be used

Finding: Road design standards use a designated design speed to establish design features. The higher the speed limit, the more extensive the design features employed, such as increased sight distance, to promote safety.

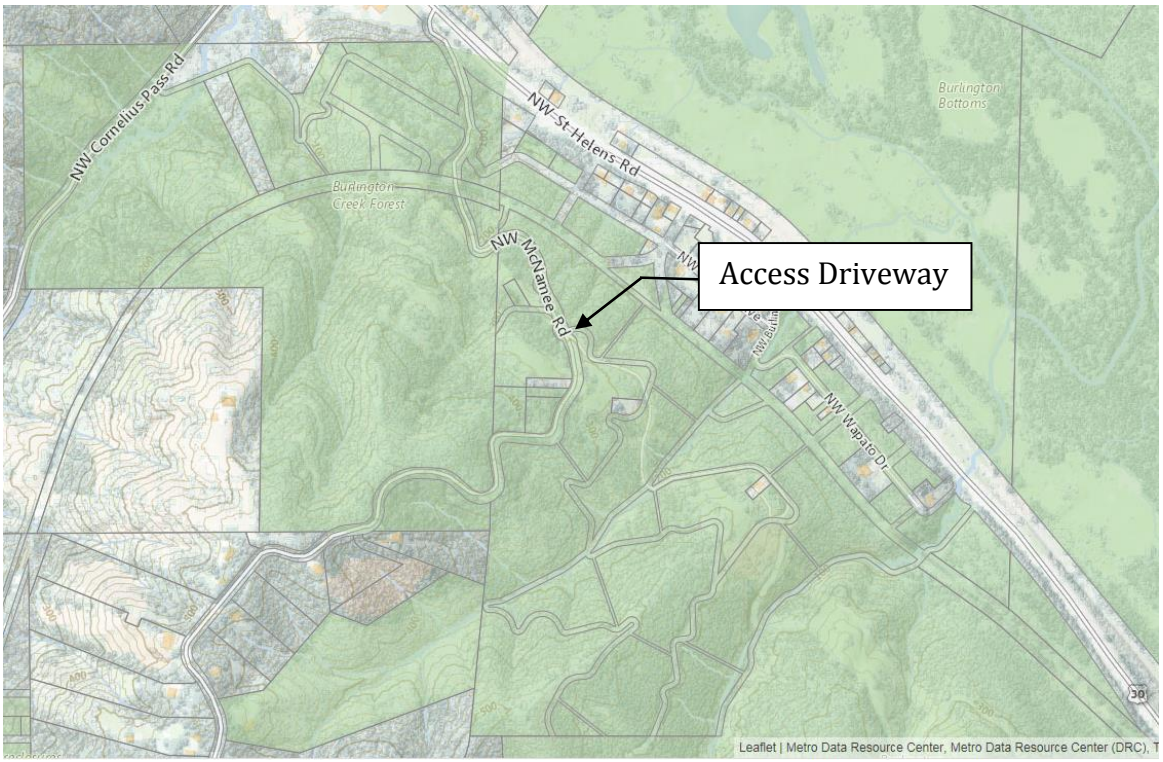
However, visibility needs are related to the operating environment and actual vehicle speeds. Using a designated design speed of 55 mph to establish design features does not reflect actual operating conditions and speeds associated with the subject intersection. Simply, drivers do not and cannot travel at a 55 mph rate of speed in this location along the local road given topographical limitations, including slopes, road width, road conditions, and curves.

As such, requiring improvements to meet a 55 mph design speed would be unduly burdensome and perform no additional safety function, while disturbing an unnecessary amount of land and slopes. There are other ways to achieve sight distance objectives.

Achieving a reduction in design speed to 25 mph in the vicinity of the access driveway: Existing conditions and measurements demonstrate that a regulated speed of 25 mph would meet AASHTO intersection and stopping sight distance design standards. In other words, the design speed and features that can be achieved under current conditions would exceed sight distances required by a 25 mph design speed. *See* Exhibit 1, table 2. This could be achieved by incorporating regulatory signage and other traffic control methods used to regulate, warn, and guide drivers through the use of signs, pavement markings, removing

roadside vegetation, and other devices. This mitigation choice would prevent the need to incur substantial public expenditures and reduce construction impacts. High operational speeds are not appropriate or needed at this location. Mobility is not a factor or otherwise would not adversely be impacted by posting reduced speed limits for a short section of the local road. An examination of road conditions reveals this is an appropriate location to reduce speed. The access drive is along a relatively straight section in the middle of two "S" curve sections. The drive is approximately 1,000 feet from the narrow, one lane railroad trestle crossing, where caution signs are present, and speeds reduce. From the trestle to the controlled intersection of Highway 30 (NW St. Helens Road) is another 900 feet. From the beginning of the first "S" curve from south to north, to the intersection with Highway 30 is all downhill, with an elevation drop of nearly 500 feet over a short distance. A lower speed limit would also be consistent with the road's function, classification, and roadside development.

Figure 3 Access Drive Map



Note: property highlighted in green is publicly owned. Green parcels south of Highway 30 all are owned by Metro.

Achieving sight distance associated with the 85th percentile speed: A mitigation alternative is to allow for the use of the 85th percentile travel speeds along the roadway to estimate the required sight distance at the proposed egress driveway onto NW McNamee. Sight line improvements can be made to achieve a design speed of 38 mph for NB traffic and 35 mph for SB traffic. This would result in a significant reduction in the amount of land disturbance, construction, and associated costs from what would be required to the 55 mph design speed. Intersection Sight Distance improvements based on the 85th percentile north bound

design speed of 38 mph (365 feet) would exceed the minimum AASHTO Stopping Sight Distance standard based on the same speed (360 feet). For south bound vehicles, the 85th percentile speed of 35 mph requires an ISD of 390 feet. The measured south bound sight distance is 330 feet, well within AASHTO's SSD of 215 feet. *See* Exhibit 2, Tables 1 and 2.

16.000 Variance from County Standards and Requirements

16.100 Variance Requirements:

A. Multnomah County Code 29.507 provides for a variance by the County Engineer from County standards and requirements when written documentation substantiates that the requested variance is in keeping with the intent and purpose of County Code and adopted rules, and the requested variance will not adversely affect the intended function of the County road system or related facilities. A variance approval may include mitigation measures as conditions of approval.

Finding: The narrative and attached exhibits substantiate that the requested variance is in keeping with the intent and purpose for the County Code and adopted rules. The information demonstrates that the requested variance will not adversely affect the intended function of the County road system or related facilities. NW McNamee Road is classified as a local street. The variance request includes mitigation measures proposed by Metro.

B. All requests for a variance to these Road Rules that are part of a development that requires approval of that development as a "land use decision" or "limited land use decision," as defined in ORS 197.015, shall be submitted to the County Engineer at the time that application for the land use review is submitted to the applicable planning office having land use jurisdiction. The County Engineer's decision on the variance to these Road Rules shall not become effective until the date that the associated land use decision becomes effective.

Finding: In reviewing the land use application case file for Metro's Burlington Creek Forest use request, County transportation staff has determined that the proposed access onto NW McNamee Road requires a Road Rules Design Exception/Variance. Metro submits the subject variance requests to be processed in conjunction with the land use review for Metro's use request. This standard is met.

C. For properties within unincorporated areas of Multnomah County for which Multnomah County has not contracted for planning and zoning services, the Hearings Officer shall be the final County decision maker for all applications for variances to these Rules that are in conjunction with applications for development classified as a "Type III" or an appeal of a "Type II" land use permit application under MCC Chapter 37 or the corresponding code parts in MCC Chapter 38, as applicable.

Finding: This standard is not applicable. Multnomah County provides planning services for the subject property. The variance application is being processed in conjunction with applicant's use application request.

16.200 General Variance Criteria:

In order to be granted a variance, the applicant must demonstrate that:

A. Special circumstances or conditions apply to the property or intended use that do not apply to other property in the same area. The circumstances or conditions may relate to the size, shape, natural features and topography of the property or the location or size of physical improvements on the site or the nature of the use compared to surrounding uses;

Finding: Metro, a public recreational service provider for the region and citizens of Multnomah County, is proposing visitor access improvements to support recreational use on the Burlington Creek Forest property. The public currently accesses the site along the existing forest practices road. Users park in a small area before the locked gate. Metro desires to improve this existing condition and to provide a safer and more efficient entrance to the site. The improvements proposed are intended to support a use on public property, which is not available in the immediate surrounding area.

Applicant directed development in a manner that utilizes existing grades, avoids sensitive areas, and utilizes an existing access drive and cleared areas associated with the road, all of which are required by habitat protection, resource conservation, and design and siting standards. Here, site distance, topographical constraints, and existing conditions dictated where the access drive is proposed.

The sight distance limitations are existing. Access to the site is only available at the proposed location given the topography and location of surrounding development. The access drive is isolated, with no other access points supporting development in the vicinity. Existing sight distances have proven functional and safe given no reported accidents at the intersection. Under the MCDCM standards (table 2.3.2), existing conditions do meet MCDCM ISD standards for a 55 mph design speed for all cases.

B. The variance is necessary for the preservation and enjoyment of a substantial property right of the applicant and extraordinary hardship would result from strict compliance with the standards;

Finding: Without the design exception/variance, a public recreational opportunity for the public would be lost. Metro, with the approval of voters, purchased the property for forest habitat and water quality protections, as well as to provide public access to nature close to home. The variance is necessary in order to be able to construct improvements associated with the planned nature park. The costs associated with moving the amount of earth required to meet sight distance standards based on a 55 mph design speed are prohibitive – in other words, the recreational improvements could not be built.

C. The authorization of the variance will not be materially detrimental to the public welfare or injurious to other property in the vicinity, or adversely affect the appropriate development of adjoining properties;

Finding: Authorizing the variance will not be materially detrimental to the public or adversely impact other property or adjoining property development potential. The public currently accesses the site along the existing forest practices road. Users park in a small area before the locked gate. The sight distance limitations are existing. Metro desires to improve this existing condition and to provide a safer and more efficient entrance to the site. The improvements proposed are intended to support a use on public property, which is not available in the surrounding area. Metro is proposing to improve sight distance, which will represent an improvement over existing conditions and a no action alternative. Metro has demonstrated that safe access can be provided with a reduction in the design speed and associated sight distance requirements.

Using a designated design speed of 55 mph to establish design features does not reflect actual operating conditions and speeds associated with the subject intersection. Simply, drivers do not and cannot travel at a 55 mph rate of speed in this location along the local road given topographical limitations, including slopes, road width, road conditions, and curves. As anticipated by the AASHTO guidelines, and to assist in the sight distance evaluation, Kittelson and Associates performed a speed study to determine the 85th percentile speed in each direction of travel at the access point. The 85th percentile of the distribution of observed speed is the most frequently used descriptive statistic for the operating speed associated with a particular location or geometric feature. The data indicated 85th percentile speeds of 38 mph for the NB direction and 35 mph for the SB direction.

The access drive is isolated, with no other access points supporting development in the vicinity. Metro owns nearly all the surrounding land (except for two small inholdings held by PGE).

Figure 4 Access Intersection Map

As such, granting the variance will not be injurious to another owner's access or development opportunities. Instead, proposed mitigation along NW McNamee Road will improve safety for nature park visitors, Metro staff, emergency responders and area neighbors. These safety improvements might not be realized with a no action alternative.

D. The circumstances of any hardship are not of the applicant's making.

Finding: The public currently accesses the site along the existing forest practices road. Users park in a small area before the locked gate. Metro desires to improve this existing condition and to provide a safer and more efficient entrance to the site. The sight distance limitations are existing. Access to the site is only available at the proposed location given the topography and location of surrounding development. Metro is seeking relief as contemplated by County code and as supported by road design and engineering principals.

16.225 Access Variance Standards:

Exceptions to access standards may be made by the County Engineer when spacing or other safety considerations make non-standard access acceptable. In addition to the variance requirements of Section 16.200 of these Rules, the applicant will be required to demonstrate that the proposed variance will not negatively impact the safety or capacity of the transportation system for a variance to be granted. The following are examples of variances that may be considered along with specific criteria that must be addressed before such a variance can be granted.

A. Multiple Access Points: The County Engineer may allow multiple access points when all spacing standards can be met, or when additional access(es) will not negatively impact the safety or functionality of the transportation system and a single access point cannot reasonably serve a site. ….

Finding: This standard is not applicable. Applicant is not requesting multiple access points.

B. Access Spacing: If it is not feasible to access a site and meet the access spacing standards, access may be located so as to provide the best access spacing possible. …

Finding: This standard is not applicable. Applicant is not requesting a variance to the access spacing standard.

C. Sight Distance: If it is not feasible to provide enough sight distance to meet County/AASHTO standards, the site's access must be located so as to provide the most sight distance possible. The County Engineer may require additional measures to mitigate sub-standard sight distance.

Finding: The proposed variance will not negatively impact the safety of the transportation system. Metro is proposing visitor access improvements to support recreational use on the Burlington Creek Forest property. The public currently accesses the site along the existing forest practices road. Users park in a small area before the locked gate. Metro desires to

improve this existing condition and to provide a safer and more efficient entrance to the site.

Applicant directed development in a manner that utilizes existing grades, avoids sensitive areas, and utilizes an existing access drive and cleared areas associated with the road, all of which are required by habitat protection, resource conservation, and design and siting standards. Here, site distance, topographical constraints, and existing conditions dictated where the access drive is proposed. In other words, access to the site is only available at the proposed location given the topography and location of surrounding development. The sight distance limitations are existing. Existing sight distances have proven functional and safe given no reported accidents at the intersection. Existing conditions do meet MCDCM ISD standards for a 55 mph design speed for all cases. However, applicant proposes to improve sight distances with the planned improvements.

Road design standards use a designated design speed to establish design features. The higher the speed limit, the more extensive the design features employed, such as increased sight distance, to promote safety.

However, visibility needs are related to the operating environment and actual vehicle speeds. Using a designated design speed of 55 mph to establish design features does not reflect actual operating conditions and speeds associated with the subject intersection. Simply, drivers do not and cannot travel at a 55 mph rate of speed in this location along the local road given topographical limitations, including slopes, road width, road conditions, and curves.

As such, requiring improvements to meet a 55 mph design speed would be unduly burdensome, perform no additional safety function, while disturbing an unnecessary amount of land and slopes. There are other ways to achieve sight distance objectives.

Achieving a reduction in design speed to 25 mph in the vicinity of the access driveway: Existing conditions and measurements demonstrate that a regulated speed of 25 mph would meet AASHTO intersection sight distance design standards. In other words, the design speed and features that can be achieved under current conditions would exceed sight distances required by a 25 mph design speed. *See* Exhibit 1, table 2. This could be achieved by incorporating regulatory signage and other traffic control methods used to regulate, warn, and guide drivers through the use of signs, pavement markings, removing roadside vegetation, and other devices. This would prevent the need to incur substantial public expenditures and reduce construction impacts. High operational speeds are not appropriate or needed at this location. Mobility is not a factor or otherwise would not adversely be impacted by posting reduced speed limits for a short section of the functionally classified local road. An examination of road conditions reveals this is an appropriate location to reduce speed. The access drive is along a relatively straight section in the middle of two "S" curve sections. The drive is approximately 1,000 feet from the narrow railroad trestle crossing, where speeds reduce. From the trestle to the controlled intersection of Highway 30 (NW St. Helens Road) is another 900 feet. From the beginning of the first "S" curve from south to north, to the intersection with Highway 30 is all downhill, with an

elevation drop of nearly 500 feet over a short distance. A lower speed limit would also be consistent with the road's "local" functional classification and roadside development.

Achieving intersection sight distance associated with the 85th percentile speed: A mitigation alternative is to allow for the use of the 85th percentile travel speeds along the roadway to estimate the required intersection sight distance at the proposed egress driveway onto NW McNamee. Sight line improvements can be made to achieve a design speed of 38 mph for NB traffic and 35 mph for SB traffic. This would result in a significant reduction in the amount of land disturbance, construction, and associated costs from what would be required to achieve the 55 mph design speed. Construction costs to achieve the required intersection sight distance in both directions was estimated in 2014 by KPFF as approximately $87,000. This cost estimate does NOT include costs associated with the acquisition of required easements, costs associated with removal of rock or other obstructions that could be encountered during excavation or an escalation factor for inflation based on actual year constructed.

16.300 Variance Request Procedure:

For the County Engineer to consider a variance request, it must be submitted in writing with the appropriate fee to the County prior to the issuance of any development permit. The written variance request shall be signed by a person with the authority to bind the applicant and shall include the following information as applicable:

Finding: The application form is signed by a Metro representative. Metro has also submitted the required fee.

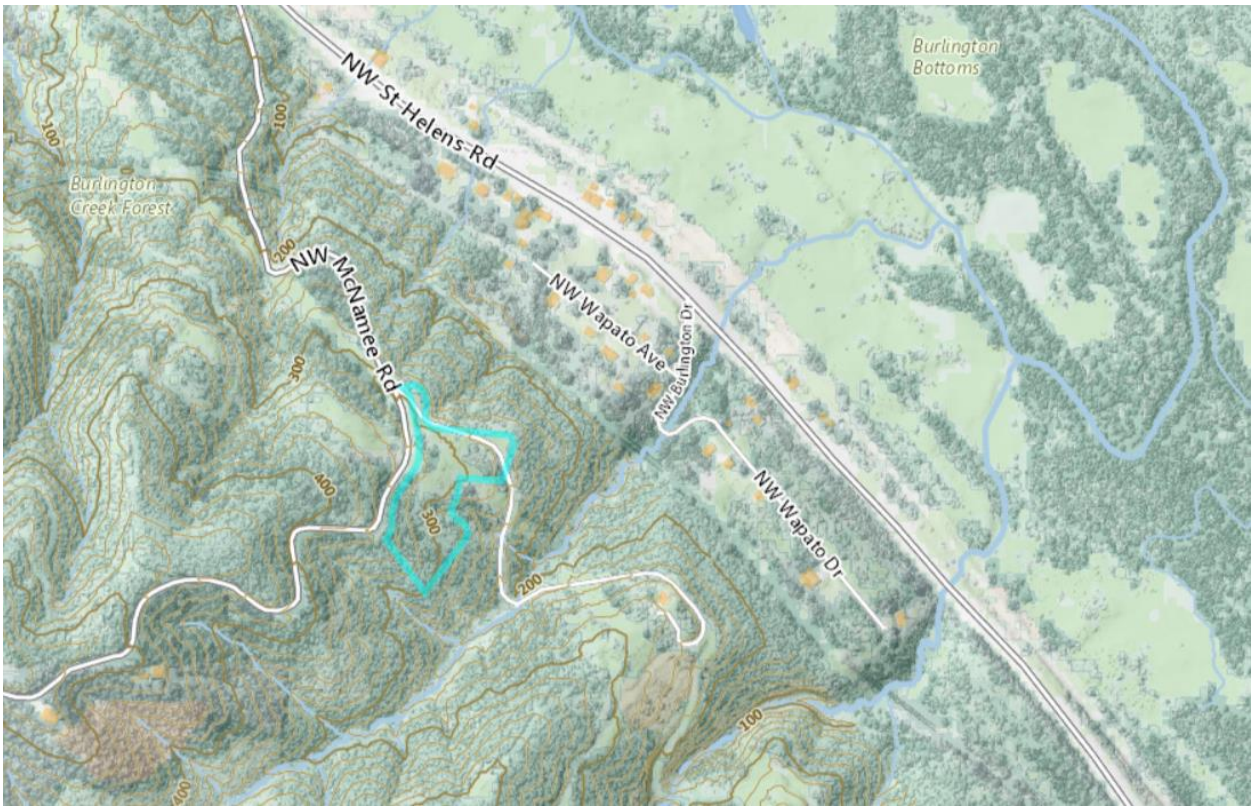
A. Applicant name, telephone/fax number(s), email address, mailing address,

Finding: Please see the introductory information provided at the front of this narrative submission.

B. Property location and zoning;

Finding: The property is zoned CFU. The property is located generally south and east of NW McNamee Road and west of the railroad corridor.

Figure 5 Property location



C. Current or intended use of the property;

Finding: The property is currently and will continue to be used for Goal 4 uses, including forest practices, to support wildlife habitat and water quality, and for public recreation in a forested environment. The variance request is necessitated by Metro's proposal to improve the access intersection and construct visitor access improvements on its Burlington Creek Forest property east of NW McNamee Road.

D. The nature and a full description of the requested variance;

Finding: Applicant proposes improvements to the access driveway and intersection with NW McNamee Drive to support visitor use. While the existing access driveway and current conditions do meet the requirements documented in the County's design standards, they do not meet AASHTO intersection sight distance standards given topographical and site limitations. As such, applicant respectfully requests a Design Exception/Road Rules Variance as permitted by County Code.

Multnomah County Design and Construction Manual (MCDCM) and AASHTO Standards provide sight distance standards, including Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD) guidelines. NW McNamee currently has no posted speed limit, and as such a 55 mph speed is assumed.

Intersection Sight Distance (ISD):

Under the MCDCM standards (table 2.3.2), the 55 mph speed correlates to a 250 foot ISD design guideline for both the north bound (NB) and south bound (SB) directions. *See* Exhibit 1, KPFF 2018 report. Table 1 of the 2018 report confirms that existing conditions do meet MCDCM ISD standards for a 55 mph design speed for all cases.

Under the AASHTO standards, the 55 mph speed correlates to ISD design guidelines between 530 feet and 610 feet at different measurement points. *See* Exhibit 1, table 2 of KPFF 2018 report. The existing condition and measured sight distances do not meet ISD standards for a 55 mph design speed. Sight distance is currently restricted to the south at approximately 300 feet due to a horizontal curve in the road and a hillside on the west side of the roadway. Sight distance is currently restricted to the north at approximately 293 feet, due to roadside trees and vegetation on the east side of the roadway.

Stopping Sight Distance (SSD):

As a matter of safety, the minimum sight distance should be no less than the stopping sight distance. The AASHTO design stopping sight distance for a design speed of 55 mph (and not accounting for grade) is 495 feet. Adjusting for grade, the SSD in the NB direction (downhill) would be approximately 600 feet and approximately 425 feet in the SB direction. Please note, ISD standards exceed SSD standards.

Improvements to meet Standard for a 55 mph design speed:

The following improvements would be required to achieve sight distance requirements for a 55 mph design speed based on AASHTO. *See* Exhibit 1.

- Removing roadside trees and vegetation north of the proposed access.
- Significant excavation, grading, and construction south of the proposed access.

Metro and its traffic engineers are of the opinion that making sight distance improvements to achieve standards associated with a 55 mph design speed would require a cost prohibitive public expenditure and substantial disturbance to trees and slopes that are not necessary to achieve safe operating conditions given actual operational speeds and at the subject access driveway intersection.

Based on the above and as detailed below, Metro requests a design exception/variance for:

Intersection Sight Distance – AASHTO guidelines
Stopping Sight Distance – AASHTO guidelines

E. Site plan, sight distance, pedestrian traffic, intersection alignment, traffic generation, vehicle mix, traffic circulation including impact on through traffic, and other similar traffic safety considerations;

Finding: The required information to consider this variance request is attached as exhibits.

F. Existing right-of-way or improvement limitations, and utility considerations;

Finding: The existing right of way – NW McNamee Road – is improved. There are no utility considerations. The proposed variance will not negatively impact the safety of the transportation system. Conversely, proposed mitigation along NW McNamee Road will improve safety for nature park visitors, Metro and PGE staff, emergency responders and area neighbors. These safety improvements might not be realized with a no action alternative.

Metro is proposing visitor access improvements to support recreational use on the Burlington Creek Forest property. The public currently accesses the site along the existing forest practices road. Users park in a small area before the locked gate. Metro desires to improve this existing condition and to provide a safer and more efficient entrance to the site. The sight distance limitations are existing. Existing sight distances have proven functional and safe given no reported accidents at the intersection. However, applicant proposes to improve sight distances with the planned improvements.

G. Adjacent land uses, their types, access requirements, and impact of traffic on them;

Finding: Metro owns the vast majority of the surrounding land up and down NW McNamee Road. With the exception of two lots held by PGE, Metro owns property on both sides of the road for nearly 2,000 feet north and south of the proposed site access driveway. The land is managed for Goal 4 uses. A power line corridor runs through the property. The property is bounded to the east by a railroad corridor. The subject access intersection is the only proposed access intersection to serve development in the vicinity. PGE uses the existing access intersection and forest practices road to access their power line infrastructure and Burlington/Hiland Water District uses it to maintain a water supply tank. There would be no impact on any other access intersection if the variance were approved.

H. Topography, grade, side hill conditions, and soil characteristics;

Finding: As depicted and described in exhibits, the topography is forest hillsides, including a steeper sloped area. The road grade is approximately 12 percent in the vicinity of the access intersection.

Figure 6 Topographical Map

The soil conditions and topography are compatible with and will support the proposed improvements. As detailed in the Geotechnical Engineering report submitted in support of the use application, in general, the site is underlain by Tertiary Columbia River Basalt that is overlain by wind-blown silt (loess) deposits, alluvium and clay. The inboard (south) side of the existing access road is cut into the north-facing slope, at gradients of up to about 1 horizontal to 1 vertical (1H:1V), while the outboard (north) side descended below the access road at gradients up to about 2H:1V. The cut slopes are generally vegetated with underbrush (blackberry bushes, ferns, etc.) and the outboard slopes are densely vegetated with coniferous trees and underbrush.

I. Drainage characteristics and problems;

Finding: Natural drainage follows the natural contours of the forest. Surface water generated from the road flows into and is controlled by roadside ditches from which it enters natural drainage courses north of the access intersection. There are no drainage problems reported at the access intersection and no adverse impacts will result from the proposed access improvements for which a sight distance design exception variance is sought. No groundwater was encountered within the depths explored by the geotechnical engineer. The preliminary access intersection improvement designs were engineered and considerations were made for surface flows, natural drainages, soils, topography and other relevant factors.

J. Fire Department access requirements within a public right of-way and their written approval of the proposed modification;

Finding: Metro does not seek a variance that implicates or otherwise modifies fire department access requirements. This standard is not applicable.

K. Natural and historic features including but not limited to trees, shrubs or other significant vegetation, water courses, wetlands, rock outcroppings, development limitation, areas of significant environmental concern, etc.;

Finding: There are no historical features impacted by the variance request. There are no natural features adversely impacted by the variance request. However, approving the variance request will permit access intersection improvements that result in substantially less disturbance to the landscape than would otherwise result from meeting sight distance standards associated with a 55 mph design speed.

L. Multnomah County Comprehensive Plan policies applicable to the particular parcel or location.

Finding: No comprehensive plan policies are specifically impacted or offended by the sight distance design exception variance. However, included with the use application is a narrative that details all applicable comprehensive plan policies related to the property. To avoid repeating and including the substantial submission, Metro respectfully incorporates that information by reference.

Section V. Conclusion

Applicant has demonstrated with findings supported by substantial evidence that the sight distance design exception variance request is warranted. Applicant respectfully requests a variance supported by mitigation to permit the location of the proposed access driveway.

Respectfully Submitted,

Gary Shepherd

Memorandum

DATE:	June 12, 2018		
PROJECT:	312064.50 – Metro North Tualatin Mountain Access	**SUBJECT:**	Burlington Creek Forest Sight Distance Evaluation
TO:	Karen Vitkay Metro	**FROM:**	Curt Vanderzanden KPFF Consulting Engineers
PHONE:	503-797-1874	**PHONE:**	503-542-3808
EMAIL:	karen.vitkay@oregonmetro.gov	**EMAIL:**	curt.vanderzanden@kpff.com

Introduction

In 2014, at Metro's request, KPFF completed an intersection sight distance evaluation for five existing access points located in the Tualatin Mountains. The results of that effort were documented in a memorandum dated May 5, 2014. At Metro's request, Multnomah County completed a review of the 2014 analysis specifically relating to proposed improvements at the Burlington Creek Forest site and identified the following concerns related to the access of the Burlington Creek site:

- The 2014 analysis utilized the 85th percentile speed as the design speed. The County is requesting that the analysis be completed utilizing the posted speed of 55 mph.
- The 2014 analysis utilized an object height of 4.25 feet (as stated in the County's design standards). The County is requesting that the analysis utilize an object height of 3.5 feet to meet AASHTO requirements.
- The County has requested that a sight distance analysis for a southwest traveling vehicle wanting to turn left to the proposed access of the Burlington Creek Forest Nature Park be included.

At the request of Metro, KPFF has completed an updated intersection sight distance evaluation at Burlington Creek Forest along NW McNamee Road to address Multnomah County comments. The purpose of this evaluation is to determine if existing conditions provide adequate sight distance to meet Multnomah County standards and to identify what improvements would be necessary to meet those standards.

Field Work

On May 24, 2018, KPFF staff performed a site visit, documenting the available sight distance through photos and field measurements. For cases B1 and B2, the measurements of the available sight distance were taken from a point 15 feet from the edge of pavement and a height of eye of 3.5 feet, to the center of each approaching travel lane, with a height of object of 3.5 feet. For Case F, the height of eye and object are the same as cases B1 and B2, but the measurements were taken 29 feet from the intersection (15 feet plus the width of the lane departing from the intersection). The results of this effort are depicted in Exhibit "A" attached and in the following tables.

Measured Sight Distances and Standards

The following tables document available sight distances based on field observations and provide a

comparison to Multnomah County standards, as well as guidelines provided in the 2011 AASHTO A Policy on Geometric Design of Highways and Streets (Green Book). Per request of Multnomah County, the sight distances shown are based on a design speed of 55 mph.

Access looking south

Access looking north

The following table summarizes the measured and required intersection sight distance per Multnomah County Design and Construction Manual (MCDCM) *Table 2.3.2 Minimum Corner Intersection Sight Distance.*

Table 1: MCDCM Intersection Sight Distances

Case	Design Speed	Measured	Standard Requirement (55 MPH)	Meets Standard?	Sight Obstruction
B1, Left turn from Stop - MCDS	55 mph	293 ft (NB) 300 ft (SB)	250 ft	Yes	N/A
B2, Right Turn from Stop - MCDS	55 mph	300 ft	250 ft	Yes	N/A
F, Left Turn from the Major Road - MCDS	55 mph	270 ft	250 ft	Yes	N/A

While the above table shows that the current condition provides sight distances meeting the requirements documented in the County's design standards, we also conducted an evaluation utilizing the current AASHTO standards. The following table summarizes the measured and required intersection sight distance per the AASHTO Green Book, *Table 9-6 Design Intersection Sight Distance – Case B1, Left Turn from Stop,* Table *9-8 Design Intersection Sight Distance – Case B2, Right Turn from Stop and Case B3, Crossing Maneuver, and Case F, Left Turn from the Major Road.*

Table 2: AASHTO Intersection Sight Distances

Intersection Sight Distance (ISD)						
Case	**Design Speed**	**Measured**	**Standard Requirement (55 MPH)**	**Meets Standard?** (Yes/No)	**Design Speed Achieved Under Current Conditions**	**Sight Obstruction**
B1, Left Turn from Stop - AASHTO	55 mph	293 ft (NB) 300 ft (SB)	610 ft	No	26.5 MPH	Hillside, Horizontal Curve
B2, Right Turn from Stop - AASHTO	55 mph	300 ft	530 ft	No	27.2 MPH	Trees and Vegetation
F, Left Turn from the Major Road - AASHTO	55 mph	270 ft	610 ft	No	33.4 MPH	Hillside, Horizontal Curve

Summary

- The existing conditions do provide ISD meeting the requirements of MCDCM Table 2.3.2 for a 55 mph design speed for all cases.
- The existing conditions do not, however, meet AASHTO ISD requirements for a 55 mph design speed. Based on AASHTO guidelines, design speeds achieved given the existing conditions are in the range of 26.5 to 33.4 mph.
- Sight distance (measured at 15 feet from the eastern pavement edge of NW McNamee Road) is currently restricted to the south at approximately 300 feet, due to a horizontal curve in the road and a hillside on the west side of the roadway.
- Sight distance is currently restricted to the north at approximately 293 feet, due to roadside trees and vegetation on the east side of the roadway.

Improvements to Meet Standard

The following improvements would be required to achieve ISD requirements for a 55 mph design speed based on AASHTO. A graphical representation of these requirements is included in Exhibit "A".

- Removing the roadside trees and vegetation and recording a restrictive sight distance easement over Metro-owned property north of the proposed access, to improve available ISD as needed to meet the required 55 mph design speed.
- Significant construction would be required to meet ISD for 55 mph south of the proposed access. This work would include excavation of the hillside west of McNamee Road. In addition, routine maintenance would be required on property owned by PGE.
- By making the modifications identified above, the required ISD based on AASHTO could be attained in all directions. See Table 3 for a summary of the measured and required sight distances.

Table 3: Sight Distance (SD) Summary – AASHTO

Traffic Direction	Measured SD	Required ISD (AASHTO)	With Trees and Vegetation Cleared	Vegetation Clearance Meets SD? (Yes/No)	Hillside Cleared and Leveled	Hillside Adjustments Meets SD? (Yes/No)
NB	300 ft	610 ft	>305 ft	No	>700 ft	Yes
SB	293 ft	530 ft	>560 ft	Yes	>560 ft	Yes

The estimated construction cost to achieve the required intersection sight distance, based on a 55 mph design speed in both directions, is approximately $1,550,000. This cost includes clearing and grubbing, grading, aggregate base, asphalt paving and other miscellaneous items required to meet AASHTO ISD requirements. This does not include costs associated with the acquisition of required easements or costs associated with removal of rock or other obstructions that could be encountered with such a significant excavation. A concept level cost estimate is provided as Exhibit "B".

Preliminary Recommendations:

We recommend that clearing of vegetation to the north of the proposed access be completed to achieve the recommended ISD for 55 mph. However, based on the significant costs associated with meeting recommended ISD for 55 mph south of the proposed access, we recommend exploring other options with the County, which could include:

- Achieve a reduction in the design speed to 25 mph through the incorporation of regulatory signage or other traffic control methods. This would significantly reduce the amount of work required south of the access and would not require construction on property not under Metro ownership.
- If the above outcome is not acceptable, move forward with the improvements identified in our 2014 memorandum for this site to achieve a design speed of 38 mph. This would result in a significant reduction in the amount of construction and the associated costs from what would be required to meet the 55 mph design speed. It would, however, still require work on property owned by PGE.

We do understand that either of the options identified above may require the acquisition of a variance from the County. As documented in our 2014 analysis, motorists are not currently traveling 55 mph through this access intersection as road conditions (curves) and topography greatly restrict travel speeds. As such, requiring improvements to meet a 55 mph design speed would be unduly burdensome, while disturbing an unnecessary amount of land and slopes. In our professional opinion, reducing the regulatory speed to 25 mph through signage or improving intersectional site distance to reflect the documented 85th percentile speeds of 38 mph is most appropriate.

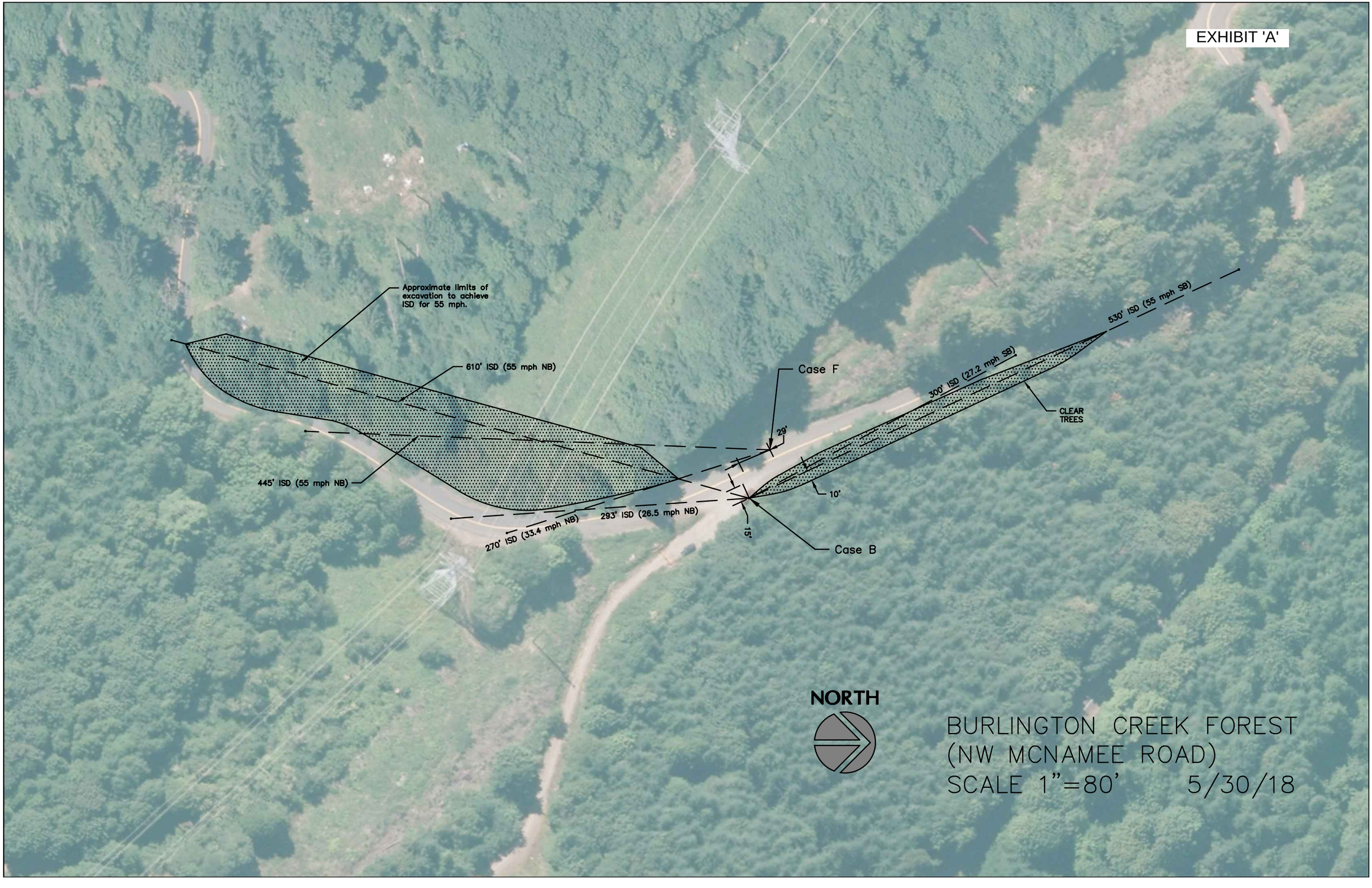
Please do not hesitate to contact us if you have any questions regarding the information provided here.

Sincerely,
KPFF Consulting Engineers

Curtis C. Vanderzanden, PE
Principal

Attachments: Appendix A – Site Maps
Appendix B – Estimates

EXHIBIT 'A'



BURLINGTON CREEK FOREST
(NW MCNAMEE ROAD)
SCALE 1"=80' 5/30/18

kpff Consulting Engineers

TOTAL CONSTRUCTION COSTS
for
Burlington Creek Forest
(NW McNamee Road)

EXHIBIT B
CONCEPTUAL Estimate: 5/30/18
METRO: North Tualatin Access Study

ITEM NUMBER	ITEM DESCRIPTION	QUANTITY	UNIT		UNIT COST		ITEM COST
PART 00200 - TEMPORARY FEATURES AND APPURTENANCES							
0210-0100000A	MOBILIZATION	1	LS	$	110,595.00	$	110,595.00
0225-0101000A	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$	110,595.00	$	110,595.00
0280-0100000A	EROSION CONTROL	1	LS	$	22,119.00	$	22,119.00
					Subtotal	**$**	**243,309.00**
PART 00300 - ROADWORK							
0305-0100000A	CONSTRUCTION SURVEY WORK	1	LS	$	44,238.00	$	44,238.00
0320-0100000R	CLEARING AND GRUBBING	4	ACRE	$	8,000.00	$	32,000.00
0330-0105000K	GENERAL EXCAVATION	38,100	CUYD	$	20.00	$	762,000.00
0330-0123000K	EMBANKMENT IN PLACE	500	CUYD	$	15.00	$	7,500.00
					Subtotal	**$**	**845,738.00**
PART 00400 - DRAINAGE AND SEWERS							
0445-010012AF	12 INCH CULVERT PIPE, 5 FT DEPTH	0	FOOT	$	55.00	$	-
0445-0700120E	SLOPED END SECTIONS, 12 INCH	0	EACH	$	400.00	$	-
					Subtotal	**$**	**-**
PART 00600 - BASES							
0641-0102000M	AGGREGATE BASE	160	TON	$	20.00	$	3,200.00
					Subtotal	**$**	**3,200.00**
PART 00700 - WEARING SURFACES							
0744-0302000M	LEVEL 3, 1/2 INCH DENSE MHMAC MIXTURE	20	TON	$	120.00	$	2,400.00
					Subtotal	**$**	**2,400.00**
PART 00900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS							
0910-0100000K	WOOD SIGN POSTS	20	FBM	$	8.00	$	160.00
0940-0134000J	TYPE "Y1" SIGNS IN PLACE	22	SQFT	$	20.00	$	440.00
					Subtotal	**$**	**600.00**
PART 01000 - RIGHT OF WAY DEVELOPMENT AND CONTROL							
1030-0102000E	SEEDING MOBILIZATION	1	EACH	$	700.00	$	700.00
1030-0108000R	PERMANENT SEEDING	4.0	ACRE	$	2,500.00	$	10,000.00
					Subtotal	**$**	**10,700.00**
					CONSTRUCTION SUBTOTAL	**$**	**1,105,947.00**
					CONTINGENCY (40.0%)	**$**	**442,378.80**
					ESTIMATE TOTAL	**$**	**1,548,325.80**

Notes:

1. Estimate based on standard measurement and payment practices as specified in the 2008 Oregon Standard Specificaitons for Construction
2. Unit costs based on ODOT Weighted Average Item Prices - Calendar Year 2013;
3. Estimate does not include costs for Right-of-Way Takings and Easements;
4. Estimate does not include costs for design and construction of utility relocations;

Memorandum

DATE: May 5, 2014

PROJECT: 312064.50-Metro North Tualatin Mountain Access

SUBJECT: Intersection Sight Distance Evaluation

TO: Robert Spurlock
Metro
PHONE: (503)813-7560
EMAIL: Robert.Spurlock@oregonmetro.gov

FROM: Curt Vanderzanden, PE, Principal
KPFF Consulting Engineers
PHONE: 503-542-3808
EMAIL: curt.vanderzanden@kpffcivil.com

Introduction

At the request of Metro, KPFF has completed an intersection site distance evaluation for five existing access points located in the Tualatin Mountains; two along NW McNamee Road, one on NW Newberry Road, and two along Skyline Boulevard. The purpose of this evaluation is to determine if existing conditions provide adequate sight distance to meet Multnomah County standards and to identify what improvements would be necessary to meet those standards.

Field Work

On April 3, 2014, KPFF staff performed a site visit, documenting, through photos and field measurements, the available sight distance. At each location, and in each travel direction, measurements of the available sight distance were taken, from a point 15 feet from the edge of pavement, and a height of eye of 3.5 feet, to the center of each approaching travel lane, with a height of object of 4.25 feet. To assist in the sight distance evaluation, Kittelson and Associates performed a speed study to determine the 85th percentile speeds in each direction of travel at each access point. The speed study was completed on April 18, 2014, and is included as Appendix A. A summary of the results of the field work and speed study can be found in Table 1 below.

Measured Sight Distances and Standards

Per Multnomah County Design Standards, intersection sight distance shall be in accordance with the procedures stated in current AASHTO Standards. The following Table 1 summarizes the five sites' measured and required intersection sight distance per AASHTO *Table 9-6 Design Intersection Sight Distance – Case B1, Left Turn from Stop* and *Table 9-8 Design Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver*.

Table 1: Intersection Sight Distances

Location	Direction	85th Percentile Speed	Intersection Sight Distance (ISD)			
			Measured	AASHTO Requirement	Adequate? (Yes/No)	Reasoning
Site #1 Burlington Creek Forest (NW McNamee Rd)	NB	38 mph	290 ft	365 ft (right turn)	No	Hillside, Horizontal Curve
	SB	35 mph	330 ft	390 ft (left turn)	No	Trees/Vegetation

Table 1: Intersection Sight Distances (continued)

Location	Direction	85th Percentile Speed	Intersection Sight Distance (ISD)			
			Measured	AASHTO Requirement	Adequate? (Yes/No)	Reasoning
Site #2 Ennis Creek Forest (NW Newberry Rd)	NB	46 mph	95 ft	510 ft (left turn)	No	Hillside
	SB	45 mph	70 ft	430 ft (right turn)	No	Hillside, Vertical Curve
Site #3 McCarthy Creek (NW McNamee Rd)	EB	36 mph	635 ft	345 ft (right turn)	Yes	None
	WB	37 mph	375 ft	410 ft (left turn)	No	Trees
Site #4 McCarthy Creek (NW Skyline Blvd)	EB	51 mph	470 ft	565 ft (left turn)	No	Vegetation
	WB	49 mph	260 ft	470 ft (right turn)	No	Hillside/Vegetation, Vertical Curve
Site #5 North Abbey Creek (NW Skyline Blvd)	EB	44 mph	20 ft	425 ft (right turn)	No	Minor vegetation
	WB	44 mph	80 ft	490 ft (left turn)	No	Minor vegetation

The Multnomah County Design Standards and AASHTO Standards state that when minimum intersection sight distance cannot be met, the minimum sight distance should be no less than the stopping sight distance on the major street. The required stopping sight distances were calculated for the five sites and are summarized below in Table 2.

Table 2: Stopping Sight Distances

Location	Direction	85th Percentile Speed	Measured Sight Distance	Stopping Sight Distance (SSD)		
				Measured Average Slope	AASHTO Recommendation	Adequate? (Yes/No)
Site #1 Burlington Creek Forest (NW McNamee Rd)	NB	38 mph	290 ft	-12.5%	360 ft	No
	SB	35 mph	330 ft	12.8%	215 ft	Yes
Site #2 Ennis Creek Forest (NW Newberry Rd)	NB	46 mph	95 ft	-5.5%	410 ft	No
	SB	45 mph	70 ft	-1.2%	370 ft	No
Site #3 McCarthy Creek (NW McNamee Rd)	EB	36 mph	635 ft	1.5%	255 ft	Yes
	WB	37 mph	375 ft	3.7%	255 ft	Yes
Site #4 McCarthy Creek (NW Skyline Blvd)	EB	51 mph	470 ft	5.5%	405 ft	Yes
	WB	49 mph	260 ft	-1.7%	425 ft	No
Site #5 North Abbey Creek (NW Skyline Blvd)	EB	44 mph	20 ft	3.6%	330 ft	No
	WB	44 mph	80 ft	-2.8%	365 ft	No

Access Evaluation

As discussed previously, five existing driveway access points have been evaluated to determine what improvements are necessary to meet Multnomah County access standards. Maps for each site are provided in Appendix B. Conceptual cost estimates are provided in Appendix C. The estimated costs at each site include costs for addressing sight distance issues as well as upgrades to the existing access points which may include grading, paving and culvert installations where needed.

Site #1: Burlington Creek Forest (NW McNamee Road)

A. Sight distance (measured at 15 feet from the eastern pavement edge of NW McNamee Road) is currently restricted to the south at approximately 290 feet due to a horizontal curve in the road and a hillside on the west side of the roadway. Sight distance is currently restricted to the north at approximately 330 feet due to roadside trees and vegetation on the east side of the roadway.

Site #1 Access looking south

Site #1 Access looking north

B. Cutting the easterly hillside down, and recording a restrictive sight distance easement over a portion of what appears to be private property, leased or owned by the power line company, will improve available sight distance somewhat to the south.

C. Removing the roadside trees and vegetation, and recording a restrictive sight distance easement over a portion of what appears to be Metro-owned property, will improve available sight distance somewhat to the north.

D. By making these modifications, it is likely that the required intersection sight distance can be attained in either direction. See Table 3 for a summary of the measured and required sight distances.

Table 3: Sight Distance (SD) Summary – Site #1

Traffic Direction	Measured SD	Required ISD	Required SSD	SD with Improvements	Meets ISD? (Yes/No)
NB	290 ft	365 ft	360 ft	>365 ft	Yes
SB	330 ft	390 ft	215 ft	>390 ft	Yes

E. The estimated construction costs to achieve the required intersection sight distance, in both directions, is approximately **$87,000**. This cost includes clearing and grubbing, grading, aggregate base, asphalt paving and other miscellaneous items required to meet Multnomah County standards. This does not include costs associated with the acquisition of required easements. If Multnomah County allows, this cost can be reduced by approximately **$5,000** if stopping sight distance is used to the north of the access.

Site #2: Ennis Creek Forest (NW Newberry Road)

A. Sight distance (measured at 15 feet from the western pavement edge of NW Newberry Road) is currently restricted to the south at approximately 95 feet due to roadside vegetation and an embankment. Sight distance is currently restricted to the north at approximately 70 feet due to roadside vegetation, an embankment and the vertical curvature of the roadway.

Site #2 Access looking south

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

April 18, 2014 Project #: 17705

Curt Vanderzanden, P.E.
KPFF Consulting Engineers
111 SW Fifth Avenue, Suite 2500
Portland, Oregon 97204

RE: Speed Study - Metro Parks Access Locations

Dear Curt,

This letter summarizes the results of a speed study conducted at five proposed site access locations in the Tualatin Mountains, northwest of Portland, for four Metro natural areas. The five site access locations were provided by KPFF and are illustrated in a series of maps provided in Attachment "A". Access to the four natural area sites are proposed at the following locations:

1. Burlington Creek Forest –NW McNamee Road, south of NW Wapato Avenue
2. Ennis Creek Forest –NW Newberry Road, between NW Skyline Boulevard and NW St Helens Road
3. McCarthy Creek –McNamee Road, south of NW Pauly Road
4. McCarthy Creek –NW Skyline Boulevard, east of NW Quarry Road
5. North Abbey Creek –NW Skyline Boulevard, west of NW McNamee Road

Bi-directional traffic volumes and travel speeds were collected near each access location over a 48-hour period. Maps showing the location of where data was collected are included in Attachment "B". Table 1 summarizes the traffic volume and travel data collected over those periods. The travel speeds shown in Table 1 reflect the 85th percentile speeds observed along the roadway, or the speeds at which 85 percent of all traffic travels at or below. The traffic volume and travel speed data is included in Attachment "C".

Table 1: Traffic Volume and Travel Speed Data

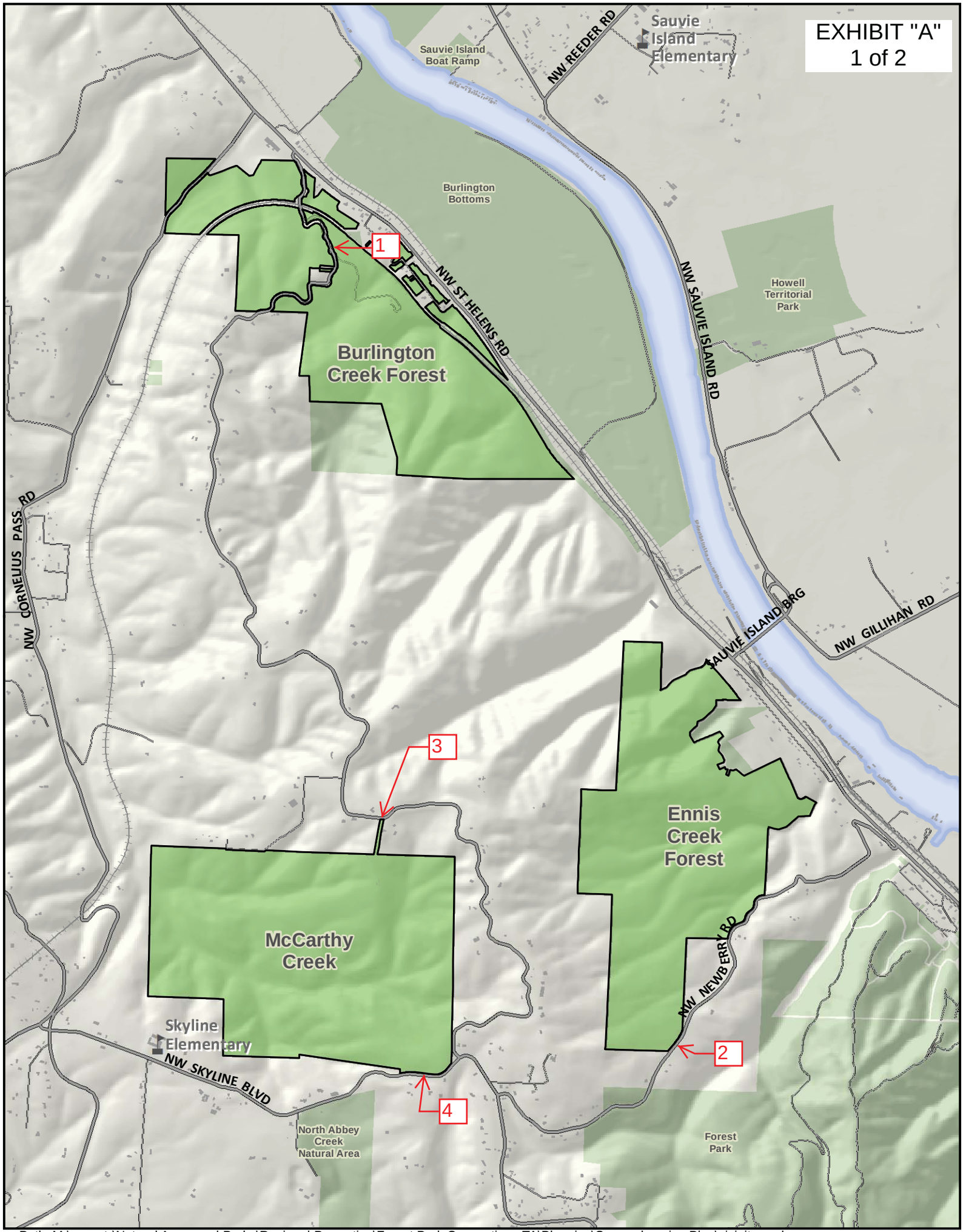
Site - Location	Traffic Volumes			85th Percentile Speeds (mph)	
	Total	Direction (NB or EB)	Direction (SB or WB)	Direction (NB or EB)	Direction (SB or WB)
1. Burlington Creek Forest (McNamee Rd)	448	232 (NB)	216 (SB)	38 (NB)	35 (SB)
2. Ennis Creek Forest (Newberry Rd)	3,351	2,319 (NB)	1,032 (SB)	46 (NB)	45 (SB)
3. McCarthy Creek (McNamee Road)	257	126 (EB)	131 (WB)	36 (EB)	37 (WB)
4. McCarthy Creek (Skyline Blvd)	4,135	2,578 (EB)	1,557 (WB)	51 (EB)	49 (WB)
5. North Abbey Creek (Skyline Blvd)	4,142	2,572 (NB)	1,570 (SB)	44 (NB)	44 (SB)

I trust this letter provides you with sufficient information about travel speeds near the proposed site access locations. Please feel free to contact me if you have any additional questions or comments.

Sincerely,
KITTELSON & ASSOCIATES, INC.

Jeff Whitman, P.E.
Engineer

Attachment A Proposed Access Location Maps



Path: M:\suscntr\Natural Areas and Parks\Regional Properties\Forest Park Connections TA\Planning\Comprehensive Plan\vicinity.mxd

Attachment B Data Collection Location Maps

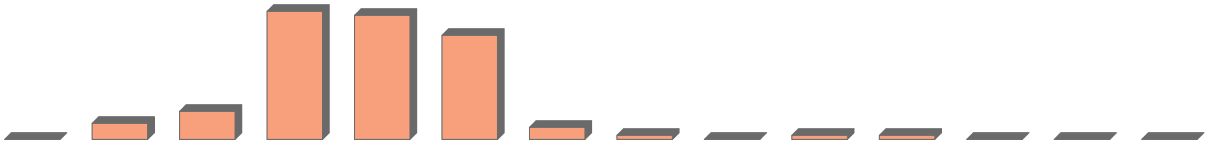
Google earth

feet 1000
meters 300

Attachment C Traffic Volume and Travel Speed Data

LOCATION: NW McNamee Rd south of NW Wapato Ave
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Portland, OR

QC JOB #: 12456909
DIRECTION: NB
DATE: Apr 09 2014

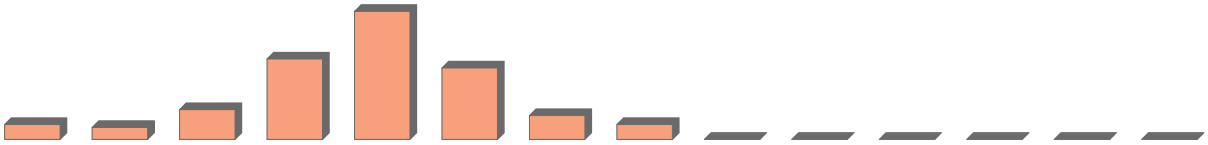
Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
4:00 AM	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3	26-35	3
5:00 AM	0	0	0	0	2	**4**	**1**	0	0	0	0	0	0	0	7	31-40	6
6:00 AM	0	0	0	3	3	4	0	0	0	0	0	0	0	0	10	31-40	7
7:00 AM	0	**1**	**2**	2	3	1	0	0	0	0	0	0	0	0	9	30-39	4
8:00 AM	0	0	1	**5**	**4**	2	0	0	0	0	0	0	0	0	**12**	26-35	9
9:00 AM	0	0	0	2	4	1	1	0	0	0	0	0	0	0	8	26-35	6
10:00 AM	0	1	0	4	1	2	0	0	0	0	0	0	0	0	8	28-37	4
11:00 AM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	31-40	2
12:00 PM	0	**2**	0	**3**	0	**3**	0	0	0	0	0	0	0	0	**8**	21-30	3
1:00 PM	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3	26-35	3
2:00 PM	0	0	**1**	2	2	1	**1**	0	0	0	0	0	0	0	7	26-35	4
3:00 PM	0	0	0	2	1	2	0	**1**	0	**1**	0	0	0	0	7	31-40	3
4:00 PM	0	0	1	0	**3**	2	0	0	0	0	0	0	0	0	6	31-40	5
5:00 PM	0	0	1	2	1	1	0	0	0	0	**1**	0	0	0	6	26-35	3
6:00 PM	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3	31-40	2
7:00 PM	0	0	0	3	1	1	0	0	0	0	0	0	0	0	5	26-35	4
8:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	26-35	1
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
11:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	16-25	1
Day Total	0	4	7	32	31	26	3	1	0	1	1	0	0	0	106	26-35	63
Percent	0.0%	3.8%	6.6%	30.2%	29.2%	24.5%	2.8%	0.9%	0.0%	0.9%	0.9%	0.0%	0.0%	0.0%			
ADT 106																	
AM Peak		7:00 AM	7:00 AM	8:00 AM	8:00 AM	5:00 AM	5:00 AM								8:00 AM		
Volume		1	2	5	4	4	1								12		
PM Peak		12:00 PM	2:00 PM	12:00 PM	4:00 PM	12:00 PM	2:00 PM	3:00 PM		3:00 PM	5:00 PM				12:00 PM		
Volume		2	1	3	3	3	1	1		1	1				8		

Comments:

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: NW McNamee Rd south of NW Wapato Ave
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Portland, OR

QC JOB #: 12456909
DIRECTION: NB
DATE: Apr 10 2014

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
4:00 AM	0	0	0	1	1	1	**1**	0	0	0	0	0	0	0	4	36-45	2
5:00 AM	0	**1**	0	0	2	**3**	0	0	0	0	0	0	0	0	6	33-42	4
6:00 AM	0	0	**2**	2	4	3	1	**1**	0	0	0	0	0	0	**13**	32-41	6
7:00 AM	0	1	1	2	4	2	0	0	0	0	0	0	0	0	10	31-40	6
8:00 AM	**1**	1	0	0	**5**	3	0	0	0	0	0	0	0	0	10	31-40	7
9:00 AM	0	0	0	**3**	2	1	1	0	0	0	0	0	0	0	7	26-35	5
10:00 AM	0	0	0	2	4	2	0	0	0	0	0	0	0	0	8	31-40	6
11:00 AM	1	0	0	2	3	1	1	0	0	0	0	0	0	0	8	30-39	4
12:00 PM	0	0	1	3	1	**3**	0	0	0	0	0	0	0	0	8	27-36	4
1:00 PM	**1**	0	1	1	2	1	0	0	0	0	0	0	0	0	6	31-40	3
2:00 PM	1	0	**3**	**4**	1	0	0	0	0	0	0	0	0	0	9	21-30	7
3:00 PM	0	**1**	1	3	2	3	**2**	**2**	0	0	0	0	0	0	**14**	36-45	5
4:00 PM	1	0	1	1	**5**	0	0	1	0	0	0	0	0	0	9	26-35	6
5:00 PM	0	0	0	2	3	0	2	1	0	0	0	0	0	0	8	28-37	4
6:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	21-30	1
7:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	26-35	3
8:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	31-40	2
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
Day Total	5	4	10	27	43	24	8	5	0	0	0	0	0	0	126	27-36	69
Percent	4.0%	3.2%	7.9%	21.4%	34.1%	19.0%	6.3%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
ADT 126																	
AM Peak	8:00 AM	5:00 AM	6:00 AM	9:00 AM	8:00 AM	5:00 AM	4:00 AM	6:00 AM							6:00 AM		
Volume	1	1	2	3	5	3	1	1							13		
PM Peak	1:00 PM	3:00 PM	2:00 PM	2:00 PM	4:00 PM	12:00 PM	3:00 PM	3:00 PM							3:00 PM		
Volume	1	1	3	4	5	3	2	2							14		

Comments:

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

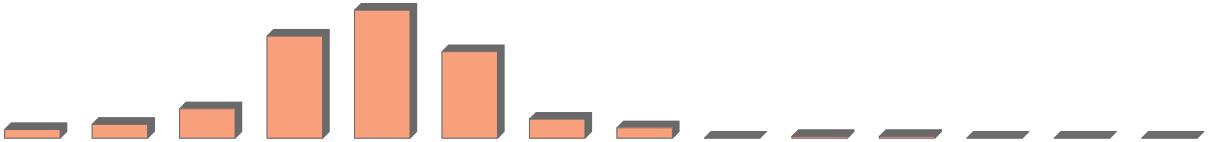
SUMMARY - Tube Count - Speed Data

LOCATION: NW McNamee Rd south of NW Wapato Ave
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Portland, OR

QC JOB #: 12456909
DIRECTION: NB
DATE: Apr 09 2014 - Apr 10 2014

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	5	8	17	59	74	50	11	6	0	1	1	0	0	0	232	26-35	133
Percent	2.2%	3.4%	7.3%	25.4%	31.9%	21.6%	4.7%	2.6%	0.0%	0.4%	0.4%	0.0%	0.0%	0.0%			
Cumulative Percent	2.2%	5.6%	12.9%	38.4%	70.3%	91.8%	96.6%	99.1%	99.1%	99.6%	100.0%	100.0%	100.0%	100.0%			

ADT
116



85th Percentile 38 MPH

Mean Speed(Average) 31 MPH

Median 31 MPH
Mode: 33 MPH

Comments:

Report generated on 4/18/2014 11:37 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

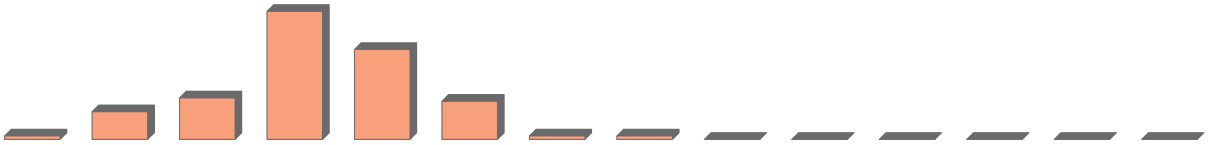
Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: NW McNamee Rd south of NW Wapato Ave
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Portland, OR

QC JOB #: 12456909
DIRECTION: SB
DATE: Apr 09 2014

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
2:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	31-40	1
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
4:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	26-35	1
5:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	21-30	1
6:00 AM	0	**1**	1	2	**2**	0	0	0	0	0	0	0	0	0	6	26-35	4
7:00 AM	0	0	0	3	2	1	0	0	0	0	0	0	0	0	6	26-35	5
8:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	11-20	1
9:00 AM	0	1	**2**	3	2	0	0	0	0	0	0	0	0	0	8	26-35	5
10:00 AM	0	0	1	**5**	1	**2**	0	0	0	0	0	0	0	0	**9**	21-30	6
11:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	21-30	2
12:00 PM	0	0	1	**5**	1	0	**1**	0	0	0	0	0	0	0	8	21-30	6
1:00 PM	0	**1**	0	2	0	0	0	0	0	0	0	0	0	0	3	21-30	2
2:00 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	21-30	1
3:00 PM	0	1	0	1	3	1	0	0	0	0	0	0	0	0	6	26-35	4
4:00 PM	0	1	**2**	2	1	**2**	0	0	0	0	0	0	0	0	8	21-30	4
5:00 PM	**1**	1	2	3	**8**	2	0	0	0	0	0	0	0	0	**17**	26-35	11
6:00 PM	0	0	1	4	2	2	0	**1**	0	0	0	0	0	0	10	26-35	6
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
8:00 PM	0	0	0	2	2	0	0	0	0	0	0	0	0	0	4	26-35	4
9:00 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	4	21-30	3
10:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	26-35	1
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
Day Total	1	8	12	37	26	11	1	1	0	0	0	0	0	0	97	26-35	63
Percent	1.0%	8.2%	12.4%	38.1%	26.8%	11.3%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

ADT
97



AM Peak		6:00 AM	9:00 AM	10:00 AM	6:00 AM	10:00 AM			10:00 AM
Volume		1	2	5	2	2			9
PM Peak	5:00 PM	1:00 PM	4:00 PM	12:00 PM	5:00 PM	4:00 PM	12:00 PM	6:00 PM	5:00 PM
Volume	1	1	2	5	8	2	1	1	17

Comments:

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

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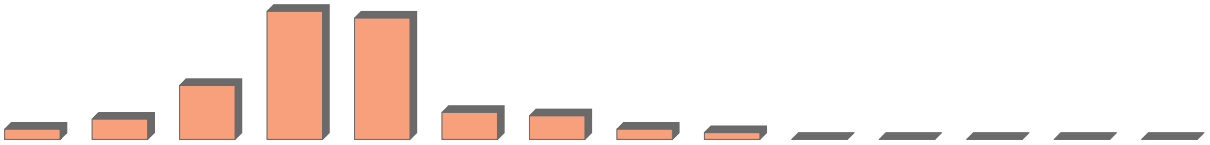
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
4:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	16-25	1
5:00 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	21-30	2
6:00 AM	0	1	**3**	1	1	0	0	0	0	0	0	0	0	0	6	16-25	4
7:00 AM	0	1	0	1	1	0	**1**	0	0	0	0	0	0	0	4	26-35	2
8:00 AM	0	1	2	2	0	1	0	0	0	0	0	0	0	0	6	21-30	4
9:00 AM	0	0	0	2	2	0	0	0	0	0	0	0	0	0	4	26-35	4
10:00 AM	0	**2**	0	**3**	**3**	**2**	0	0	0	0	0	0	0	0	**10**	31-40	5
11:00 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	21-30	1
12:00 PM	0	0	**4**	1	2	0	1	0	0	0	0	0	0	0	8	23-32	4
1:00 PM	0	0	2	**5**	1	1	2	0	0	0	0	0	0	0	11	21-30	7
2:00 PM	**1**	0	0	2	3	0	0	0	0	0	0	0	0	0	6	28-37	4
3:00 PM	1	0	0	2	5	0	0	0	0	0	0	0	0	0	8	26-35	7
4:00 PM	0	0	0	5	**6**	0	0	0	0	0	0	0	0	0	11	26-35	10
5:00 PM	0	0	1	3	2	0	0	0	0	0	0	0	0	0	6	26-35	5
6:00 PM	1	0	2	2	1	**3**	**3**	**3**	**1**	0	0	0	0	0	**16**	43-52	5
7:00 PM	0	0	0	3	2	0	0	0	0	0	0	0	0	0	5	26-35	5
8:00 PM	0	0	1	0	2	0	0	0	0	0	0	0	0	0	3	26-35	2
9:00 PM	0	**1**	0	1	1	0	0	0	1	0	0	0	0	0	4	26-35	2
10:00 PM	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	26-35	4
11:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	21-30	2
Day Total	3	6	16	38	36	8	7	3	2	0	0	0	0	0	119	26-35	74
Percent	2.5%	5.0%	13.4%	31.9%	30.3%	6.7%	5.9%	2.5%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%			
ADT 119																	
AM Peak		10:00 AM	6:00 AM	10:00 AM	10:00 AM	10:00 AM	7:00 AM								10:00 AM		
Volume		2	3	3	3	2	1								10		
PM Peak	2:00 PM	9:00 PM	12:00 PM	1:00 PM	4:00 PM	6:00 PM	6:00 PM	6:00 PM	6:00 PM						6:00 PM		
Volume	1	1	4	5	6	3	3	3	1						16		

Comments:

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

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Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	4	14	28	75	62	19	8	4	2	0	0	0	0	0	216	26-35	137
Percent	1.9%	6.5%	13.0%	34.7%	28.7%	8.8%	3.7%	1.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%			
Cumulative Percent	1.9%	8.3%	21.3%	56.0%	84.7%	93.5%	97.2%	99.1%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

ADT
108

85th Percentile 35 MPH

Mean Speed(Average) 29 MPH

Median 29 MPH
Mode: 28 MPH

Comments:

Report generated on 4/18/2014 11:37 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Quality Counts
TRANSPORTATION DATA COLLECTION

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12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
2:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	31-40	1
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
4:00 AM	0	0	0	1	3	0	0	0	0	0	0	0	0	0	4	26-35	4
5:00 AM	0	0	0	1	2	**4**	**1**	0	0	0	0	0	0	0	8	31-40	6
6:00 AM	0	**1**	1	5	5	4	0	0	0	0	0	0	0	0	16	26-35	10
7:00 AM	0	1	**2**	5	5	2	0	0	0	0	0	0	0	0	15	26-35	10
8:00 AM	0	1	1	5	4	2	0	0	0	0	0	0	0	0	13	26-35	9
9:00 AM	0	1	2	5	**6**	1	1	0	0	0	0	0	0	0	16	27-36	10
10:00 AM	0	1	1	**9**	2	4	0	0	0	0	0	0	0	0	**17**	26-35	10
11:00 AM	0	0	1	1	1	1	0	0	0	0	0	0	0	0	4	31-40	2
12:00 PM	0	**2**	1	**8**	1	3	**1**	0	0	0	0	0	0	0	16	21-30	9
1:00 PM	0	1	0	4	1	0	0	0	0	0	0	0	0	0	6	27-36	4
2:00 PM	0	0	1	3	2	1	1	0	0	0	0	0	0	0	8	26-35	5
3:00 PM	0	1	0	3	4	3	0	**1**	0	**1**	0	0	0	0	13	28-37	7
4:00 PM	0	1	**3**	2	4	**4**	0	0	0	0	0	0	0	0	14	31-40	8
5:00 PM	**1**	1	3	5	**9**	3	0	0	0	0	**1**	0	0	0	**23**	26-35	14
6:00 PM	0	0	1	5	3	3	0	1	0	0	0	0	0	0	13	28-37	7
7:00 PM	0	0	0	3	1	1	0	0	0	0	0	0	0	0	5	26-35	4
8:00 PM	0	0	0	2	3	0	0	0	0	0	0	0	0	0	5	28-37	4
9:00 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	4	21-30	3
10:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	26-35	1
11:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	16-25	1
Day Total	1	12	19	69	57	37	4	2	0	1	1	0	0	0	203	26-35	126
Percent	0.5%	5.9%	9.4%	34.0%	28.1%	18.2%	2.0%	1.0%	0.0%	0.5%	0.5%	0.0%	0.0%	0.0%			

ADT 203

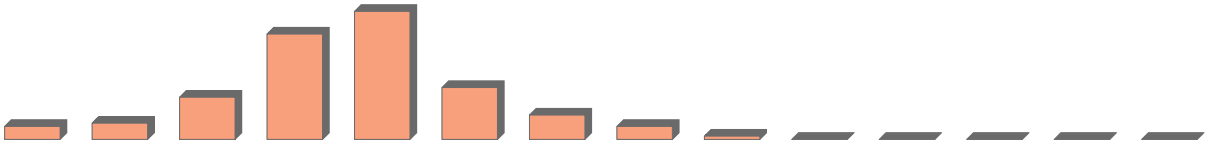
AM Peak		6:00 AM	7:00 AM	10:00 AM	9:00 AM	5:00 AM	5:00 AM								10:00 AM		
Volume		1	2	9	6	4	1								17		
PM Peak	5:00 PM	12:00 PM	4:00 PM	12:00 PM	5:00 PM	4:00 PM	12:00 PM	3:00 PM		3:00 PM	5:00 PM				5:00 PM		
Volume	1	2	3	8	9	4	1	1		1	1				23		

Comments:

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: NW McNamee Rd south of NW Wapato Ave
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Portland, OR

QC JOB #: 12456909
DIRECTION: NB/SB
DATE: Apr 10 2014

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
4:00 AM	0	0	1	1	1	1	**1**	0	0	0	0	0	0	0	5	36-45	2
5:00 AM	0	1	0	2	2	3	0	0	0	0	0	0	0	0	8	33-42	4
6:00 AM	0	1	**5**	3	5	3	1	**1**	0	0	0	0	0	0	**19**	25-34	8
7:00 AM	0	**2**	1	3	5	2	1	0	0	0	0	0	0	0	14	26-35	8
8:00 AM	**1**	2	2	2	5	**4**	0	0	0	0	0	0	0	0	16	31-40	9
9:00 AM	0	0	0	**5**	4	1	1	0	0	0	0	0	0	0	11	26-35	9
10:00 AM	0	2	0	5	**7**	4	0	0	0	0	0	0	0	0	18	31-40	11
11:00 AM	1	0	0	3	3	2	1	0	0	0	0	0	0	0	10	31-40	5
12:00 PM	0	0	**5**	4	3	**3**	1	0	0	0	0	0	0	0	16	21-30	9
1:00 PM	1	0	3	**6**	3	2	2	0	0	0	0	0	0	0	17	22-31	9
2:00 PM	**2**	0	3	6	4	0	0	0	0	0	0	0	0	0	15	26-35	10
3:00 PM	1	**1**	1	5	7	3	2	2	0	0	0	0	0	0	**22**	28-37	11
4:00 PM	1	0	1	6	**11**	0	0	1	0	0	0	0	0	0	20	26-35	17
5:00 PM	0	0	1	5	5	0	2	1	0	0	0	0	0	0	14	26-35	10
6:00 PM	1	0	2	3	1	3	**3**	**3**	**1**	0	0	0	0	0	17	43-52	5
7:00 PM	0	0	0	3	5	0	0	0	0	0	0	0	0	0	8	26-35	8
8:00 PM	0	0	1	0	3	1	0	0	0	0	0	0	0	0	5	31-40	4
9:00 PM	0	1	0	1	1	0	0	0	1	0	0	0	0	0	4	26-35	2
10:00 PM	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	26-35	4
11:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	21-30	2
Day Total	8	10	26	65	79	32	15	8	2	0	0	0	0	0	245	26-35	144
Percent	3.3%	4.1%	10.6%	26.5%	32.2%	13.1%	6.1%	3.3%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%			
ADT 245																	
AM Peak	8:00 AM	7:00 AM	6:00 AM	9:00 AM	10:00 AM	8:00 AM	4:00 AM	6:00 AM							6:00 AM		
Volume	1	2	5	5	7	4	1	1							19		
PM Peak	2:00 PM	3:00 PM	12:00 PM	1:00 PM	4:00 PM	12:00 PM	6:00 PM	6:00 PM	6:00 PM						3:00 PM		
Volume	2	1	5	6	11	3	3	3	1						22		

Comments:

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

SUMMARY - Tube Count - Speed Data

LOCATION: NW McNamee Rd south of NW Wapato Ave
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Portland, OR

QC JOB #: 12456909
DIRECTION: NB/SB
DATE: Apr 09 2014 - Apr 10 2014

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	9	22	45	134	136	69	19	10	2	1	1	0	0	0	448	26-35	270
Percent	2.0%	4.9%	10.0%	29.9%	30.4%	15.4%	4.2%	2.2%	0.4%	0.2%	0.2%	0.0%	0.0%	0.0%			
Cumulative Percent	2.0%	6.9%	17.0%	46.9%	77.2%	92.6%	96.9%	99.1%	99.6%	99.8%	100.0%	100.0%	100.0%	100.0%			

ADT 224

85th Percentile 37 MPH

Mean Speed(Average) 30 MPH

Median 30 MPH
Mode: 33 MPH

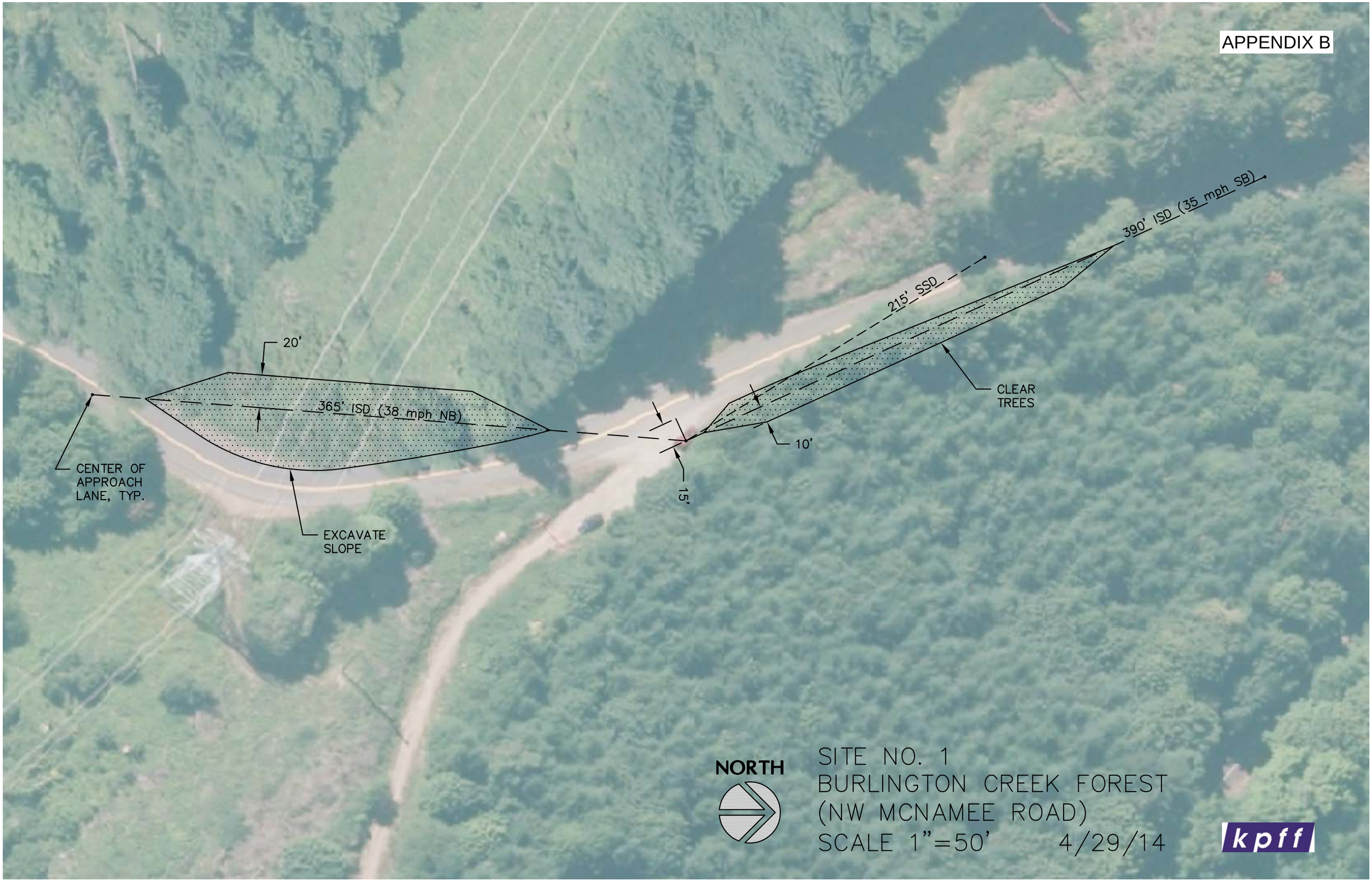
Comments:

Report generated on 4/18/2014 11:37 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Quality Counts
TRANSPORTATION DATA COLLECTION

APPENDIX B



SITE NO. 1
BURLINGTON CREEK FOREST
(NW MCNAMEE ROAD)
SCALE 1"=50' 4/29/14

kpff

kpff Consulting Engineers

TOTAL CONSTRUCTION COSTS
for
Site 1 - Burlington Creek Forest
(NW McNamee Road)

APPENDIX C
CONCEPTUAL Estimate: 4/29/14
METRO: North Tualatin Access Study

ITEM NUMBER	ITEM DESCRIPTION	QUANTITY	UNIT		UNIT COST		ITEM COST
PART 00200 - TEMPORARY FEATURES AND APPURTENANCES							
0210-0100000A	MOBILIZATION	1	LS	$	6,189.00	$	6,189.00
0225-0101000A	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$	6,189.00	$	6,189.00
0280-0100000A	EROSION CONTROL	1	LS	$	1,238.00	$	1,238.00
					Subtotal	**$**	**13,616.00**
PART 00300 - ROADWORK							
0305-0100000A	CONSTRUCTION SURVEY WORK	1	LS	$	2,476.00	$	2,476.00
0320-0100000R	CLEARING AND GRUBBING	0.4	ACRE	$	8,000.00	$	3,200.00
0330-0105000K	GENERAL EXCAVATION	1,400	CUYD	$	20.00	$	28,000.00
0330-0123000K	EMBANKMENT IN PLACE	500	CUYD	$	15.00	$	7,500.00
					Subtotal	**$**	**41,176.00**
PART 00400 - DRAINAGE AND SEWERS							
0445-010012AF	12 INCH CULVERT PIPE, 5 FT DEPTH	0	FOOT	$	55.00	$	-
0445-0700120E	SLOPED END SECTIONS, 12 INCH	0	EACH	$	400.00	$	-
					Subtotal	**$**	**-**
PART 00600 - BASES							
0641-0102000M	AGGREGATE BASE	160	TON	$	20.00	$	3,200.00
					Subtotal	**$**	**3,200.00**
PART 00700 - WEARING SURFACES							
0744-0302000M	LEVEL 3, 1/2 INCH DENSE MHMAC MIXTURE	20	TON	$	80.00	$	1,600.00
					Subtotal	**$**	**1,600.00**
PART 00900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS							
0910-0100000K	WOOD SIGN POSTS	20	FBM	$	8.00	$	160.00
0940-0134000J	TYPE "Y1" SIGNS IN PLACE	22	SQFT	$	20.00	$	440.00
					Subtotal	**$**	**600.00**
PART 01000 - RIGHT OF WAY DEVELOPMENT AND CONTROL							
1030-0102000E	SEEDING MOBILIZATION	1	EACH	$	700.00	$	700.00
1030-0108000R	PERMANENT SEEDING	0.4	ACRE	$	2,500.00	$	1,000.00
					Subtotal	**$**	**1,700.00**
					CONSTRUCTION SUBTOTAL	**$**	**61,892.00**
					CONTINGENCY (40.0%)	**$**	**24,756.80**
					ESTIMATE TOTAL	**$**	**86,648.80**

Notes:

1. Estimate based on standard measurement and payment practices as specified in the 2008 Oregon Standard Specificaitons for Construction
2. Unit costs based on ODOT Weighted Average Item Prices - Calendar Year 2013;
3. Estimate does not include costs for Right-of-Way Takings and Easements;
4. Estimate does not include costs for design and construction of utility relocations;

EXHIBIT 3

Burlington Creek Forest Area Traffic Impact Analysis

Submitted by: Nemariam Engineers & Associates, LLC

September 25th, 2018

Burlington Creek Forest Area Traffic Impact Analysis
Multnomah County, Oregon
September 25, 2018

Prepared By:
Nemariam Engineers & Associates, LLC
10976 NW Ironwood Lane
Portland, OR 97229
(503) 746-4386

Project Engineer: Merhi Tesfay, PHD, EIT
Principal Engineer: Haregu Nemariam, PE

Haregu Nemariam

09/25/2018

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Exhibit B:	Proposed Sit Plan
Exhibit C:	Nature Park Trip Data/Trip Estimates Worksheet
Exhibit D:	Roadway Classification/Average Daily Traffic
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Exhibit G	Year 2018 Traffic Condition Synchro Worksheet
Exhibit H	Crash Data
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Exhibit J	Year 2019/2033 Background Traffic Calculation Entering/Exiting Site Generated Trip Estimates
Exhibit K	Year 2019 Background/Total Traffic Synchro Worksheet
Exhibit L	Year 2033 Background/Total Traffic Synchro Worksheet
Exhibit M	Year 2033 Background/Total SimTraffic Queue Report
Exhibit N	Multnomah County Comprehensive Plan Update for 2016 Planned Projects List Mitigated Condition Synchro Worksheet

EXECUTIVE SUMMARY

This report summarizes the results of the traffic impact analysis for the proposed visitor access and nature park area improvements. The traffic impact analysis is performed to assess the impact of trips generated by the proposed project to the nearby transportation system. The analysis is prepared in accordance with the standards set forth by Oregon Department of Transportation (ODOT) and Multnomah County.

Five scenarios were evaluated to assess the impact of the trips generated by the proposed improvement. These scenarios were developed based on Multnomah County, ODOT and Metro's input. Following is a brief description of the scenarios:

- Year 2018 weekday/weekend day existing peak traffic condition.
- Project completion year 2019 weekday/weekend day background peak traffic condition.
- Project completion year 2019 weekday/weekend day background traffic plus site generated trips.
- Year 2033 weekday/weekend day background peak traffic condition.
- Year 2033 weekday/weekend day background peak traffic plus site generated trips.

An assessment of traffic operation and safety analysis was conducted at the intersections listed below.

1. US 30/NW Cornelius Pass Road
2. US 30/NW McNamee Road
3. NW McNamee Road/Project Site Access
4. NW McNamee Road/NW Skyline Boulevard
5. NW Skyline Boulevard/NW Cornelius Pass Road

SUMMARY OF FINDINGS

The following summarizes the results of the traffic impact analysis.

1. Multnomah County's planned improvements are anticipate to mitigate safety deficiencies at the study locations.
2. The intersection of NW Cornelius Pass Road/NW Skyline Boulevard has existing safety and capacity deficiencies.
3. The additional trips from the proposed development are not projected to have an adverse impact on the nearby transportation system.
4. The small increase of site generated trips does not further degrade the intersection that is projected to fail under background traffic conditions.

5. With the County's planned intersection improvements, NW Cornelius Pass Road/NW Skyline Boulevard is projected to operate within ODOT's acceptable mobility standard of 0.99 v/c in year 2033 during weekday peak background traffic plus site trips condition.
6. With the County's planned intersection improvements at NW Cornelius Pass Road/NW Skyline Boulevard, the intersection is projected to operate within Multnomah County's LOS "C" in year 2033 during weekend day peak background traffic plus site trips condition.

CONCLUSION

The results of the traffic impact study showed that most of the intersections within the study area have ample capacity to accommodate the trips generated by the proposed project. In addition, the results of the traffic impact analysis showed that the proposed project site trips will not degrade the study location that does not currently operate within ODOT's and/or Multnomah County's operating standards.

With the sight distance improvements at the project site access and Multnomah County's planned improvements in place, the projected trips anticipated by the proposed development use can safely and adequately be served by the existing transportation system.

Section I: Introduction

The project proposes visitor access improvements including parking amenities, a restroom, roadway safety improvements, and trails to be constructed at the Burlington Creek Forest in Multnomah County, Oregon.

This Transportation Impact Study is prepared to address transportation impacts of the proposed improvements on the surrounding transportation system. Information regarding expected trip generation, site plan, access spacing compliance, access sight distance, and safety have been investigated and the results are reported herein.

Section II: Background

Burlington Creek Forest Natural Area encompasses 354 acres of land in Multnomah County, along the north-eastern border of the Urban Growth Boundary (UGB) just outside of Portland city limits. It is approximately 16 miles north from downtown Portland. The total acreage is located outside the UGB. The local zoning for the park property is commercial forest use (CFU). *See* Exhibit A for Zoning Map. NW McNamee Road, NW Cornelius Pass Road, and the railroad along the northeast site boundary all cross through Burlington Creek Forest. The nature park is proposed on a 208 acre portion of the natural area site.

The proposed development includes primary vehicular access from NW McNamee Road. *See* Exhibit B for the Site Plan. Proposed improvements at Burlington Creek Forest include a trailhead and shared-use trails, designed specifically for hiking and off-road cycling.

The NW McNamee Road entrance is proposed as the project site access. The parking area will provide parking for 25 parking spaces as shown in Exhibit B. Overflow parking on NW McNamee Road will not be allowed.

The NW McNamee Road entrance will provide access to an access drive, vehicle parking area, vault toilet, two picnic tables, trail system and an information sign. Approximately five miles of new unpaved trails will be provided to allow visitors to explore Burlington Creek Forest by foot or by off-road bicycle. Over two miles of existing gravel road will also be open to park visitors, including equestrians. The proposed development is intended to protect water quality, fish and wildlife habitat while creating opportunities for the community to recreate and enjoy nature.

Section III: Applicable Criteria

Below is a discussion of the applicable criteria listed in *italics*, followed by **findings** of compliance. The criteria evaluated are identified in the County's March 28th, 2017, EP-2017-

6780 North Tualatin Mountains Park Master Plan - Comprehensive Plan Amendment, Site Development at Burlington Creek Forest memorandum.

Section 3 of *Multnomah County Road Rules* specifies a transportation impact as:

Any new construction or alteration which increases the number of trips generated by a site by more than 20 percent, by more than 100 trips per day or by more than 10 trips in the peak hour. A minimum increase of 10 new trips per day is required to find a transportation impact.

Findings: Per the trip estimate for Burlington Creek Forest Nature Park discussion below, the proposed use constitutes a "transportation impact" under Multnomah County Road Rules. Typically, trips generated by proposed developments are estimated using trip rates from *Institute of Transportation Engineer (ITE) Trip Generation Manual (Reference 5).* This manual is a useful resource for estimating vehicle trips as a function of land use. The *ITE Trip Generation Manual* identifies trip rates for over 1,500 different land use types. However, the manual has limitations. The manual does not provide trip rates for nature parks of the type proposed. According to *Shoup,* "It is important to note that Trip Generation does not represent a quick fix for transportation problems or a shortcut to planning procedures; rather, it serves as a foundation on which the professional engineer can build his or her own knowledge and experience and apply this knowledge to any given transportation-related situation. The *ITE User* Guide states, "In some cases, limited data were available; thus, the statistics presented may not be truly representative of the trip generation characteristics of a particular land use."[1] In other words, the ITE manual is intended as a guide and when more relevant, local data is available, it should be considered as a means of estimating trip generation. Metro has examined and provided trip data for its existing parks and other regional parks. The nature park data reviewed and trip calculation for the proposed improvements are included in Exhibit C for reference.

Therefore, local trip rates for the proposed development were estimated using the *ITE Trip Generation Handbook, 9th Edition,* methodology and the average weekday/weekend day trip rate information provided by Metro. The trip rates provided by Metro are based on 24-hour vehicle counts taken over seven days during peak months (May-August) for 2016 and 2017 at four Metro parks with similar operations. The following is a description of the parks surveyed and the methods/assumptions used in developing trip rates for the proposed development.

- Mt. Talbert Nature Park is a 253 acres nature park in Clackamas County, Oregon. This nature park offers 4.0 miles of hiking trails, accessible trail, sheltered picnic area, nature education. It has 29 existing parking stalls. Mt. Talbert Nature Park generates an average of 3 vehicle trips per hour (0.01 average hourly trips per acre) on a summer weekday during peak traffic hour of the nearby transportation system. This park generates 5 vehicle trips per hour (0.02 average hourly trips per acre) on a summer weekend day during the peak traffic hour. On average, the summer weekday and

[1] *Shoup, Donald. Truth in Transportation Planning. University of California Transportation Center, University of California (2002)*

weekend day average daily trips generated by the park are 231 and 244 daily trips, respectively.

- Graham Oaks Nature Park is a 246 acres nature park in Wilsonville, Oregon. This nature park offers 3.0 miles of hiking trails, walking, biking, play area, nature education center, shelter and picnic tables and regional trail. It has 27 parking stalls. Graham Oaks Nature Park generates an average of 5 vehicle trips per hour (0.02 average hourly trips per acre) on a summer weekday during peak traffic hour of the nearby transportation system. This park generates 6 vehicle trips per hour (0.02 average hourly trips per acre) on a summer weekend day during the peak traffic hour. On average, the summer weekday and weekend day average daily trips generated by the park are approximately 194 and 153 daily trips, respectively.
- Cooper Mountain Nature Park is a 230 acres nature park in Beaverton, Oregon. This nature park offers 3.5 miles of hiking trails, walking, play area, nature education center, shelter and picnic tables. It has 53 parking stalls. Cooper Mountain Nature Park generates an average of 11 vehicle trips per hour (0.04 average hourly trips per acre) on a summer weekday during peak traffic hour of the nearby transportation system. This park generates 17 vehicle trips per hour (0.07 average hourly trips per acre) on a summer weekend day during the peak traffic hour. On average, the summer weekday and weekend day average daily trips generated by the park are approximately 330 and 399 daily trips, respectively.
- Scouter's Mountain Nature Park is a 100 acre nature park in Happy Valley, Oregon. This nature park offers 1 mile of hiking trail, sheltered picnic area and nature education. It has 24 existing standard parking stalls. Scouter's Mountain Nature Park generates an average of 9 vehicle trips per hour (0.04 average hourly trips per acre) on both a summer weekday and weekend day during peak traffic hour of the nearby transportation system. On average, the summer weekday and weekend day average daily trips generated by the park are approximately 80 and 105 daily trips, respectively.

Per guidelines contained in the *ITE Trip Generation Handbook*, weighted average trip rates for the weekday and weekend day peak traffic hour at the project site is estimated based on the average trip rates at the four similar Metro parks. The weekday and weekend day adjacent street peak traffic hours occur between 4:15 p.m. and 5:15 p.m. and between 1:20 p.m. and 2:20 p.m., respectively.

Based on the daily trips generated by the proposed park, the weekday and weekend day weighted average daily trips were calculated to estimate daily trips generated by the proposed park. The results of the weighted average daily trips calculated show that the daily trips generated by the proposed park are estimated to be 210 for the weekday and 226 for the weekend day. Detailed information on the weighted average trip rate calculations, the four Metro parks including park sizes in acres, average weekday and weekend day trip summary, and other traffic count data provided by Metro are included in Exhibit C of this report.

Per Section 3 of Multnomah County's Road Rules requirement to find a transportation impact where trips generated by proposed developments increase the number of trips by 100 trips per day or 10 trips per hour, a traffic impact assessment will be performed.

Section 8.100 of Multnomah County Road Rules states that:

To protect the public from the detrimental effects of a proposed development, County policy requires Off-site improvements as a condition of a site development permit to:

1. **Satisfy Capacity Requirement**

Findings: To identify capacity-related concerns at intersections near the proposed development, the existing transportation system capacity was evaluated. The purpose of this section is to set the stage for a basis of comparison to future conditions.

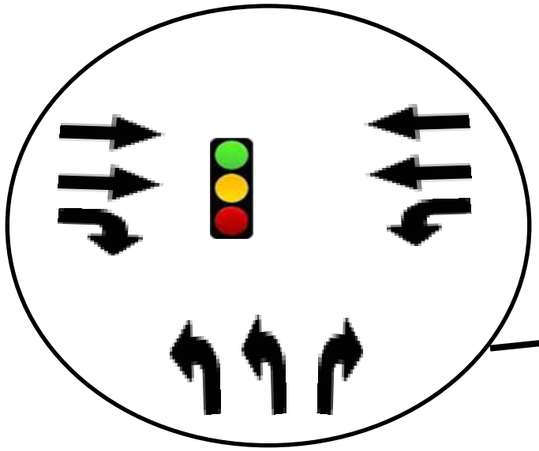
This section discusses the study area limits and existing transportation system conditions that are likely to be impact by the proposed project. Given the proximity to the proposed entrance, the following intersections were evaluated in this report.

1. US 30/NW Cornelius Pass Road
2. US 30/NW McNamee Road
3. NW McNamee Road/Project Site Access
4. NW McNamee Road/NW Skyline Boulevard
5. NW Skyline Boulevard/NW Cornelius Pass Road

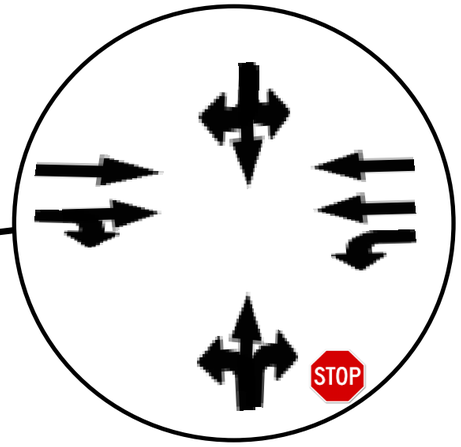
Roadway Facilities: The primary roadway facilities in the project study area include NW McNamee Road, US 30, NW Cornelius Pass Road, and NW Skyline Boulevard. According to the *2016 Multnomah County Comprehensive Plan,* NW McNamee Road, US 30, NW Skyline Boulevard and NW Cornelius Pass Road are classified as rural local street, rural principal arterial, rural collector street and rural arterial, respectively.

US 30 at its intersection at NW Cornelius Pass Road and its intersection with NW McNamee Road runs in the east/west direction. NW Cornelius Pass Road at its intersection at NW Skyline Boulevard and US 30 runs in the north/south direction. NW Skyline Boulevard runs in the east/west direction at its intersection with NW Cornelius Pass Road and north/south direction at its intersection with NW McNamee Rd.

Figure 1 illustrates the location of the study intersections formed by the primary roadways as well as the respective lane configuration and traffic control devices. A physical description and functional description of each roadway is summarized in Table 1 below.



US 30/NW Cornelius Pass Rd



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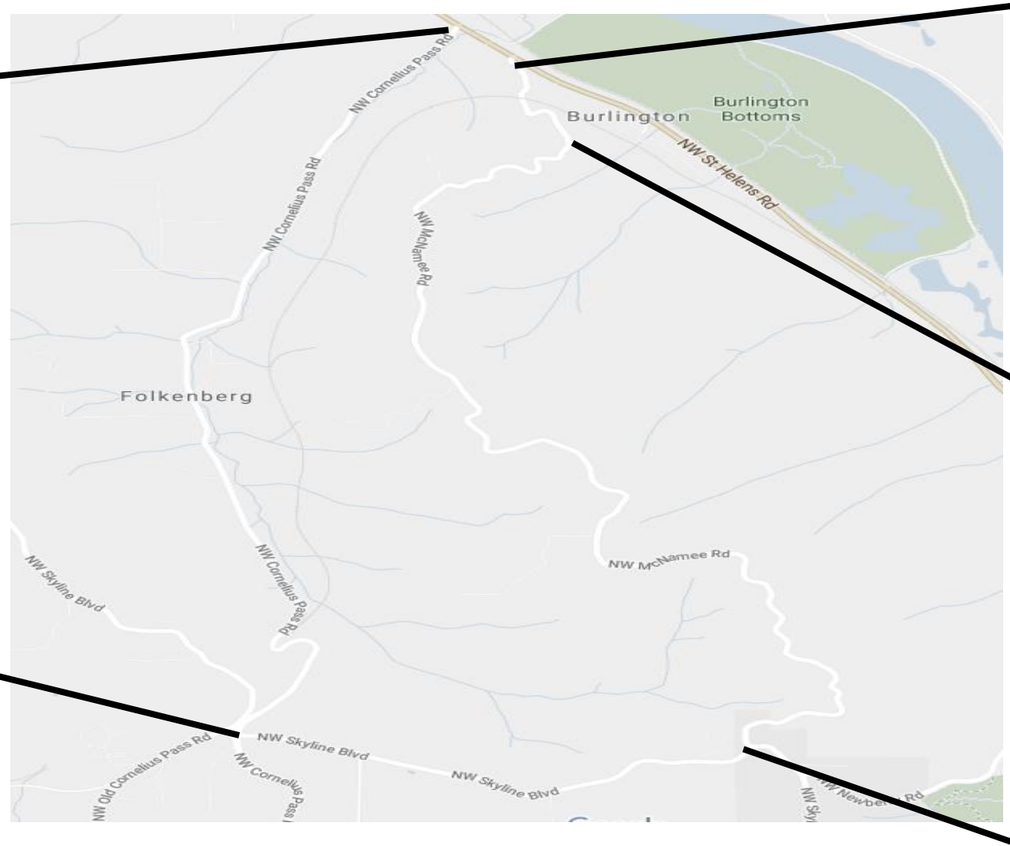

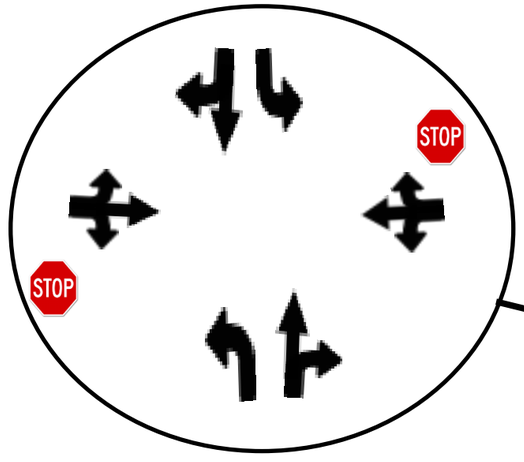

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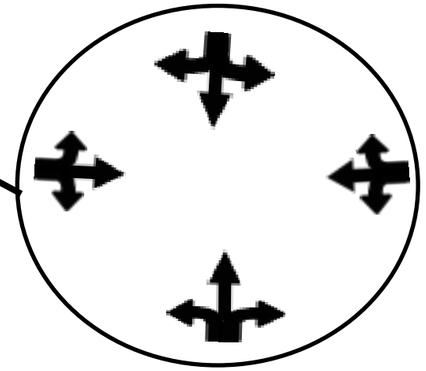

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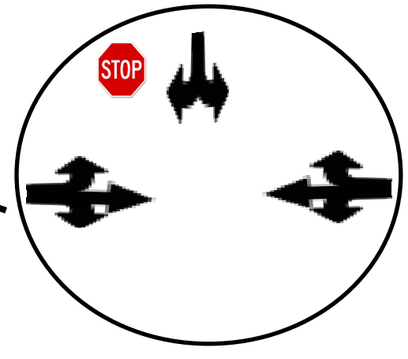


NW Skyline Blvd/NW McNamee Rd

LEGEND

STOP SIGN CONTROL

TRAFFIC SIGNAL CONTROL

FIGURE 1: EXISTING LANE CONFIGURATION & TRAFFIC CONTROL DEVICES

Table 1
Existing Roadway Facilities

Roadway	[1]Functional Classification	Sidewalks	Travel Lanes	Speed Limit	Comments
NW McNamee Rd	Rural Local	No	2	38 mph (NB); 35 mph (SB) [2](85th percentile speed)	There are no shoulders on both sides of the street.
US 30	Rural Principal Arterial	Unimproved dirt walkway behind curb	4	50 mph Posted speed	There are wide shoulders near its intersection with NW McNamee Rd and its intersection with NW Cornelius Pass Rd.
NW Skyline Bl.	Rural Collector Street	No	2	44 mph [2](85th percentile speed)	There are wide shoulders near its intersection with NW Cornelius Pass Rd. There are no shoulders near its intersection with NW McNamee Rd
NW Cornelius Pass Rd	Rural Arterial Road	No	2	45 mph Posted speed	There are wide shoulders near its intersection with US 30 and its intersection with NW Skyline Bl.

1=Exhibit D/Roadway Classification; 2=Exhibit E/2014 KPFF Intersection Sight Distance Evaluation

Availability of Transit Service/Facilities and Connections to Transit: The closest TriMet bus service is line #16 on Highway 30 available less than three miles from the project entrance.

Bicycle Facilities/Pedestrian: There are no designated bicycle/pedestrian facilities near the study locations, although cyclists can be found riding on each of the study roads.

Traffic Volume and Conditions: This section presents the existing peak hour turning movement traffic volumes, determines the operating conditions, and describes the methodology used to assess the traffic conditions at each intersection within the study area.

Existing Year 2018: Traffic analysis for weekday and weekend day peak traffic hours will be analyzed to comply with Multnomah County's and ODOT's requirements. Per input from Multnomah County and Metro, the weekend day peak traffic hour was determined based on 16-

hour turn movement counts, with 15-minute break downs, taken during 2 weekend days (Saturday, June 30th, 2018 and Sunday, July 01st, 2018).

Based on ODOT's staff input, it was determined that the highest peak traffic hour of the day at the study locations within ODOT jurisdictions occurs during a weekday evening peak hour (3:00 p.m. to 6:00 p.m.). Because the counts were taken during the peak summer months (May through August), seasonal adjustment factor for the turn movement counts was not applied.

Figure 2 and Figure 3 (2018 Traffic Volume) show the existing year peak weekday and weekend day peak traffic hours, respectively. The volumes are balanced and rounded to the nearest five vehicles. The year 2018 balanced peak traffic hour worksheet and turning-movement counts mentioned above are included in Exhibit F.

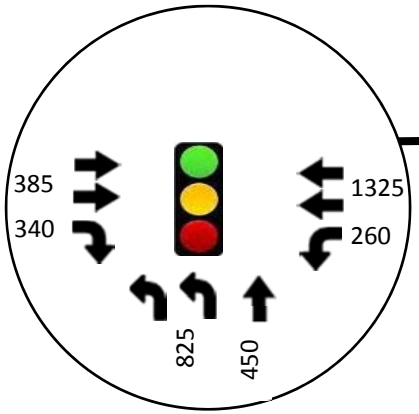
Capacity Analysis: This section describes the methodology used to assess the traffic conditions, presents the existing turn movement volumes, and determines the operating conditions for the study location.

Operating conditions for weekend day peak traffic hour at the study locations were evaluated using the latest *Highway Capacity Manual (HCM) Operations Methodology, 6th Edition* contained in the *SYNCHRO* software package and the *Multnomah County Design Manual (Reference 1)*. Adequacy of the operating condition during weekend day peak traffic hour at the study locations is determined based on the Multnomah County's Level-of-Service (LOS) criteria. The County's LOS criteria requires that all new and improved arterial and major collector roadways in rural areas operate at LOS "C" or better during the design hour. If approved by the County Engineer, local streets intersecting arterials or collectors may be LOS "F" during the peak hour.

The LOS criteria for un-signalized intersections are different than the criteria used for signalized intersections. For an un-signalized intersection, the LOS is defined for each minor movement and not for the intersection. LOS criteria for signalized and un-signalized intersections is described in detail in the *Multnomah County Design Manual* (Reference 1) and the *HCM 2016* (Reference 2).

Per *ODOT Analysis Procedures Manual (Reference 4)*, traffic analysis for un-signalized intersections and signalized intersections at the study intersections were evaluated using the *HCM 2010* and *HCM 2000* methods, respectively. Operations Methodologies for HCM 2010 and HCM 2000 that are used for the analysis are contained in the SYNCHRO software package. Adequacy of the operating condition during weekday peak traffic hour of the study locations is determined based on mobility standards in Table 7 of the 1999 Oregon Highway Plan (OHP) Policy 1F (Action 1F.1). Table 7 in the OHP (Reference 3) provides maximum volume-to-capacity (v/c) ratio of 0.99 for all signalized and un-signalized intersections within the Portland Metro area.

According to Policy 1F (Action 1F.5), in situations where the highway segment/intersection currently operates or is projected to operate above the mobility standards in Table 7 of the OHP, the mobility standard is to avoid further degradation of the facility.



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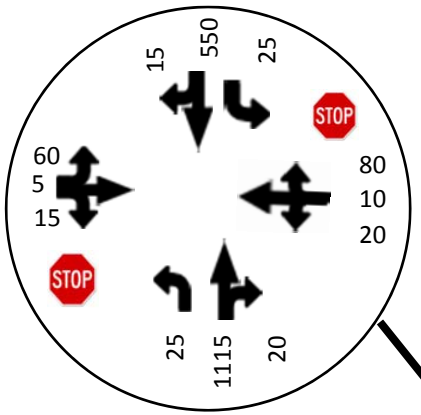
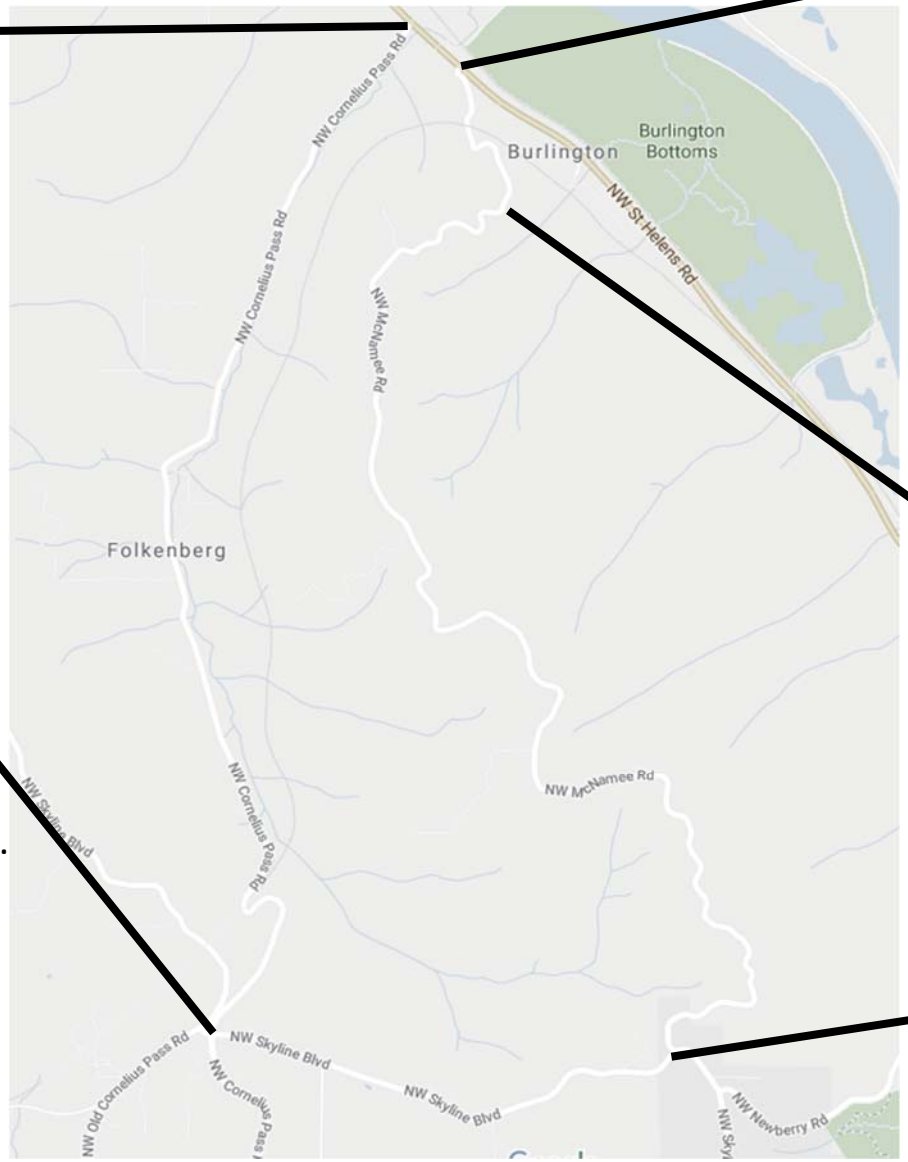
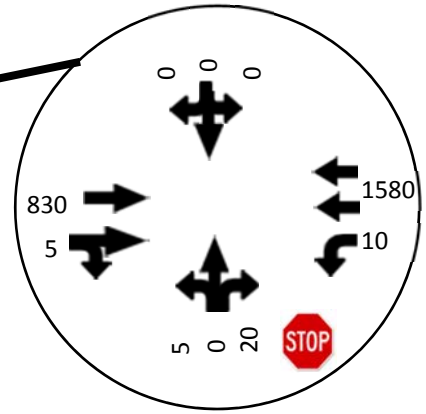


NW Cornelius Pass Rd/NW Skyline Blvd.





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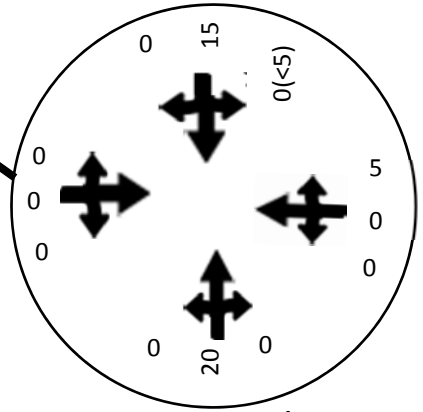
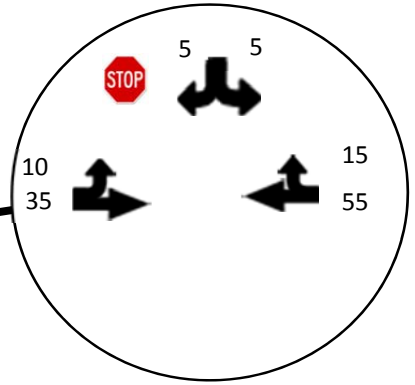


NW McNamee Rd/Project



NW Skyline Blvd/NW McNamee

N

FIGURE 2: Year 2018 Weekday Balanced Traffic Volume

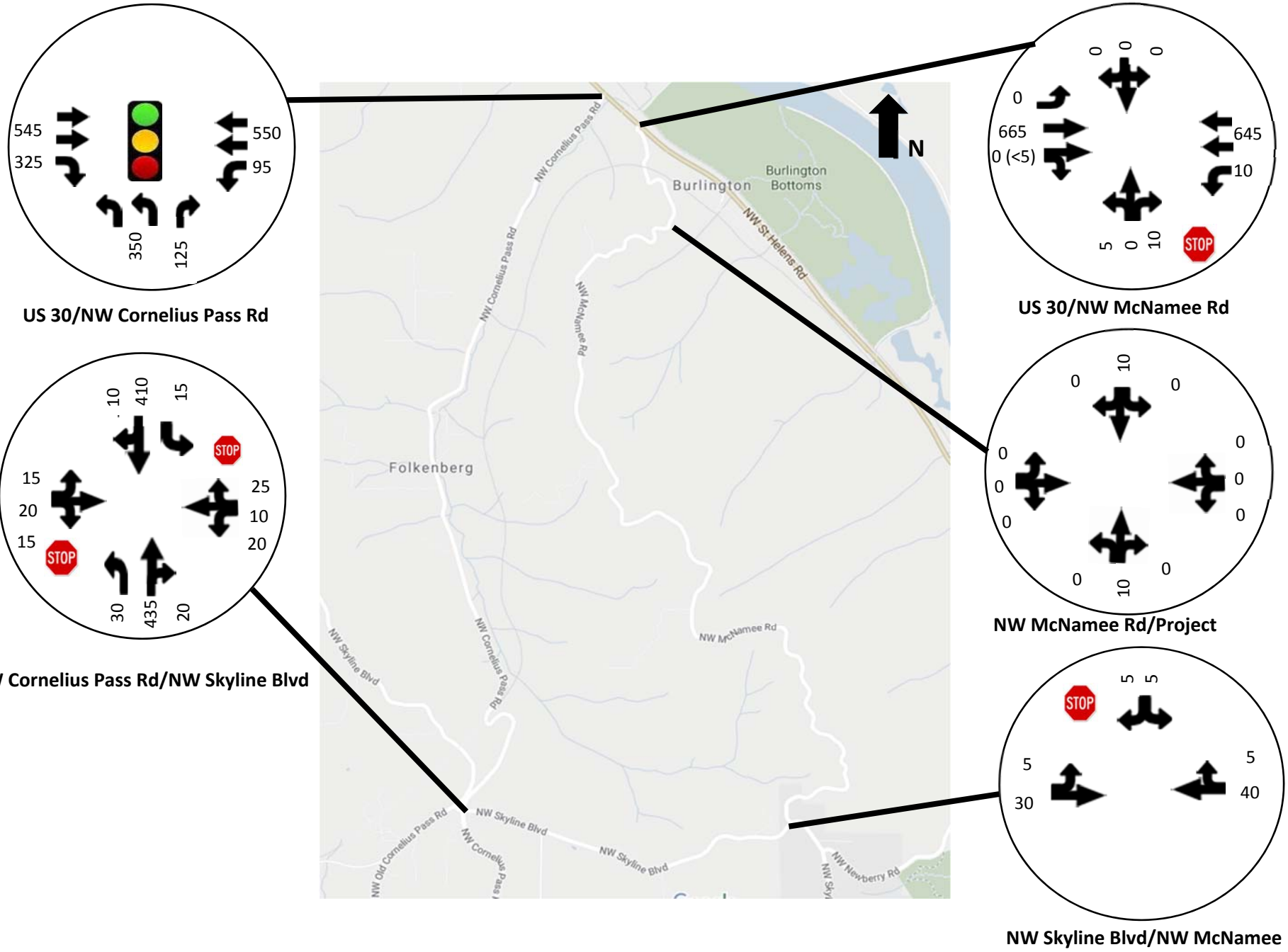


FIGURE 3: Year 2018 Balanced Weekend Traffic Volume

Existing Peak Hour Condition: Based on the above methodology, operational analysis was performed for the Existing Year 2018 traffic condition at the study locations. Table 2 summarizes the results of the analysis. The worksheet for the analysis is presented in Exhibit G.

Table 2
Year 2018 Peak Hour Traffic Condition

	Weekday (*HCM 2000 & AHCM 2010)		Weekend Day (HCM 6TH Edition)			Weekend Day County Standard Met?	Weekday ODOT Standard Met?
Study Intersections	**Control Delay (seconds)**	**V/C**	**LOS**	**Control Delay (seconds)**	**V/C**		
*US 30/NW Cornelius Pass	23.4	0.87	A	11.9	0.71	Y	Y
US 30/ NW McNamee Road	11.8	0.04	C	16.7	0.02	Y	Y
NW McNamee Road/Project Site/Maintenanc	8.4	0.01	A	0	0	Y	Y
NW McNamee Road/ NW Skyline Boulevard	8.9	0.01	A	8.8	0.01	Y	Y
NW Skyline Boulevard/NW Cornelius Pass	1186.8	2.99	C	23.3	0.22	Y	N

* = Control Delay and V/C ratio reported are based on HCM 2000 methodology for signalized intersection.
A = LOS, Control Delay and V/C ratio for weekday peak traffic hour are for critical movement of un-signalized intersection.

As shown in Table 2 above, all intersections within the study area currently operate within the County's LOS "C" standard during weekend day peak traffic conditions. All of the study intersections within the study area currently operate within ODOT's acceptable standard of 0.99 v/c ratio during weekday evening peak traffic hour with the exception of NW Cornelius Pass Road/NW Skyline Boulevard intersection. County Planned improvements for the NW Cornelius Pass Road/NW Skyline Boulevard is described under "*Planned Improvements*" later in this report.

EXISTING SAFETY CONDITION

This section evaluates the existing safety condition at the study locations. Review of crash records is essential to reveal general and specific deficiencies in transportation systems. Therefore, as part of the study area safety analysis, available crash data for the most recent 10 years (January 1, 2007 to December 31, 2016) at the study locations was obtained from *Oregon Department of Transportation (ODOT) Crash Analysis and Reporting Unit Records* (ODOT). The crash data is included in Exhibit H of this report. Table 3 below summarizes crash types at each of the study intersections.

Table 3
Crash Type Summary (2007-2016)

Crash Type Summary							
Intersection	**Number of Crashes**	**Collision Type**				**Severity**	
		Rear End	**Turning/ Sideswipes**	**Angle**	**Other Pedestrian/ Fixed Object**	**Property Damage**	**Personal Injury**
US 30/NW Cornelius Pass Road	57	37	10 Turning/ 2 Sideswipes	0	2 Non-collision 1 Head-on 5 Fixed-object	32	24 Personal Injury + 1 Fatal
US 30/NW McNamee Road	2	0	1 Sideswipe	0	1 Fixed-object	2	0
NW McNamee Road/Project Site Access	0	0	0	0	0	0	0
NW McNamee Road/NW Skyline Boulevard	4	0	1 Side swipes	0	1 Head-on 2 Fixed-object	3	1
NW Skyline Boulevard/NW Cornelius Pass Road	22	0	4 Turning 3 Sideswipes	9	1 Non-collision 5 Fixed-object	15	7

US 30/NW Cornelius Pass Road: As shown in Table 3 above, the intersection of US 30/NW Cornelius Pass Road has 57 crashes, 24 of which involved personal injury and one fatal crash. Of the 57 crashes, 37 were rear-end type of crashes, 10 were turning movement type, 2 were sideswipes, 2 non-collision type, one head-on type and 5 fixed object crash types. According to ODOT, this intersection is identified as one of the top 5% highest crash locations in the SPIS (Safety Priority Index System) site. ODOT classifies a location as a SPIS site if the location has three or more crashes or one or more fatal crashes in a three-year period.

Most of the rear-end crashes were caused by motorists driving too fast for conditions and following too closely to avoid a stopped or parked vehicle ahead. Of the 37 rear-end crashes, 4 involved motorists driving from east to west, 8 involved motorists driving from west to east, 15 involved motorists driving from south to north, 8 involved motorists travelling from north to south, and 2 involved motorists traveling from southeast to northwest.

Of the 10 turning type crashes, 2 involved motorists turning left from south to west and motorists traveling straight from west to east, 4 involved motorists turning left from west to north and motorists traveling straight from north to south, 1 involved 2 motorists turning left from south to west, 1 involved a motorist turning right from west to south and a motorist traveling from north to south, 1 involved motorist turning west from south and a motorist travelling south from north and 1 involved a vehicle entering at an angle. Most of the turning crashes are caused by motorists driving in excess of posted speed, disregarding traffic signal, and failure to yield right-of-way.

The 2 sideswipe type of crashes involved motorists traveling from west to east. One of the crashes was caused by improper change of traffic lane. Crash report did not associate any cause for the second sideswipe crash.

Of the 5 fixed object crashes, 2 involved motorists traveling from north to south, 1 turning left from south to west, 1 turning right from west to south, and 1 turning left from north to east. Most of the fixed-object crash types are caused by motorists driving too fast for the condition to maintain lane. The 2 two non-collision crashes involved motorists driving from west to east. One of the non-collision crashes was caused by a motorist traveling too fast for the condition to maintain lane and the other was caused by a motorist who slowed down.

The head-on crash involved motorists travelling from north to south and south to north. The crash was caused by a motorist's failure to maintain lane due to improper driving caused by physical illness.

Evaluation of the crash patterns revealed that the majority of crashes involved rear-end collisions. The second highest crash type at this intersection is turning type. Recognizing the crash patterns at this intersection, the County has planned projects to improve safety at this intersection as shown under "*Planned Improvements*" later in this report.

US 30/NW McNamee Road: The intersection of US 30/NW McNamee Road has 2 crashes. None of the crashes involved personal injury or fatality. One of the crashes was fixed object type and the other was sideswipe type. The fixed object and sideswipe crashes involved motorists travelling from south to north. The fixed object crash was caused by a motorist driving too fast for conditions. The sideswipe crash was caused by improper change of traffic lane. Providing wider shoulder width could help reduce fixed object and sideswipe type of crashes.

NW McNamee Road/Project Site Access: There are no crashes at this location.

NW McNamee Road/NW Skyline Boulevard: A total of 4 crashes occurred at the NW McNamee Road/NW Skyline Boulevard intersection during the study period (Year 2007 to Year 2016). Of the 4 crashes, 2 crashes involved fixed objects, one crash involved head-on crash between a motorcyclist and a passenger car and one crash involved sideswipe driving on opposite direction. The two crashes involving fixed object are caused by motorists driving too fast for the condition (not exceeding posted speed) to maintain lane. The head-on crash was caused by a motorcyclist driving too fast on wrong lane. The sideswipe crash type was caused by a motorist driving on wrong side of the road on undivided 2-way roadway. Providing passing lane or wider shoulder width as well as improving sight distances could help reduce fixed object, head-on and sideswipe type of crashes.

NW Skyline Boulevard/NW Cornelius Pass Road: This intersection has 22 crashes, 7 of which involved personal injury. Of the 22 crashes, 9 are angle type of crashes, 4 are turning type, 3 are sideswipes, 1 is non-collision, and 5 are fixed-object crash types.

Most of the angle crashes were caused by motorists' failure to yield right-of-way. Of the 9 angle crashes, 4 involved motorists driving from north to south and motorists travelling from west to east and 5 involved motorists travelling from south to north and motorists travelling from west to east.

3 of the 4 turning crash types involve motorists turning right from south to east and motorists travelling straight from south to north and 1 of the turning crashes involved a motorist turning left from south to west and a motorist travelling from north to south. The turning crash types at this intersection are due to motorists passing on the wrong side of the street, passing at intersection, improper overtaking, turning left in front of oncoming traffic and failure to obey traffic control devices.

The 5 fixed object crash types involved 1 crash turning south to west, 2 travelling north to south, 1 south to north, and 1 east to west. Most of the crashes involving the fixed-object crashes were caused by motorists driving too fast to maintain lane and other improper driving.

The 3 sideswipes involved motorist traveling on opposite direction (north to south and south to north). These crashes were caused by motorists driving too fast for the condition to maintain lane.

Considering the crash patterns at this intersection, the County has planned projects to improve safety at this intersection. Additional information is provided under "Planned Improvements" later in this report.

Crash Rate: Using the crash data information and the crash rate calculation procedure outlined in the ODOT's *Analysis Procedure Manual, Version 2 (AMP),* critical crash rates expressed in

crashes in million entering vehicles (MEV) were calculated to screen intersections with higher than usual crashes. The results of the individual intersection crash rate calculations were then compared to the published statewide 90th percentile intersection crash rates at similar locations in Exhibit 4-1 of the ODOT AMP. Below is a list of crash rates obtained from Exhibit 4-1 that are comparable to the study location.

- 3-legged un-signalized intersections in rural area = 0.475
- 4-legged un-signalized intersections in rural area = 1.080
- 3 legged signaled intersections in rural area = 0.464

The Average Daily Traffic (ADT) that is used in the crash rate calculation is estimated based on information obtained from the *Cornelius Pass Road Safety Improvement*, *KPFF's 2014 Intersection Sight Distance Memorandum* and ODOT's most recent *Transportation Volume Table (TVT)* in Exhibit I. Table 4 below shows the ADT at each of the study locations.

Table 4
Total ADT Entering Study Intersections

Study Intersections	North/South	East/West	Total Entering Volume
US 30/NW Cornelius Pass Road	[b]10,500	[a]17,800	28,300
US 30/NW McNamee Road	[c]245	[a]17,800	18,045
NW McNamee Road/Project Site Access	[c]245	[d]10	245
NW McNamee Road/ NW Skyline Boulevard	[c]2103	[c]134	2,237
NW Skyline Boulevard/ NW Cornelius Pass Road	[b]11,500	[d]2,103	12,879

a = 2016 Transportation Volume Table b = Cornelius Pass Road Safety Improvement
c = KPFF

The results of the individual intersection crash rate calculation are summarized in Table 5 below.

Table 5
Crash Rates (2007-2016)

Study Intersection	Number of Crashes	Crashes/ Year	Total Entering Volume	Crash Rate/MEV = (Annual Number of Crashes X 10^6)/ (ADT)x(365days/year)	Statewide 90th Percentile crash rates
US 30/NW Cornelius Pass Road	57	5.7	28,300	0.552	0.464
US 30/NW McNamee Road	2	0.2	18,045	0.030	0.475

Study Intersection	**Number of Crashes**	**Crashes/ Year**	**Total Entering Volume**	**Crash Rate/MEV = (Annual Number of Crashes X 10^6)/ (ADT)x(365days/year)**	**Statewide 90th Percentile crash rates**
NW McNamee Road/Project Site Access	0	0	245	0.000	0.475
NW McNamee Road/ NW Skyline Boulevard	4	0.4	2,237	0.490	0.475
NW Skyline Boulevard/ NW Cornelius Pass Road	22	2.2	12,879	0.468	1.080

Comparison of the crash rates in Table 5 to the statewide 90th percentile crash rates for similar locations shows that the crash rates at 3 of the 5 study locations are below the statewide 90th percentile rate at similar locations. The NW McNamee Road/NW Skyline Boulevard intersection crash rate (0.490) is higher than the statewide 90th percentile crash rate (0.475) for a three - legged un-signalized intersection in rural area. The US 30/NW Cornelius Pass Road intersection crash rate (0.552) is also higher than the statewide 90th percentile crash rate (0.464) for a three - legged signalized intersection in rural area.

ODOT's Crash Summary Data by Year was also evaluated to determine the study locations recent safety condition. The results of the crash data reviewed for the period of 2015-2016 is summarized in Table 6 below.

Table 6
Crash Data 2015-2016

Intersection	**Fatal Crashes**	**Injury/property damage crashes**	**Total crashes**
US 30/NW McNamee Road	0	0	0
NW McNamee Road/ Project Site/ Maintenance Access	0	0	0
NW Skyline Bl. /NW McNamee Road	0	0	0
NW Cornelius Pass Road/NW Skyline Blvd	0	4	4
US 30/ NW Cornelius Pass Road	0	10	10

As shown in Table 6, review of the ODOT Crash Summary by Year Data did not reveal any apparent safety deficiencies at the intersections nearest to the project site in recent years. Although two of the study intersections have a history of crashes, considering the availability of other routes with low crash rates, the crash frequency at these intersections is not likely to be exacerbated by small increase in trips at the project site. In addition, the county has planned projects to improve safety at these intersections. The projects are listed in the *County's Comprehensive Plan Updated for 2016 "Planned Project List".* Additional information is provided under *"Planned Improvements"* later in this report." See Exhibit N for detailed information.

Traffic Impact Analysis:

The traffic impact analysis in this section identifies how the study area's transportation system will operate with the additional trips from the proposed Burlington Nature Park after the completion of the project in build year 2019. The impact of traffic generated by the proposed development was examined as summarized below.

- Site generated trips were distributed to the transportation system
- Background traffic volume for year 2019 and year 2033 were forecast
- Background traffic volume condition for year 2019 and year 2033 were evaluated
- Total traffic volume for year 2019 and year 2033 were calculated
- Total traffic volume conditions for year 2019 and year 2033 were evaluated

Site Trips: Trip rates for the weekday and weekend day were estimated from local nature park survey data as described above. The survey data does not provide information on directional distribution of trips. Therefore, the percent of entering/exiting trips for the proposed development is based on the directional distribution for ITE Code 417 (Regional Park) and ITE Code 412 (County Park). The estimated percent of trips entering and exiting the project site during adjacent streets peak traffic hour are 53% entering and 47% exiting. The estimated 14 weekday and 19 weekend day peak traffic hour trips generated by the proposed development are distributed as shown in Table 7. The work sheet for trip distribution estimate is included in Exhibit J.

Table 7
Entering/Exiting Site Generated Trip Estimates

Weekday Peak Hour			Weekday Trips	Weekend Day Peak Hour			Weekend Day Trips
In	Out	Total	Total	In	Out	Total	Total
7	7	14	210	10	9	19	226

Trip Distribution: Trip distribution pattern in the study area is determined based on existing peak hour trip patterns, knowledge of the project site and engineering judgment. It is expected that 100% of the trips generated by the site will travel on NW McNamee Road with 60% to/from northbound and 40% to/from southbound to access the project site. Figure 4, 5, and 6 show site trip distribution pattern and site generated trip assignments for weekday and weekend day, respectively.

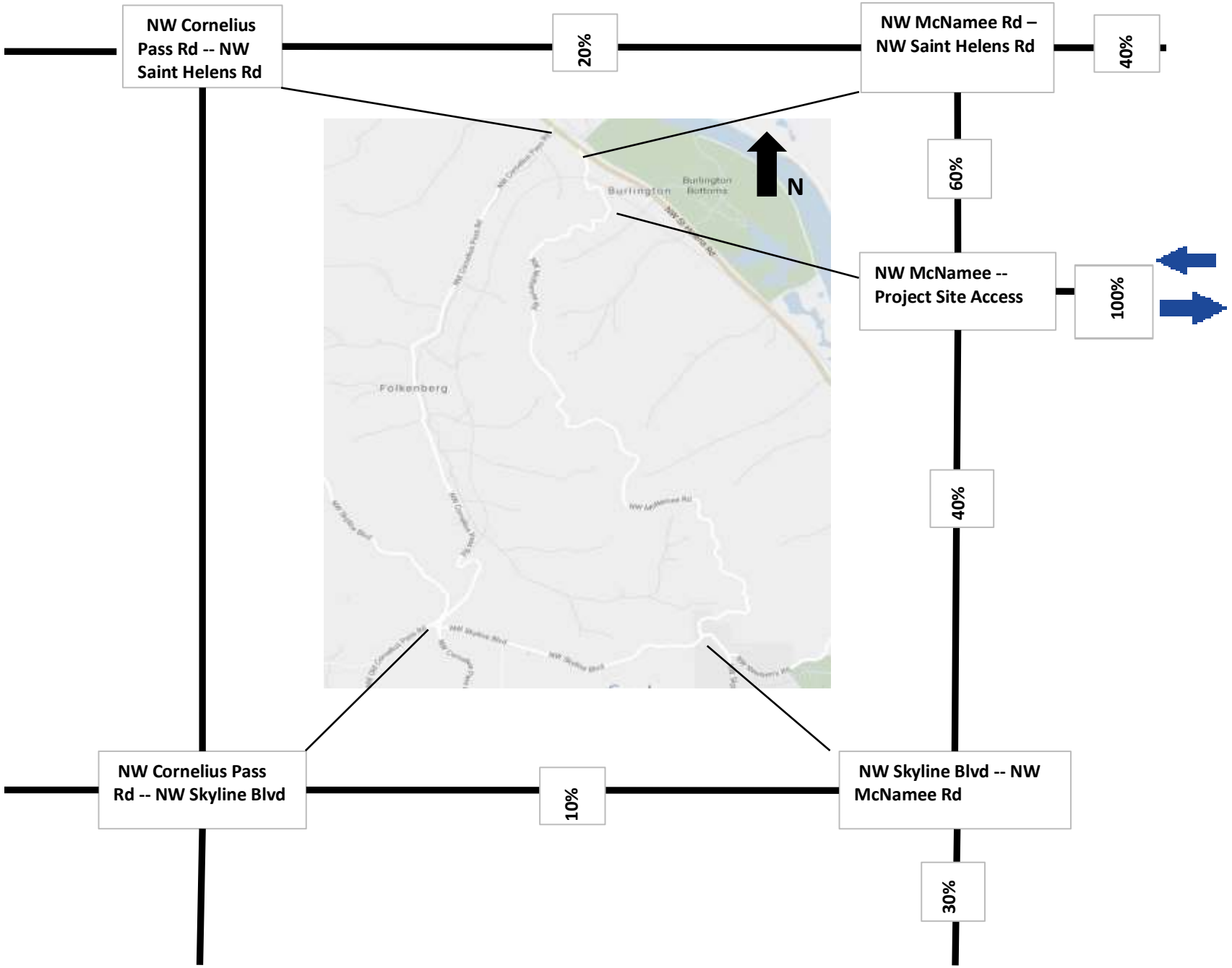
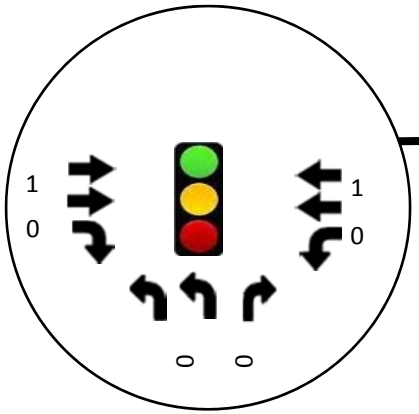


FIGURE 4: Site Generated Trip Distribution Percentage



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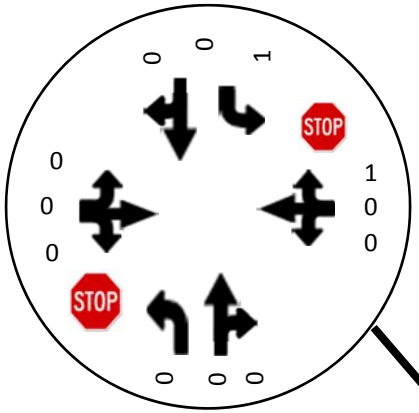
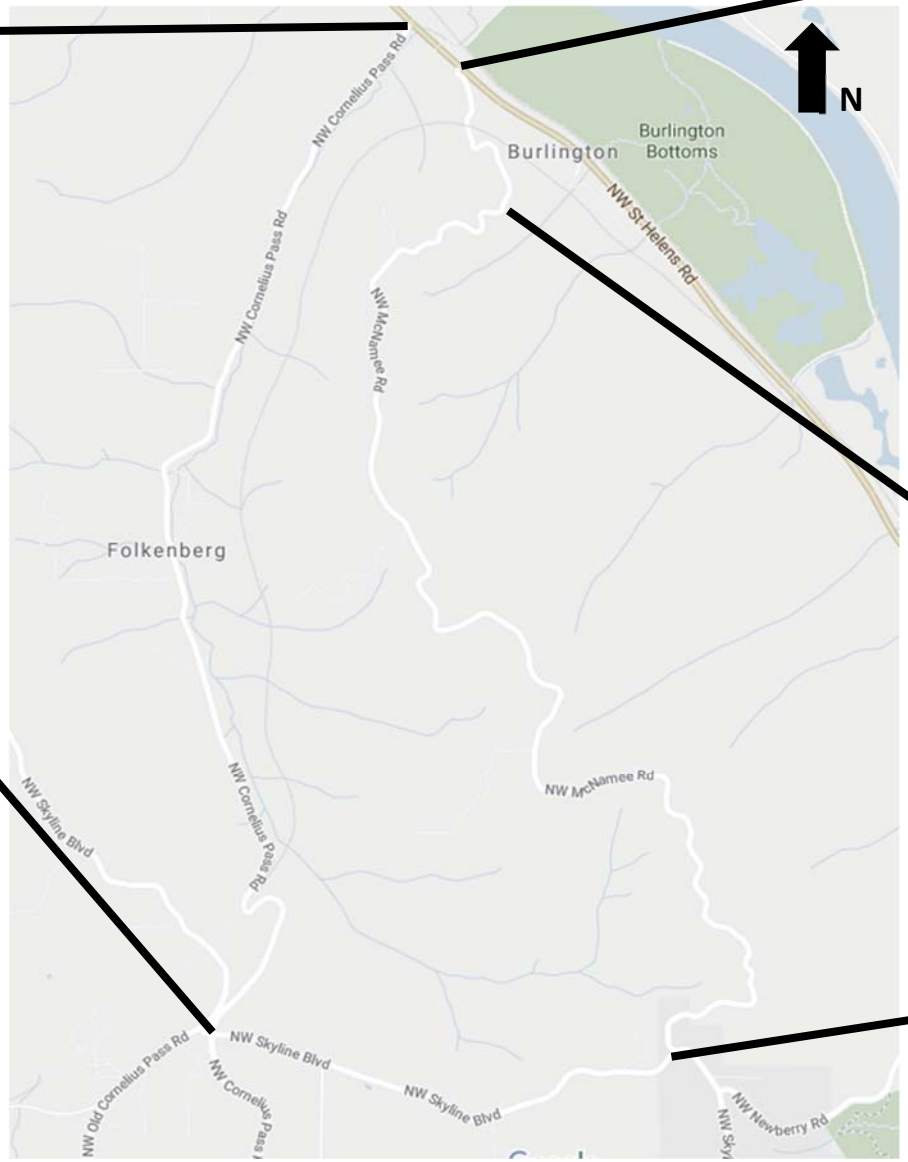
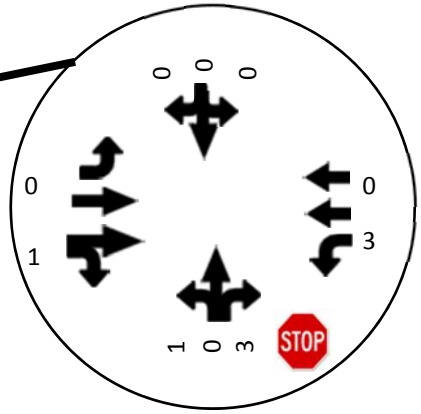
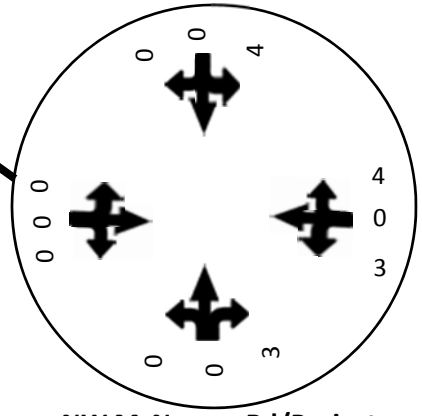


NW Cornelius Pass Rd/NW Skyline Blvd.

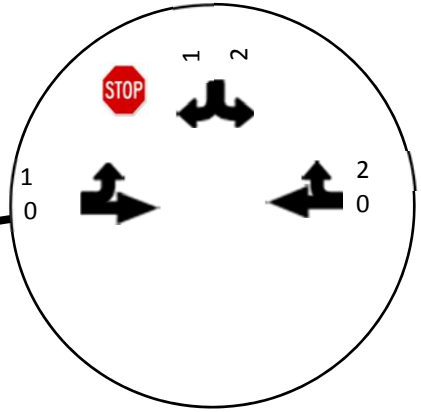




US 30/NW McNamee Rd

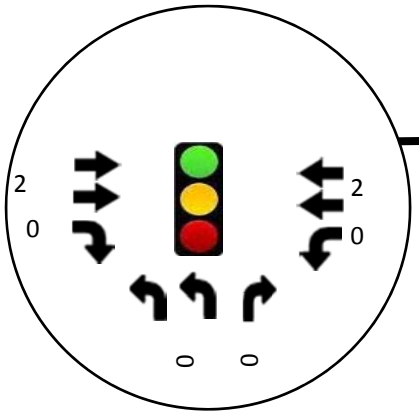


NW McNamee Rd/Project

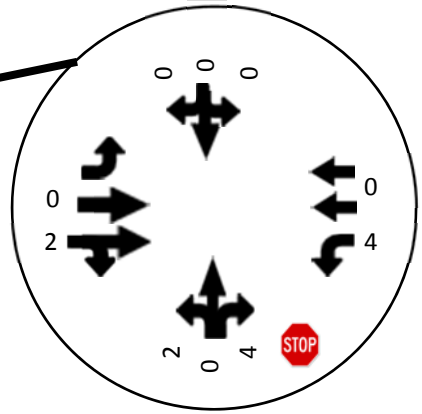


NW Skyline Blvd/NW McNamee

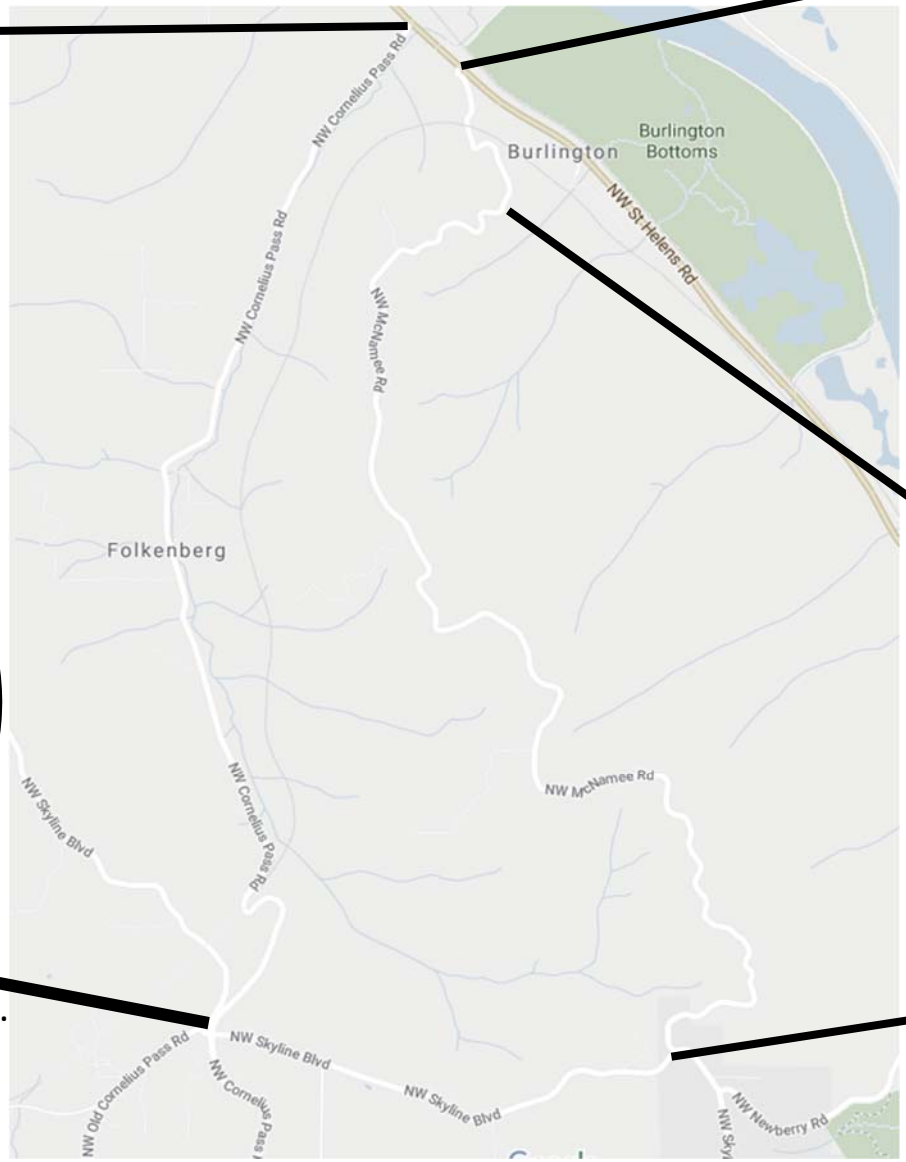
FIGURE 5: Year 2019 Site Generated Weekday Trips

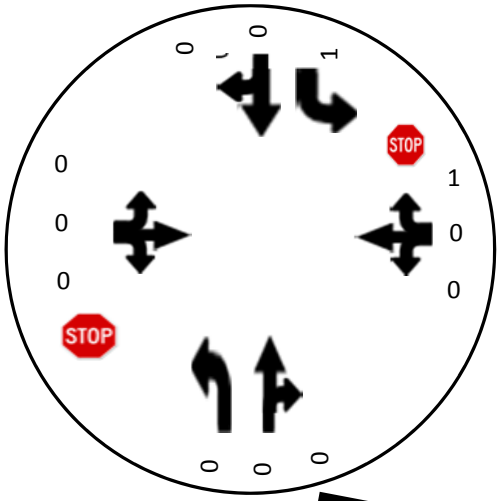


US 30/NW Cornelius Pass Rd

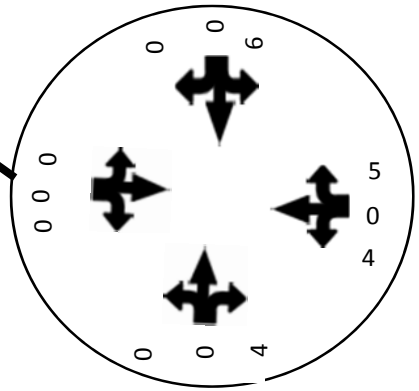


US 30/NW McNamee Rd

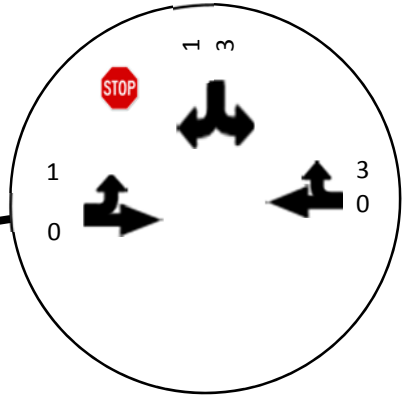




NW Cornelius Pass Rd/NW Skyline Blvd.



NW McNamee Rd/Project



NW Skyline Blvd/NW McNamee

N

FIGURE 6: Year 2019 Weekend Day Site Generated Trips

Projected Traffic:

In order to determine traffic conditions for opening year 2019 and future year 2033, traffic volumes would need to be projected to future years. Background traffic volumes represent non-site generated traffic volumes during the anticipated year of project completion and future years. As noted in the scope of work, an annual growth rate of 2.03% obtained from the County's TSP (Table 13 in Appendix B of the TSP) were applied to year 2018 traffic counts to account for regional traffic growth. The year 2019 and year 2033 background traffic volume calculation worksheets are presented in Exhibit J.

Year 2019 Background Traffic Volume: The background traffic volumes for the anticipated build-out year 2019 were estimated by applying a 2.03% annual growth rate to the existing year 2018 peak hour traffic volumes in Figures 2 and 3. The year 2019 background traffic volume for weekday peak traffic hour and weekend day peak traffic hour are shown in Figures 7 and 8, respectively.

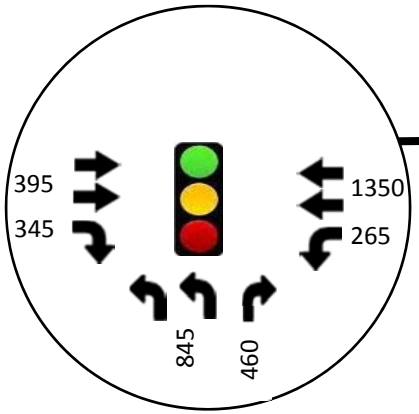
Year 2033 Background Traffic Volume: The background traffic volumes for year 2033 traffic condition consists of the existing traffic with regional growth. To account for the regional growth that occurred between year 2018 and year 2033, an annual growth rate of 2.03% to year 2018 peak hour traffic volumes were applied to the weekday and weekend day peak traffic hour. Figures 9 and 10 show the year 2033 background volume for weekday and weekend day peak traffic hours, respectively.

Total Network Traffic:

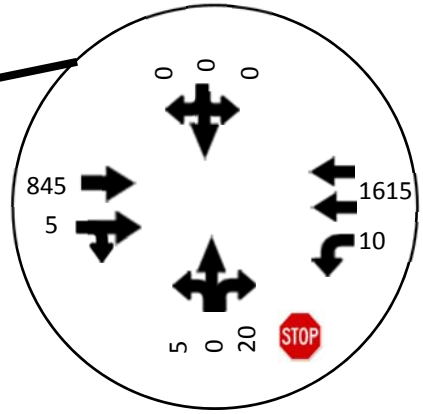
The proposed Burlington Creek Nature Park development trips were added to the background traffic for each of the analysis year to determine the total network traffic. The total network trips for weekday and weekend day year 2019 traffic volumes are shown in Figures 11 and 12, respectively. Figures 13 and 14 show year 2033 weekday and weekend day peak traffic hours, respectively**.**

Traffic Analysis: Operational analysis at each of the study locations was performed using the background and total traffic volume conditions. The following discussion summarizes the results of the analysis.

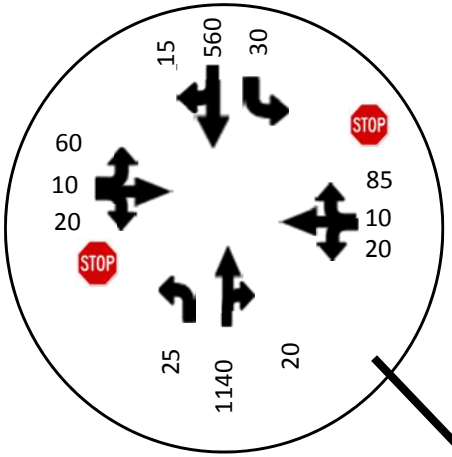
Build-out Year 2019 Background Traffic Conditions: The projected year 2019 background volumes in Figures 7 and 8 were used to determine how each of the intersections in the study area will operate during the project completion year 2019 without the site-generated trips. The results of the operational analysis are summarized in Table 8 below. The worksheet for the analysis is presented in Exhibit K of this report.



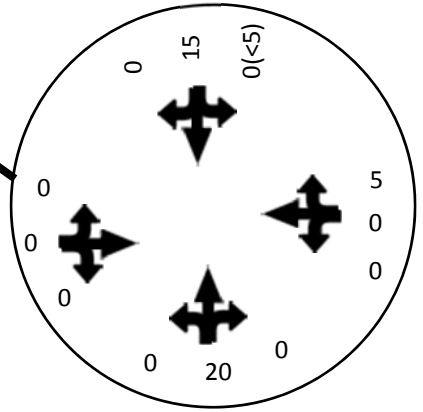
US 30/NW Cornelius Pass Rd



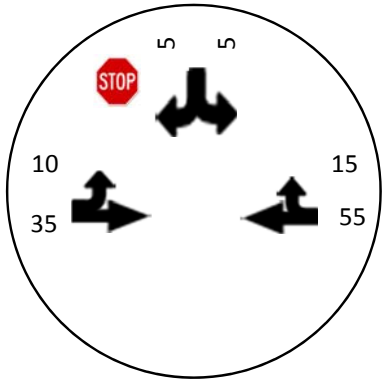
US 30/NW McNamee Rd



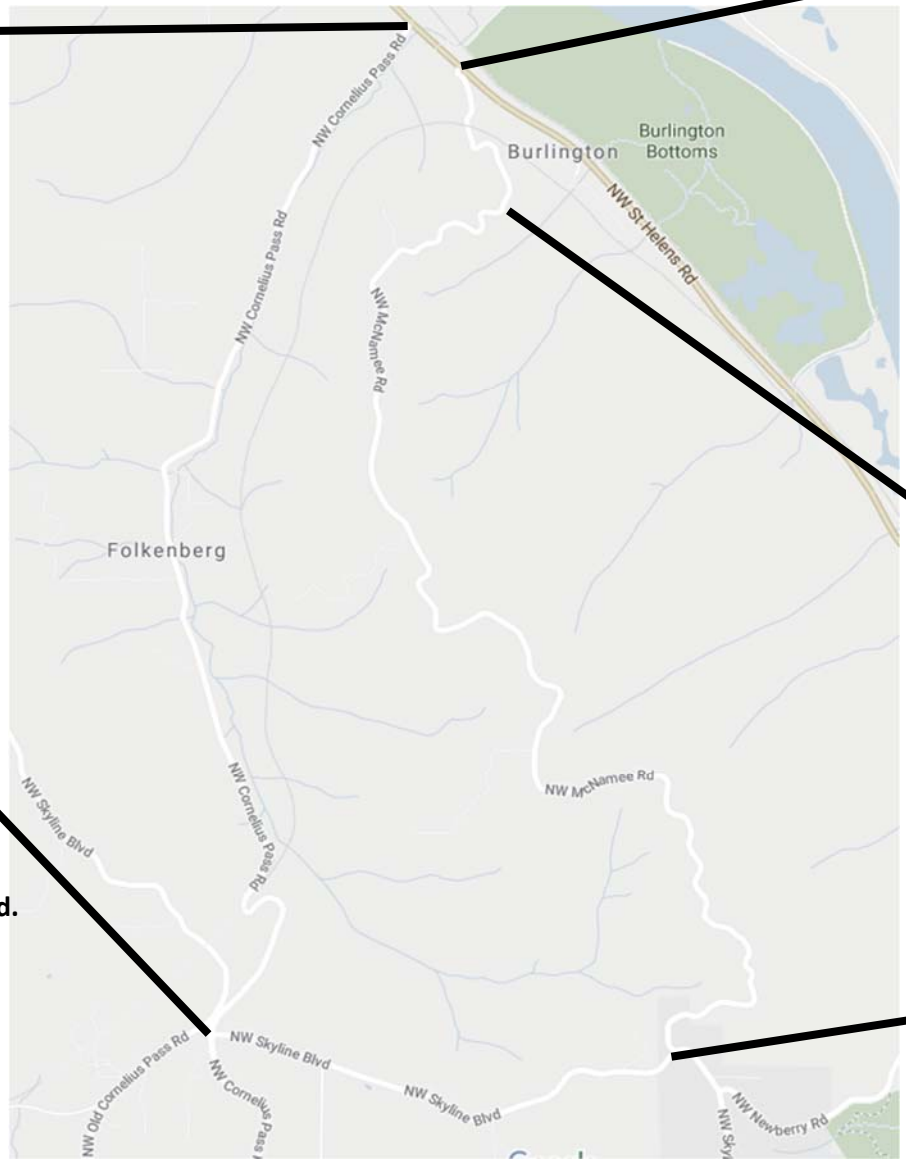
NW Cornelius Pass Rd/NW Skyline Blvd.



NW McNamee Rd/Project



NW Skyline Blvd/NW McNamee



N

FIGURE 7: Year 2019 Weekday Background Traffic Volume

FIGURE 8: Year 2019 Weekend Day Background Traffic Volume

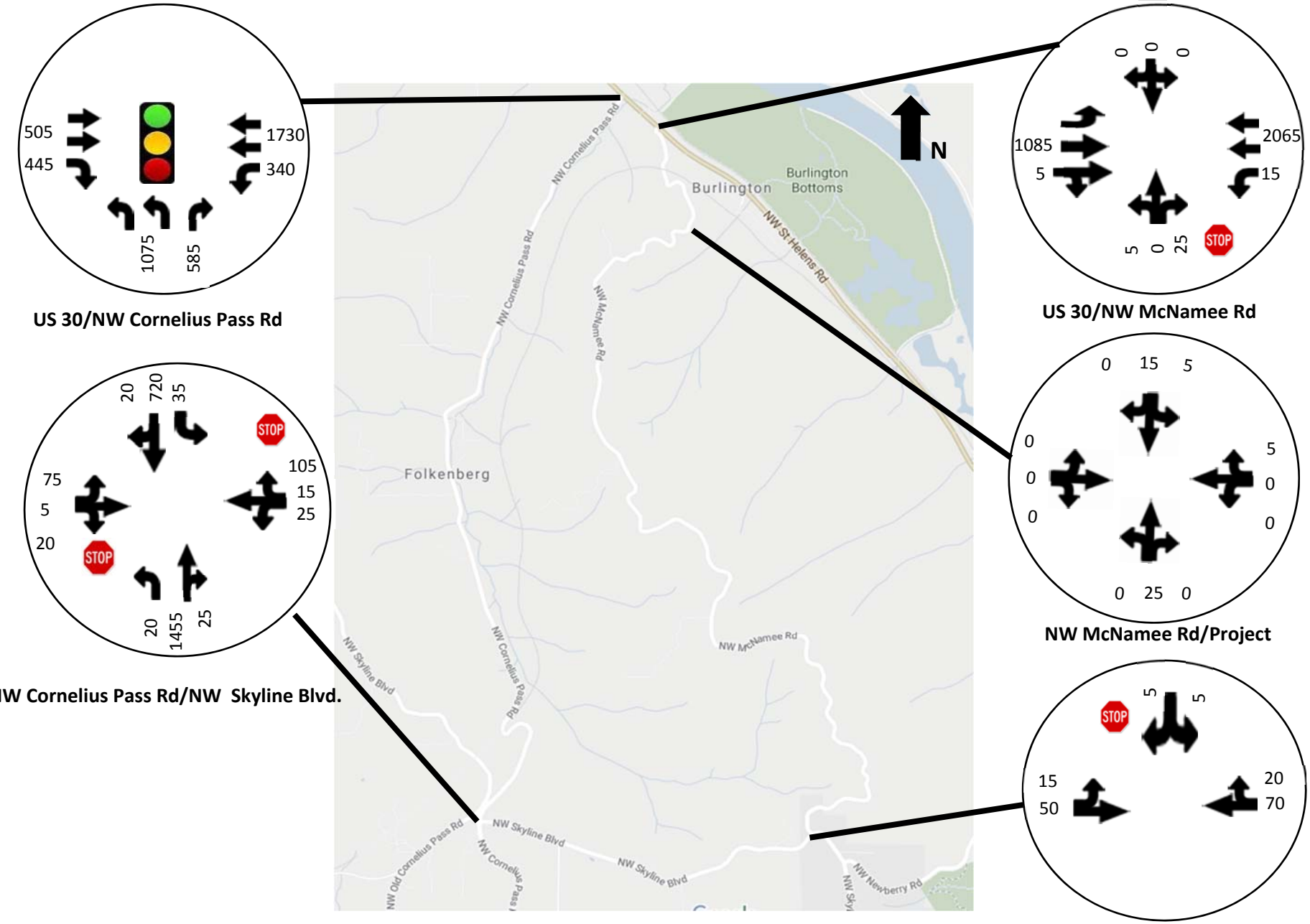


FIGURE 9: Year 2033 Weekday Background Traffic Volume

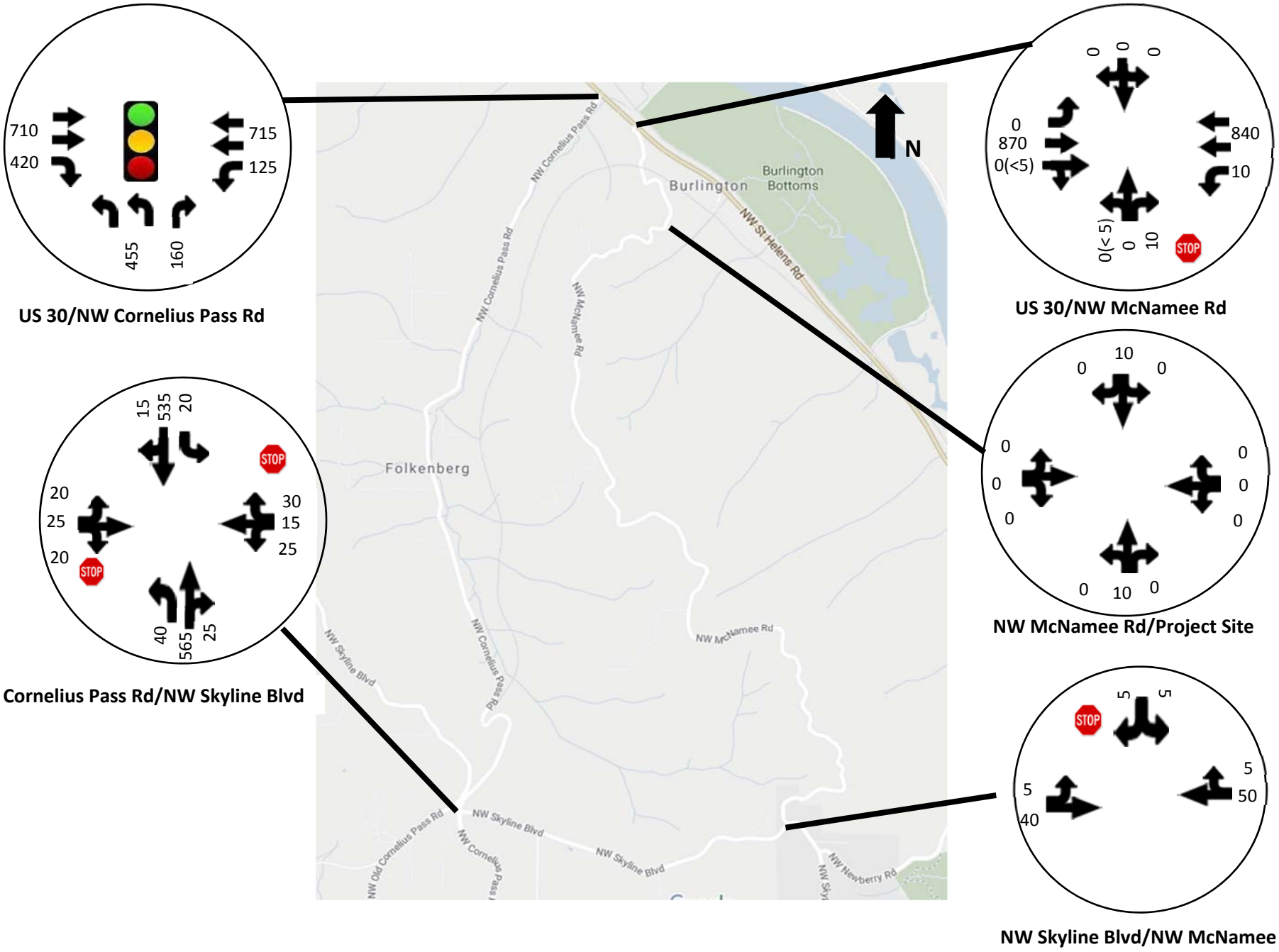
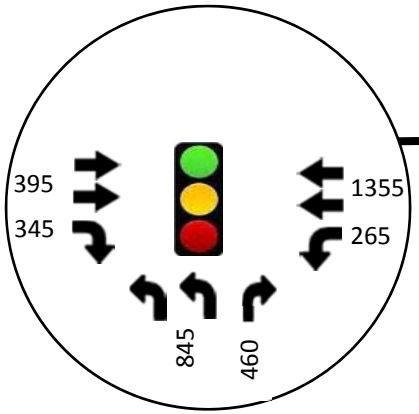
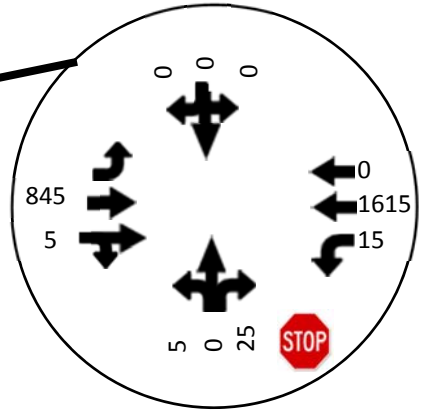


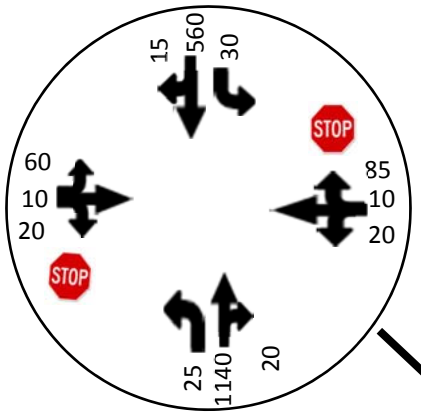
FIGURE 10: Year 2033 Weekend Day Background Traffic Volume



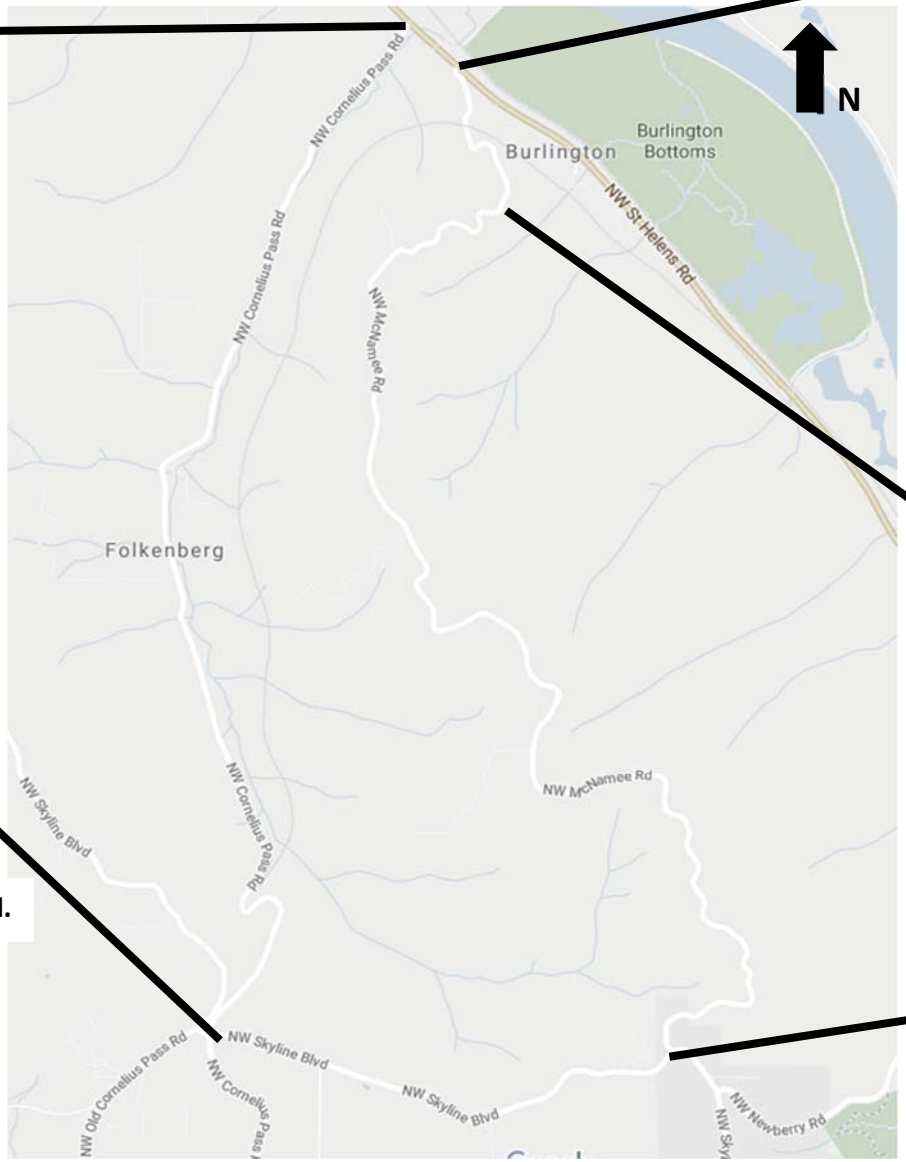
US 30/NW Cornelius Pass Rd

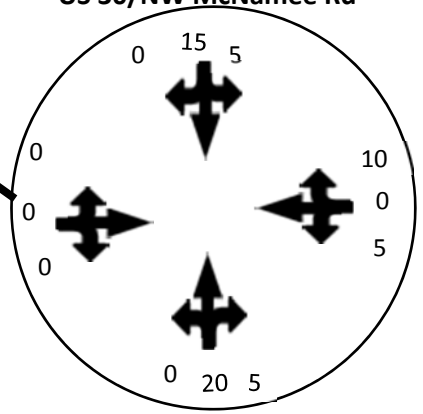


US 30/NW McNamee Rd

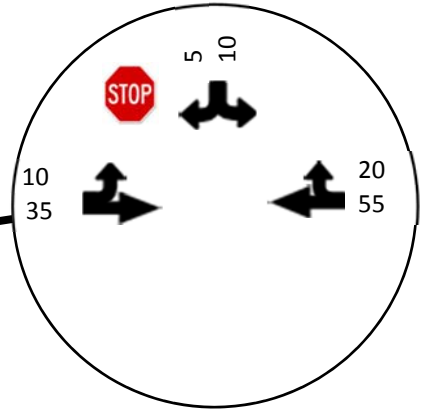


NW Cornelius Pass Rd/NW Skyline Blvd.





NW McNamee Rd/Project



NW Skyline Blvd/NW McNamee

FIGURE 11: Year 2019 Weekday Background Traffic Volume plus Site Trips

FIGURE 12: Year 2019 Weekend Day Background Traffic volume plus Site Trips

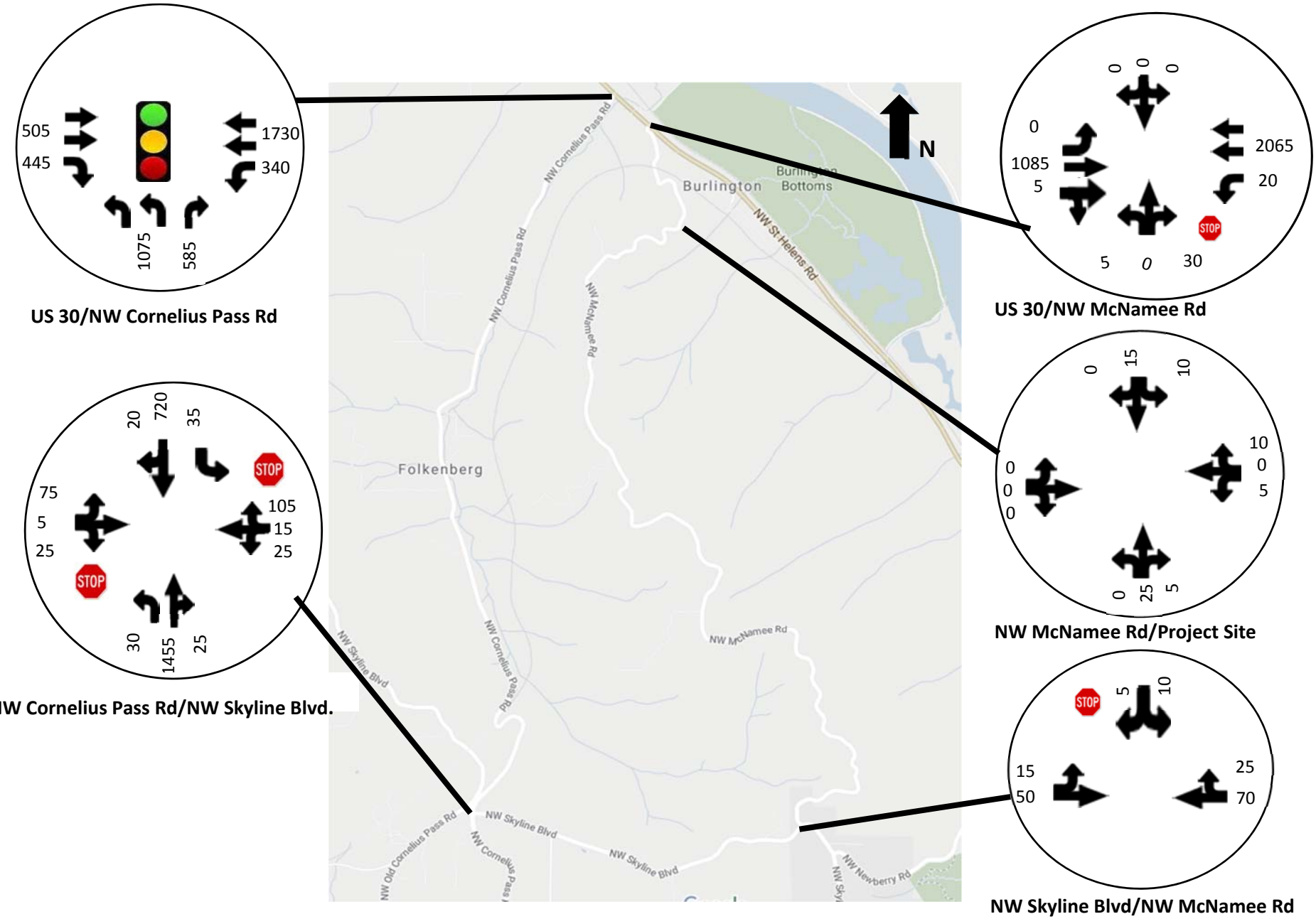


FIGURE 13: Year 2033 Weekday Background Traffic Volume plus Site Trips

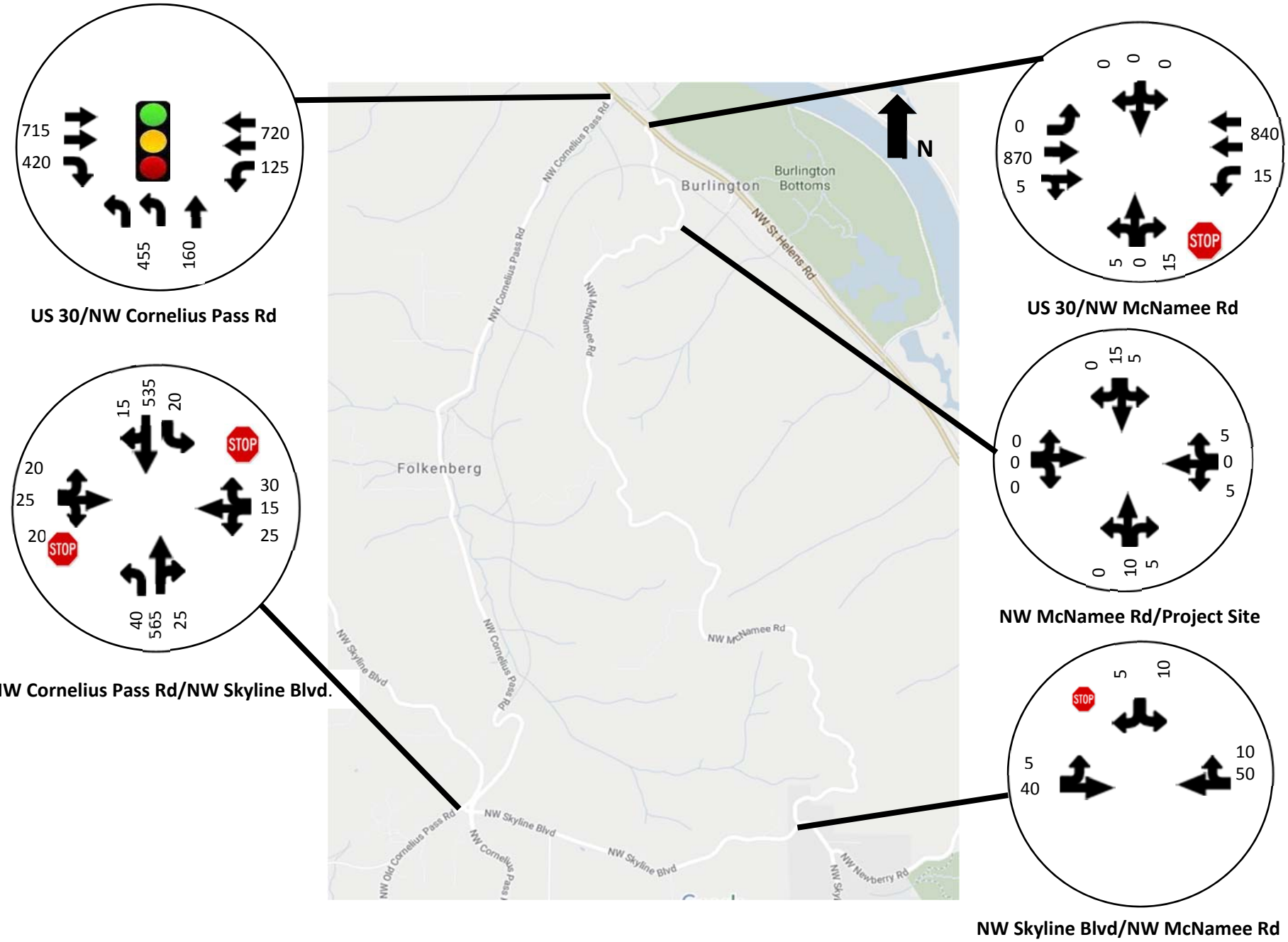


FIGURE 14: Year 2033 Weekend day Background Traffic Volume plus Site Trips

Table 8
Year 2019 Peak Hour Background Traffic Condition

	Weekday *HCM 2000/[A]2010		Weekend Day HCM 6th Edition			Weekend Day County Standard Met?	Weekday ODOT Standard Met?
Study Intersections	**Control Delay (Seconds)**	**V/C**	**LOS**	**Control Delay (seconds)**	**V/C**		
*US 30/NW Cornelius Pass Road	24.1	0.88	B	10.4	0.79	Y	Y
US 30/NW McNamee Road	11.9	0.04	A	10.8	0.02	Y	Y
NW McNamee Road/Project Site/Maintenance Access	8.4	0.01	A	0	0	Y	Y
NW McNamee Road/NW Skyline Boulevard	8.9	0.01	A	8.8	0.01	Y	Y
NW Skyline Boulevard/ NW Cornelius Pass Road	1480.7	3.62	C	24.5	0.23	Y	N

* = Control Delay and V/C ratio reported are based on HCM 2000 methodology for signalized intersection.
A = LOS, Control Delay and V/C ratio for weekday peak traffic hour are for critical movement of un-signalized intersection.

As shown in Table 8 above, all intersections within the study area operate within the County's LOS "C" standard in year 2019 weekend day peak background traffic conditions. All intersections within the study area are projected to operate within ODOT's acceptable standard of 0.99 v/c ratio in year 2019 during weekday evening peak traffic hour with the exception of NW Cornelius Pass Road/NW Skyline Boulevard.

Year 2019 Total Traffic Condition: Using the year 2019 total volumes in Figures 11 (weekday peak traffic) and 12 (weekend day peak traffic), capacity analysis at each of the study intersection was performed to determine the impact of trips generated by the proposed development. The results of the operational analysis are summarized in Table 9 below. The worksheet for the analysis is presented in Exhibit K.

Table 9
Year 2019 Peak Hour Total Traffic Condition

	Weekday*HCM 2000/[A]HCM 2010		Weekend Day HCM 6th Edition			Weekend Day County Standard Met?	Weekday ODOT Standard Met?
Study Intersections	**Control Delay (Seconds)**	**V/C**	**LOS**	**Control Delay (Seconds)**	**V/C**		
*US 30/NW Cornelius Pass Road	24.1	0.88	B	12.1	0.71	Y	Y
US 30/NW McNamee Road	11.9	0.05	B	15.9	0.06	Y	Y
NW McNamee Road/Project Site/Maintenance Access	8.6	0.02	A	8.6	0.01	Y	Y
NW McNamee Road/ NW Skyline Boulevard	8.9	0.02	A	8.9	0.2	Y	Y
NW Skyline Boulevard/ NW Cornelius Pass Road	1480.7	3.62	C	24.5	0.23	Y	N

* = Control Delay and V/C ratio reported are based on HCM 2000 methodology for signalized intersection.
A = LOS, Control Delay and V/C ratio for weekday peak traffic hour are for critical movement of un-signalized intersection.

As shown in Table 9 above, all intersections within the study area operate within the County's LOS "C" standard in year 2019 weekend day peak traffic plus site trips conditions. All intersections within the study area are projected to operate within ODOT's acceptable standard of 0.99 v/c ratio in year 2019 during weekday background peak traffic plus site trips with the exception of NW Cornelius Pass Road/NW Skyline Boulevard. In addition, the results of the analysis show that the additional site generated trips do not degrade the intersection's performance further.

Year 2033 Background Traffic Conditions: The projected year 2033 background volumes in Figures 9 (weekday peak traffic) and 10 (weekend day peak traffic) were used to determine how each of the intersections in the study area will operate during the future year 2033 without site-generated trips. The results of the operational analysis are summarized in Table 10 below. The worksheet for the analysis is presented in Exhibit L of this report.

Table 10
Year 2033 Peak Hour Background Traffic Condition

	Weekday [A]HCM 2010/ *HCM 2000		Weekend Day HCM 6th Edition			Weekend Day County Standard Met?	Weekday ODOT Standard Met?
Study Intersections	**Control Delay (Seconds)**	**V/C**	**LOS**	**Control Delay (Seconds)**	**V/C**		
*US 30/NW Cornelius Pass Road	50.3	0.99	B	14.6	0.75	Y	Y
US 30/NW McNamee Road	62.4	0.35	B	11.8	0.02	Y	Y
NW McNamee Road/Project Site/Maintenance Access	8.5	0.01	A	0	0	Y	Y
NW McNamee Road/ NW Skyline	9.1	0.01	A	8.9	0.01	Y	Y
NW Skyline Boulevard / NW Cornelius Pass Road	2484.1	114.13	E	46.8	0.46	N	N

* = Control Delay and V/C ratio reported are based on HCM 2000 methodology for signalized intersection.
A = LOS, Control Delay and V/C ratio for weekday peak traffic hour are for critical movement of un-signalized intersection.

As shown in Table 10 above, all intersections within the study area are projected to operate within ODOT's acceptable standard of 0.99 v/c ratio during weekday background peak traffic hour except NW Cornelius Pass Road/NW Skyline Boulevard. All intersections within the study area are projected to operate within the County's LOS "C" standard in year 2033 weekend day peak background traffic condition except the intersection of NW Cornelius Pass Rd/NW Skyline Boulevard. The County has a plan to install a traffic signal control at this intersection. Planned improvements for this intersection is described in detail elsewhere in this report.

Year 2033 Total Traffic Condition: Using the year 2033 total volumes in Figure 13 (weekday peak traffic) and Figure 14 (weekend day peak traffic), capacity analysis at each of the study intersections was performed to determine the impact of trips generated by the proposed development. The results of the operational analysis are summarized in Table 11 below. The worksheet for the analysis is presented in Exhibit L.

Table 11
Year 2033 Peak Hour Total Traffic Condition

	Weekday [A]HCM 2010/*HCM 2000		Weekend Day HCM 6th Edition			Weekend Day County Standard Met?	Weekday ODOT Standard Met?
Intersections	Control Delay (Seconds)	V/C	LOS	Control Delay (Seconds)	V/C		
US 30/NW Cornelius Pass (Signalized) Road (Signalized)	48.3	0.99	B	14.6	0.75	Y	Y
US 30/NW McNamee Road	59.9	0.37	B	21.3	0.09	Y	Y
NW McNamee Road/Project Site/ Maintenance Access	8.7	0.02	A	8.6	0.01	Y	Y
NW McNamee Road/NW Skyline Boulevard	9.3	0.03	A	9.0	0.02	Y	Y
NW Skyline Boulevard/NW Cornelius Pass Road	2484.1	114.13	E	46.8	0.46	N	N

* = LOS, Control Delay and V/C ratio reported are based on HCM 2000 methodology for signalized intersections.
A = LOS and V/C ratio for weekday peak traffic hour are for critical movement of the un-signalized intersections.

As shown in Table 11 above, all intersections within the study area are projected to operate within ODOT's acceptable standard of 0.99 v/c ratio during weekday evening peak traffic hour except the NW Cornelius Pass Road/NW Skyline Boulevard during the weekday evening peak hour background plus site generated trips in year 2033. All intersections within the study area are projected to operate within the County's LOS "C" standard in year 2033 weekend day peak traffic with background plus site trips except the intersection of NW Cornelius Pass Rd/NW Skyline Boulevard. This intersection's poor performance is due to heavy background traffic and not the impact of trips generated by the proposed project. The additional trips generated by the proposed development will not degrade the v/c ratio at this intersection further.

Queue Analysis: Queue analysis for future year 2033 background and total traffic conditions was performed to determine the 95th percentile and average queue lengths. The queue analysis was performed using SimTraffic simulation. ODOT and Multnomah County use the 95th percentile queue length to determine adequate storage lengths for turn lanes. The results of the 95th percentile queue analysis for year 2033 traffic conditions are shown in Tables 12 and 13 below.

The SimTraffic queue analysis output that are show in the table below are rounded to the nearest 25 feet queue length. The storage lengths are determined by the striped storage lane/link lengths. For movements that don't have striped storage lengths the distance between the streets is shown as the storage lengths. The worksheet for the queue analysis is presented in Exhibit M.

Table 12
Year 2033 Weekday Peak Traffic Hour Queue Analysis

Intersection	Movement/ Approach	Queue Without Development		Queue With Development		*Existing Link/Turn-lane Storage Length in feet	Adequate?
		50%ile	95%ile	50%ile	95%ile		
US 30/NW Cornelius Pass Rd	EBT	75	150	75	125	1200	YES
	EBR	100	150	100	150	625	YES
	WBT	75	125	75	100	950	YES
	WBL	75	100	125	175	300	YES
	NBL	2200	4675	2225	4345	225/(5280)+	YES
	NBR	125	125	125	125	100	YES
US30/NW McNamee Road	EBL	NR	NR	NR	NR	950	YES
	EBTR	NR	NR	NR	NR	950	YES
	WBL	NR	NR	0	25	250	YES
	WBTR	NR	NR	NR	NR	2025	YES
	NBLTR	25	50	25	25	2225	YES
NW McNamee Road/Project Site Access	NBLTR	NR	NR	NR	NR	5280+	YES
	SBLTR	NR	NR	NR	NR	2225	YES
	EBLTR	NR	NR	NR	NR	NA	YES
	WBLTR	NR	NR	0	25	400	YES
NW McNamee Road/NW Skyline Blvd	EBLT	0	25	NR	NR	3535	YES
	WBTR	NR	NR	NR	NR	1000	YES
	SBLR	NR	NR	25	25	5280+	YES
NW Skyline Boulevard/ NW Cornelius Pass Road	EBLTR	0	25	275	500	175	NO
	WBLTR	NR	NR	300	400	1750	YES
	NBL	NR	NR	50	75	225	YES
	NBTR	NR	NR	0	25	2050	YES
	SBL	NR	NR	NR	NR	300	YES
	SBTR	NR	NR	NR	NR	5280+	YES

*Approximate storage length measured from google maps NA=Information is not available.
NR=Not report in SimTraffic out put

Evaluation of the queue analysis results in Table 12 indicates that the average and 95th percentile queue lengths can be accommodated by the existing storage area at the study locations nearest to the project site.

Table 13
Year 2033 Weekday Peak Traffic Hour Queue Analysis

Intersection	Movement/ Approach	Queue Without Development		Queue With Development		*Existing Link/ Turn-Lane Length in feet	Adequate?
		50%ile	95%ile	50%ile	95%ile		
US 30/NW Cornelius Pass Rd	EBT	75	100	75	125	1200	Yes
	EBR	50	75	75	625	625/1200	Yes
	WBT	25	50	25	50	950	Yes
	WBL	75	100	75	100	300/950	Yes
	NBL	75	100	100	150	225/5280+	Yes
	NBR	25	75	NR	NR	100/5280+	Yes
US30/NW McNamee Road	EBL	NR	NR	NR	NR	950	Yes
	EBTR	NR	NR	NR	NR	950	Yes
	WBL	NR	NR	0	25	250/2025	Yes
	WBTR	NR	NR	NR	NR	2025	Yes
	NBLTR	25	50	25	25	5280+	Yes
NW McNamee Road/Project Site Access	NBLTR	NR	NR	NR	NR	2225	Yes
	SBLTR	NR	NR	NR	NR	1000	Yes
	EBLTR	NR	NR	NR	NR	NA	Yes
	WBLTR	NR	NR	NR	NR	400	Yes
NW McNamee Road/ NW Skyline Blvd	EBLT	NR	NR	NR	NR	3535	Yes
	WBTR	NR	NR	NR	NR	1000	Yes
	SBLR	NR	NR	25	25	5280+	Yes
NW Skyline Boulevard/ NW Cornelius Pass Road	EBLTR	50	75	75	125	1419	Yes
	WBLTR	25	75	75	100	3535	Yes
	NBL	0	25	100	150	225/2050	Yes
	NBTR	0	25	NR	NR	2050	Yes
	SBL	0	25	NR	NR	300/5280+	Yes
	SBTR	NR	NR	NR	NR	5280+	Yes

*Approximate storage length measured from google maps NA=Information is not available.
NR=Not report in SimTraffic out put

As shown in Table 13, the average and 95 percentile queue lengths can be accommodated by the existing storage areas at study locations during the weekend day peak traffic hour in year 2033 with/without the proposed development.

Access Evaluation:

Section 4.000 of *Multnomah County Road Rules* requires that:

"An applicant for access to County roads must either demonstrate that a sight distance requirement is currently met, propose mitigation measures that will meet this standard, or propose alternate measures acceptable to the County Transportation Division to mitigate sub-standard sight distance."

In addition, the County's Road Rules require that the minimum spacing standard for driveways on local streets be 50 feet.

Findings: KPFF evaluated intersection sight distance for five access points located in the Tualatin Mountains in 2014 and 2018. The sight distance evaluation included the project site access on NW McNamee Road. The results of the sight distance evaluation for the project site are documented in the *2014 KPFF Intersection Sight Distance Evaluation Memorandum* and the 2018 memorandum and summarized below.

The results of the sight distance evaluation showed that the sight distance at the project site access does not meet both Multnomah County's and AASHTO's minimum corner sight distance and stopping sight distance standards. The sight distance is limited due to trees, vegetation, a horizontal curve and a hillside on the roadway.

The memorandum recommends removal of the sight distance obstructions and recording restrictive sight distance easements over a portion of the nearby properties. See excerpt of the 2018 and *2014 KPFF Intersection Sight Distance Evaluation Memorandum* in Exhibit H. With the recommended obstruction removal, the KPFF report indicates that safe and adequate sight distance can be provided.

In addition, review of the proposed access locations showed that there are no accesses within 50 feet of the proposed driveway. The County's access spacing standard for driveways on local streets is a minimum of 50 feet. Therefore, the proposed access spacing follows the County's access spacing standard.

County Planned Improvements: The *Comprehensive Plan Update* for 2016 "*Planned Projects List"* in Exhibit I includes transportation improvements in the project site vicinity. The improvements include the following.

- NW Skyline Boulevard/NW Cornelius Pass Road intersection improvements:

    1. Install a traffic signal
    2. Add exclusive westbound left-turn lane
    3. Add a shared westbound through/right lane.

- NW Skyline Boulevard from UGB to Cornelius Pass Road and from Cornelius Pass Road to Rocky Point Road improvement add shoulder.

- Cornelius Pass Road Improvements: Install photo radar for speed enforcement; install reflectors, delineators, and traffic striping; conduct speed zone study; and, study the need for climbing lanes, guardrail, drainage and additional shoulder.

- The intersection of NW Skyline Boulevard/NW Cornelius Pass Road was evaluated with the proposed signal installation and westbound lane improvements noted above in place. The results of the analysis show that this intersection is forecast to operate within ODOT's acceptable mobility standard of 0.99 v/c ratio and the County's LOS "C" in year 2033 during weekday and weekend day peak background plus site trips traffic conditions. The worksheet for the analysis is presented in Exhibit N.

Findings:

The analysis described above resulted in the following findings.

1. Multnomah County's planned improvements are anticipated to mitigate safety deficiencies at the study locations.
2. The intersection of NW Cornelius Pass Road/NW Skyline Boulevard has existing safety and capacity deficiencies.
3. The additional trips from the proposed development are not projected to have an adverse impact on the nearby transportation system.
4. The small increase of site generated trips does not further degrade the intersection that is projected to fail under background traffic conditions.
5. With the County's planned intersection improvements, NW Cornelius Pass Road/NW Skyline Boulevard is projected to operate within ODOT's acceptable mobility standard of 0.99 v/c in year 2033 during weekday peak background traffic plus site trips condition.
6. With the County's planned intersection improvements at NW Cornelius Pass Road/NW Skyline Boulevard, the intersection is projected to operate within Multnomah County's LOS "C" in year 2033 during weekend day peak background traffic plus site trips condition.

Section IV: Conclusion

With the sight distance improvements at the project site access and Multnomah County's planned improvements in place, the projected trips anticipated by the proposed development use can safely and adequately be served by the existing transportation system.

References

1. *Multnomah County Design Manual, https://multco.us/file/16499/download*
2. *Highway Capacity Manual 2010, 5th Edition* (Transportation Research Board, National Research Council, Washington, D.C. , 2010)
3. *Oregon Highway Plan, 1999*
4. *Analysis Procedure Manual, version 2, 2018* (Oregon Department of Transportation) *http://www.oregon.gov/ODOT/Planning/Documents/APMv.2.pdf*
5. *Trip Generation Manual, 9th Edition* (Institute of Transportation Engineers).

EXHIBIT A - Zoning Map

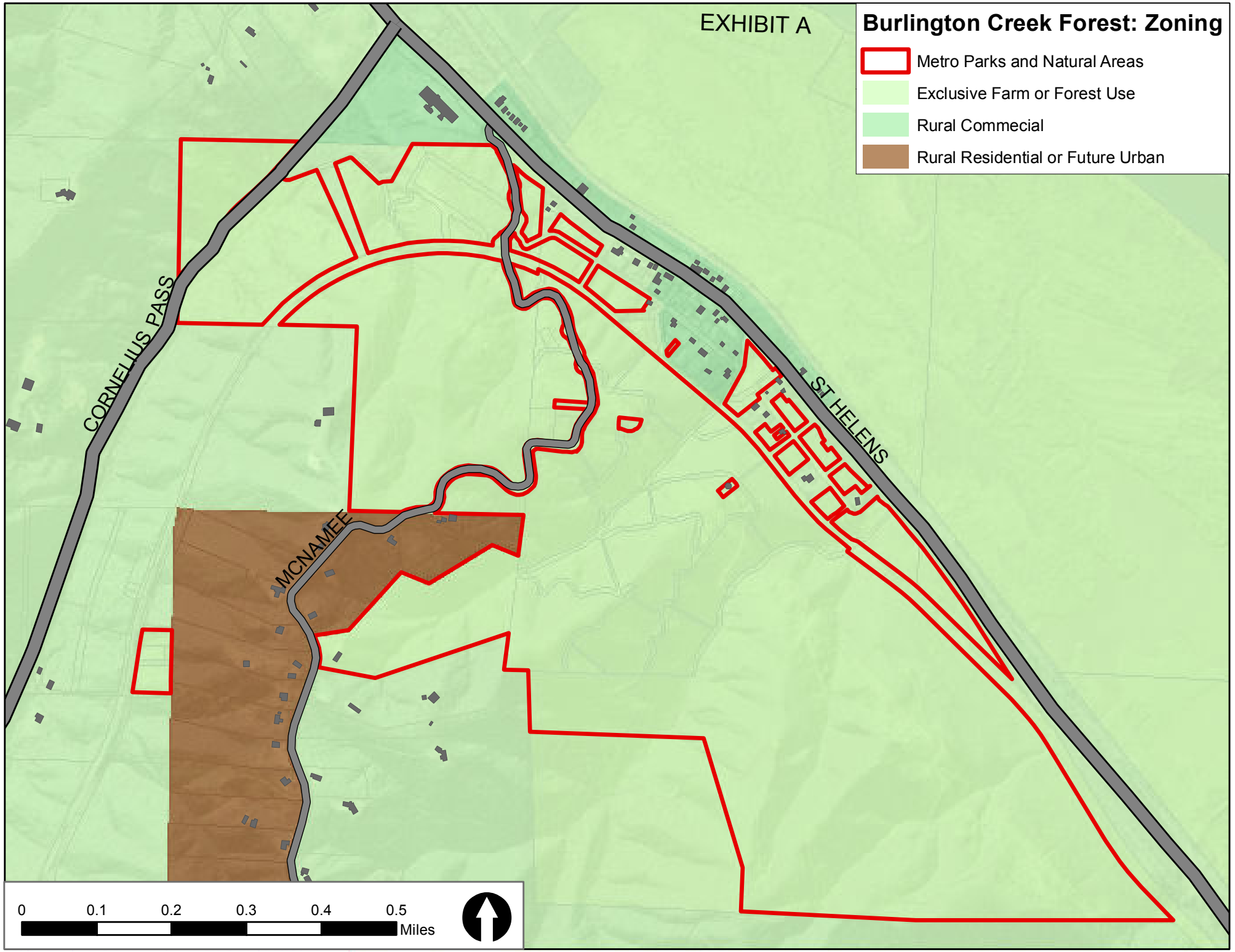
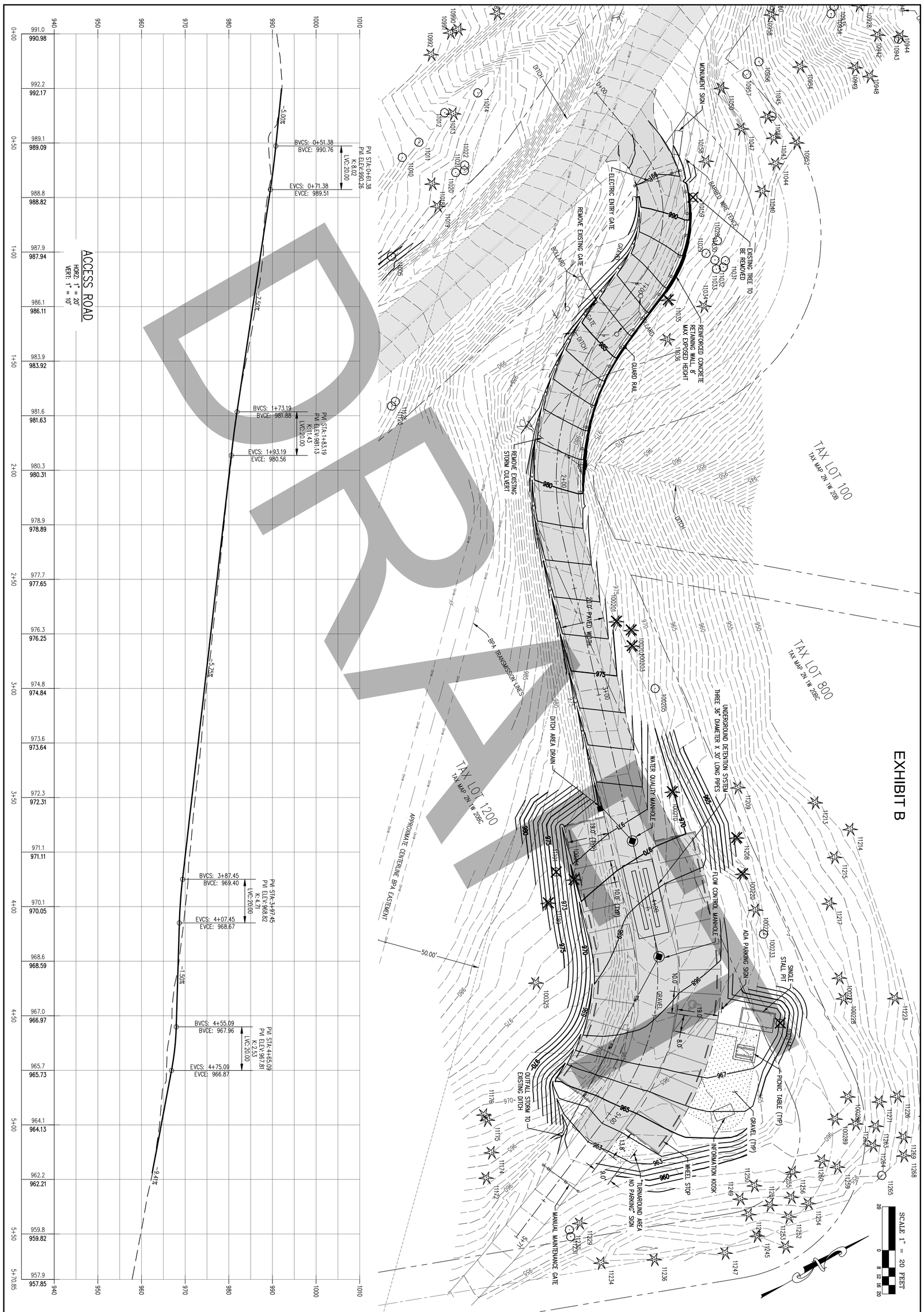


EXHIBIT A
Burlington Creek Forest: Zoning
Metro Parks and Natural Areas
Exclusive Farm or Forest Use
Rural Commecial
Rural Residential or Future Urban
CORNELIUS PASS
MCNAMEE
ST HELENS
0
0.1
0.2
0.3
0.4
0.5
Miles

EXHIBIT B - Proposed Site plan



BURLINGTON PARKING SITE PLAN

BURLINGTON CREEK PARKING METRO

MULTNOMAH COUNTY OREGON

AKS ENGINEERING & FORESTRY, LLC
12965 SW HERMAN RD STE 100
TUALATIN, OR 97062
P: 503.563.6151
F: 503.563.6152
aks-eng.com

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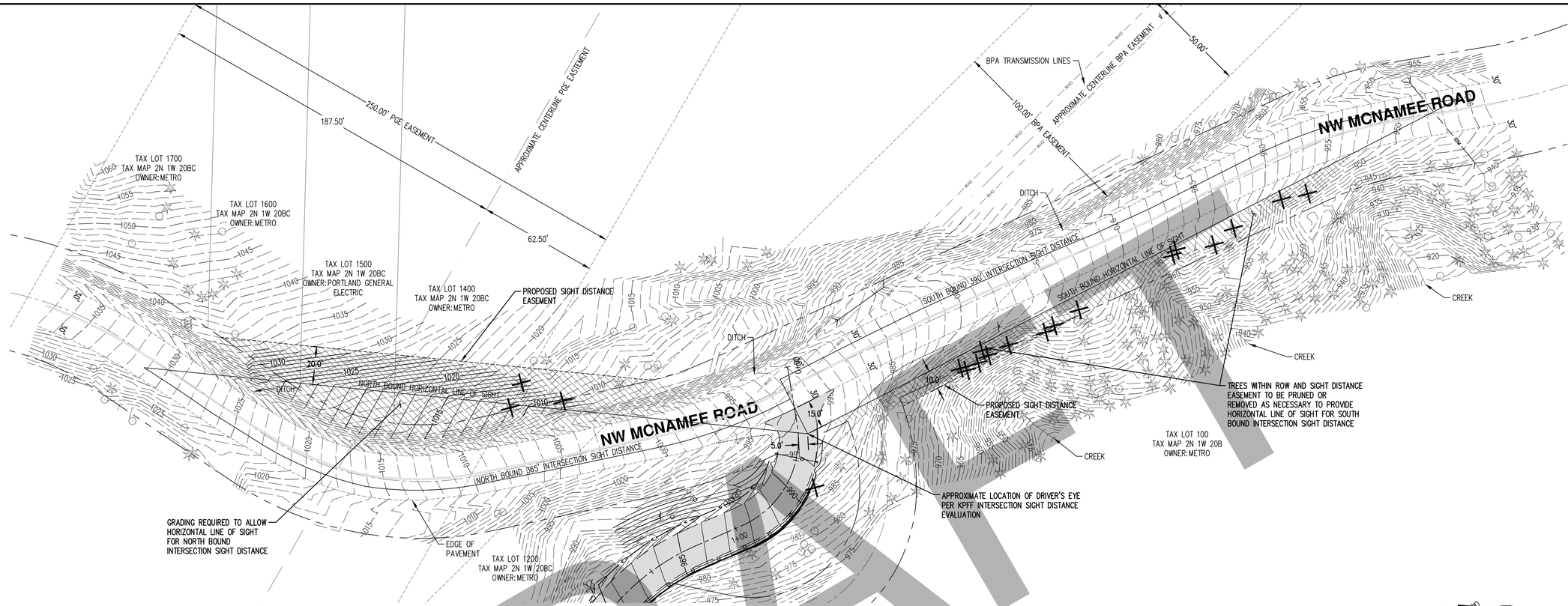
JOB NUMBER 4781
SHEET

REVISIONS

DESIGNED BY: BRB
DRAWN BY: AZV
CHECKED BY: ANH
SCALE: AS NOTED
DATE: 09/05/2017



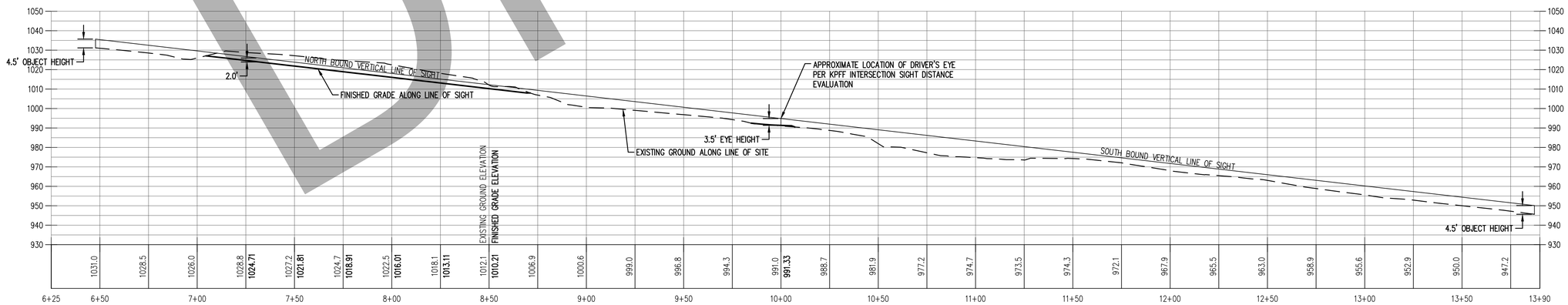
LEGEND:

SIGHT DISTANCE CLEARING AREA

TREE REMOVAL/PRUNING

SCALE 1" = 30 FEET

30 0 12 18 24 30



SITE DISTANCE

Hor. Scale: 1"= 30'

Vert. Scale: 1"= 30'

DRAFT

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BURLINGTON CREEK PARKING METRO

MULTNOMAH COUNTY OREGON

NW MCNAMEE ROAD SIGHT DISTANCE

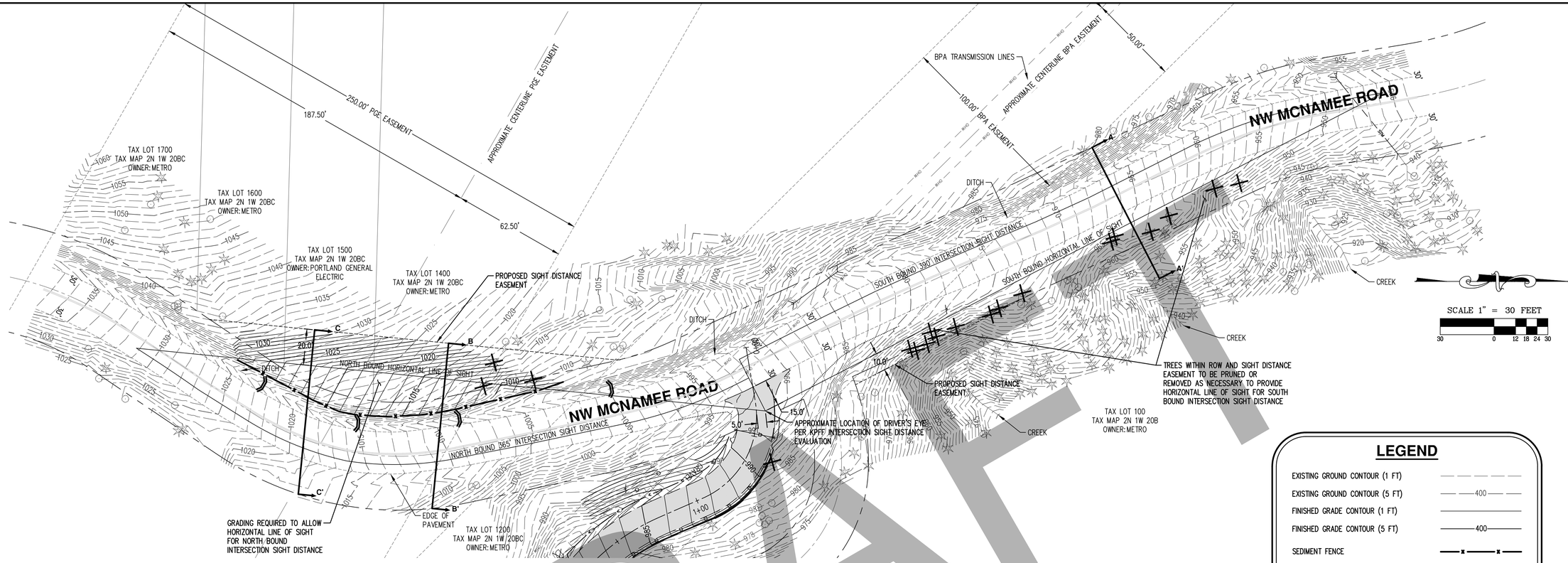
DESIGNED BY: BRB
DRAWN BY: AZV
CHECKED BY: AHH
SCALE: AS NOTED
DATE: 07/14/2017

REVISIONS

JOB NUMBER 4781

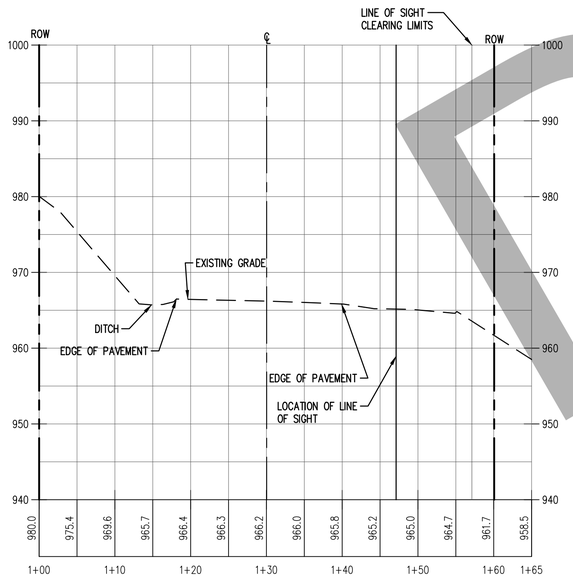
SHEET 1 OF 2

AKS DRAWING FILE: 4781 MCNAMEE SIGHT DISTANCE.DWG | LAYOUT: LAYOUT1

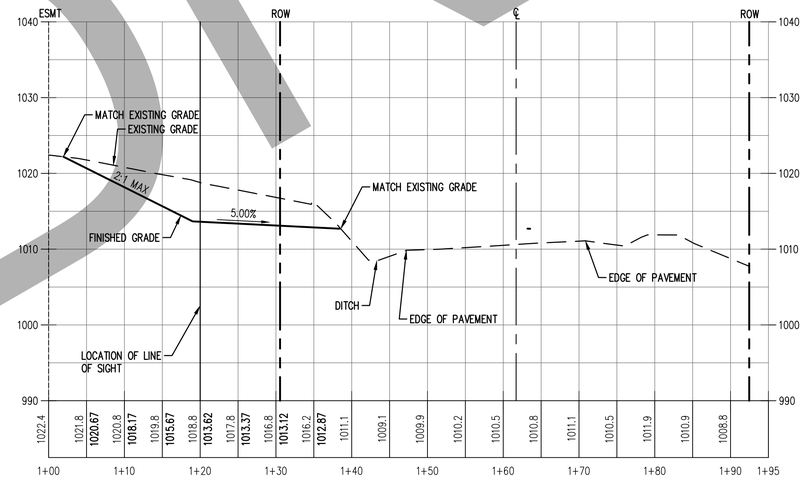


LEGEND

- EXISTING GROUND CONTOUR (1 FT)
- EXISTING GROUND CONTOUR (5 FT) — 400 —
- FINISHED GRADE CONTOUR (1 FT)
- FINISHED GRADE CONTOUR (5 FT) — 400 —
- SEDIMENT FENCE
- CHECK DAM



A-A'
Hor. Scale: 1"= 10'
Vert. Scale: 1"= 10'



B-B'
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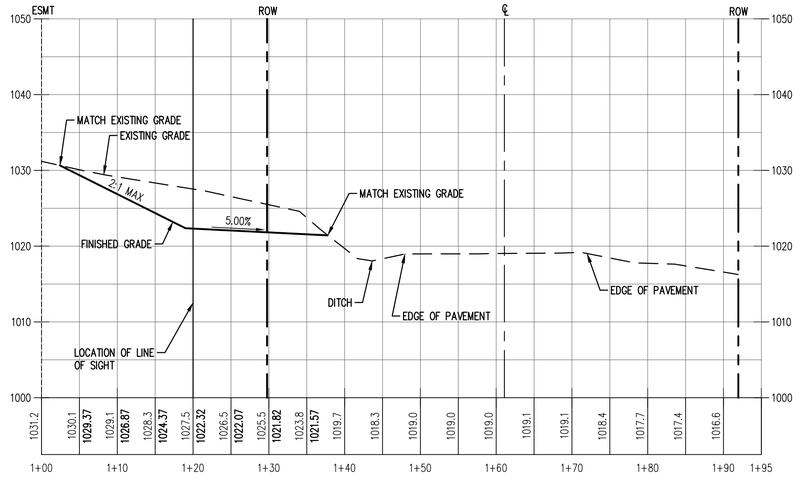
Vert. Scale: 1"= 10'



C-C'
Hor. Scale: 1"= 10'
Vert. Scale: 1"= 10'

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BURLINGTON CREEK PARKING METRO
MULTNOMAH COUNTY OREGON

NW MCNAMEE ROAD GRADING PLAN

DESIGNED BY:	BRB
DRAWN BY:	AZV
CHECKED BY:	AHH
SCALE:	AS NOTED
DATE:	07/14/2017

REVISIONS

JOB NUMBER 4781

SHEET 2 OF 2

AKS DRAWING FILE: 4781 MCNAMEE SIGHT DISTANCE GRADING.DWG | LAYOUT: LAYOUT1

EXHIBIT C - Nature Park Trip Data
- Trip Rate Estimates

Park Comparables

Sept-18

Park	Agency	Location	Acres	Annual Day Use Attendance	Annual Vehicle Trips	Annual Vehicle Count	10 Minute Population	20 Minute Population	30 Minute Population	POC % (20 min)	Trail Miles	Activities	No. Parking Spaces	Comments
Burlington Creek Forest	Metro	Multnomah County, OR	350	NA	NA	NA	3,400	149,000	739,000	0.35	8	Hiking, MTB, equestrian trails, 1-2 picnic tables proposed	25	No equestrian parking, single restroom, two picnic tables. 5.5 miles of trails and 2.5 miles gravel road.
Graham Oaks Nature Park	Metro	City of Wilsonville, OR	246	109,300	58,600	29,300	28,000	200,000	737,000	0.24	3	Hiking, walking, biking, play area, nature education center, shelter and picnic tables, regional trail	27	Nature education center, picnic tables and shelter, regional trail, adjacent neighborhood.
Scouter's Mountain Nature Park	Metro	Happy Valley, OR	100	28,225	22,580	11,290	58,000	456,000	1,028,000	0.31	1	Hiking, walking, nature education, shelter and picnic tables.	24	Significant local neighborhood population.
Mount Talbert Nature Park	NCPRD/Metro	Happy Valley, OR	253	87,200	69,800	34,900	112,000	587,000	1,400,000	0.27	4	Hiking, accessible trail, sheltered picnic area, nature education	29	Picnicing, restroom, shelter, nature education
Cooper Mountain Nature Park	THPRD/Metro	Beaverton, OR	230	123,450	98,760	49,380	145,000	487,000	790,000	0.33	3.5	Hiking, walking, play area, nature education center, shelter and picnic tables.	53	Surrounded by significant residential community. Functions like a neighborhood park.
Whipple Creek Regional Park	Clark County	Vancouver, WA	300	NA	NA	NA	NA	316,000	787,000	NA	4.3	Hiking, equestrian, MTB	10 passenger, 12 trailer	
Powell Butte Nature Park	City of Portland	Portland, OR	612	NA	NA	NA	111,000	464,000	1,020,000	0.34	8+	Hiking, MTB, equestrian, nature education center, picnicking	65 passenger vehicle and 4 trailer spaces	A city park within city limits. More extensively developed than BCF, more than 3x the population within a 20 minute drive time.
L.L. Stub Stewart State Park	Oregon State Parks	Washington County, OR	1,673	112,716	56,360	28,180	NA	108,400	395,900	NA	25	Hiking, equestrian, mountain biking, regional trail, disc golf, picnicking, dog park, nature education center, wildlife viewing	unknown	Oregon State Parks assumes 4 passengers/ vehicle. Counts are for day users only, campers are not included.
Forest Park	City of Portland	Portland, OR	5,100	NA	NA	NA	17,500	297,000	1,048,000	0.33	70	Hiking, MTB, equestrian	unknown	Includes the Wildwood Trail a National Scenic Trail.

NOTES

1) Population data based on ESRI business analyst 2016 estimates.
2) Drive times generated with network analyst.
3) POC = Persons of Color.
4) Trail miles include existing gravel roads where visitor use is allowed.
5) A vehicle occupancy rate of 2.5 persons/vehicle is typically assumed to calculate # of visitors.
6) A study of four Metro parks found a vehicle occupancy rate of 1.6 persons/vehicle.

North Tualatin Mountains
Burlington Creek Forest
METRO

Annual Trips

SUMMARY
Average Annual Vehicle Trips across Four Metro Parks
62,430

The future Burlington Creek Forest Nature Park is compared to four Metro nature parks in terms of level of development and proximity to population. Burlington is most similar to Graham Oaks in terms of proximity to 10/20/30 minute population and least like Cooper Mountain Nature Park in terms of population proximity and level of development. Burlington Creek Forest is proposed to have fewer visitor amenities than each of the comparable Metro Parks.

Annual Vehicle Trips					
Year	**Cooper Mountain**	**Graham Oaks**	**Mt. Talbert**	**Scouter's Mountain**	
2016	97,147	54,236	70,552	21,273	
2017	100,371	62,967	69,005	23,887	
	98,759	58,601	69,779	22,580	Average Annual Vehicle Trips for 2016 and 2017
				62,430	Average Annual Vehicle Trips

Notes

1) Data represents vehicle counts from Jan 1, 2016 - Dec 31, 2017

2) Average annual vehicle trips without Cooper Mountain is 50,320.

North Tualatin Mountains
Burlington Creek Forest
METRO

Summer Daily Averages (Vehicle Trips on peak travel days)

Summary	
0.14	Average portion of trips that occur on a week day
0.15	Average portion of trips that occur on a weekend day
0.14	Average portion of peak trips (Friday - Monday)
212	Average Daily Trips (ADT) - week day
222	Average Daily Trips (ADT) - weekend day
216	Average Daily Trips (ADT) - peak travel days

The data below highlight vehicle trips during the peak months for 2016 and 2017 for four Metro parks.
Peak months were assumed to be May - August per Multnomah County.
Peak travel days were assumed to be Friday - Monday per Multnomah County.
Vehicle counts were multiplied by 2 to determine number of vehicle trips (ADT).
ADT was found to be 216 for peak travel days during summer when comparing four Metro Parks.
When Cooper Mountain is excluded, peak summer ADT for three Metro parks 165.

Cooper Mountain (Parking Lot) Daily averages

Day	May 1, 2016 - August 31, 2016	May 1, 2017 - August 31, 2017	Daily Ave Vehicle Count	Weekly %	ADT (vehicle x2)
Mon	179.2	178.6	179	0.15	358
Tue	165.0	159.4	162	0.13	324
Wed	165.7	165.3	165	0.14	331
Thu	157.3	159.1	158	0.13	316
Fri	161.6	157.4	159	0.13	319
Sat	173.2	193.8	184	0.15	367
Sun	202.1	228.4	215	0.18	430
	Summer Weekly Average		*1,223*		*2,446*
	Portion of Trips that occur on a week day			*0.13*	
	Portion of Trips that occur on weekend			*0.16*	
	Portion of Trips that occur during peak travel days			*0.15*	
		Summer Weekday Average			*330*
		Summer Weekend Day Average			*399*
		Summer Peak Day Average			*369*

Mt Talbert (Parking Lot) Daily averages

Day	May 1, 2016 - August 31, 2016	May 1, 2017 - August 31, 2017	Daily Ave Vehicle Count	Weekly %	ADT (vehicle x2)
Mon	126.3	125.8	126	0.15	252
Tue	133.9	119.1	127	0.15	253
Wed	128.7	124.1	126	0.15	253
Thu	119.8	119.0	119	0.14	239
Fri	115.4	109.9	113	0.13	225
Sat	112.3	112.5	112	0.13	225
Sun	116.7	121.1	119	0.14	238
	Summer Weekly Average		*842*		*1,685*
	Portion of Trips that occur on a week day			*0.15*	
	Portion of Trips that occur on weekend			*0.14*	
	Portion of Trips that occur during peak travel days			*0.14*	
		Summer Weekday Average			*244*
		Summer Weekend Day Average			*231*
		Summer Peak Day Average			*235*

Graham Oaks (Parking Lot) Daily averages

Day	May 1, 2016 - August 31, 2016	May 1, 2017 - August 31, 2017	Daily Ave Vehicle Count	Weekly %	ADT (vehicle x2)
Mon	90.2	100.2	95	0.15	190
Tue	95.7	105.4	101	0.16	201
Wed	88.7	104.0	96	0.15	193
Thu	93.6	111.8	103	0.16	205
Fri	84.4	96.1	90	0.14	180
Sat	71.4	85.5	78	0.12	157
Sun	71.2	77.4	74	0.12	149
	Summer Weekly Average		*638*		*1,275*
	Portion of Trips that occur on a week day			*0.15*	
	Portion of Trips that occur on weekend			*0.12*	
	Portion of Trips that occur during peak travel days			*0.13*	
		Summer Weekday Average			*194*
		Summer Weekend Day Average			*153*
		Summer Peak Day Average			*169*

Scouter's Mountain (Parking Lot) Daily averages*

Day	May 1, 2016 - August 31, 2016	May 1, 2017 - August 31, 2017	Daily Ave Vehicle Count	Weekly %	ADT
Mon	69.7	97.1	42	0.14	84
Tue	74.1	80.2	39	0.13	82
Wed	72.7	91.8	41	0.14	86
Thu	68.5	81.7	38	0.13	79
Fri	56.5	89.4	36	0.12	72
Sat	80.4	106.9	47	0.16	95
Sun	98.8	129.6	57	0.19	115
	Summer Weekly Average		*299*		*612*
	Portion of Trips that occur on a week day			*0.13*	
	Portion of Trips that occur on weekend			*0.17*	
	Portion of Trips that occur during peak travel days			*0.15*	
		Summer Weekday Average			*80*
		Summer Weekend Day Average			*105*
		Summer Peak Day Average			*91*

** The Scouter's counter counts vehicles in and out and is divided by 2 to determine car counts.*

North Tualatin Mountains
Burlington Creek Forest
METRO

Monthly Averages

April 1, 2016 - April 1, 2018

0.41	Portion of annual visitation that typically occurs at four Metro parks during peak months (May - August).
6,574	Monthly Average Vehicle Trips during Peak Months (Four Parks)

Month	Cooper Mountain (Parking Lot)	Ave Monthly Trips (# Vehicles x2)
Jan	3,104	6,208
Feb	3,298	6,597
Mar	4,710	9,419
Apr	4,997	9,995
May	5,413	10,827
Jun	4,965	9,929
Jul	5,979	11,957
Aug	5,131	10,262
Sep	4,013	8,026
Oct	3,832	7,663
Nov	3,014	6,027
Dec	2,617	5,233
TOTAL	**51,071**	**102,143**
Peak Counts	21,487	42,975
Average Peak Monthly Trips		10,744
Peak %		0.42

Month	Graham Oaks Car Monthly averages	Ave Monthly Trips (# Vehicles x2)
Jan	2,412	4,823
Feb	2,376	4,752
Mar	2,887	5,773
Apr	2,408	4,816
May	2,726	5,452
Jun	2,733	5,465
Jul	2,884	5,767
Aug	2,883	5,765
Sep	2,640	5,280
Oct	2,751	5,501
Nov	2,314	4,628
Dec	2,168	4,335
TOTAL	**31,179**	**62,357**
Peak Counts	11,225	22,449
Average Peak Monthly Trips		5,612
Peak %		0.36

Month	Mt. Talbert Car Monthly averages	Ave Monthly Trips (# Vehicles x2)
Jan	2,509	5,018
Feb	2,446	4,892
Mar	3,320	6,639
Apr	2,941	5,882
May	3,819	7,638
Jun	3,643	7,286
Jul	3,854	7,708
Aug	3,307	6,614
Sep	2,884	5,768
Oct	3,112	6,224
Nov	2,374	4,748
Dec	2,067	4,134
TOTAL	**36,276**	**72,551**
Peak Counts	14,623	29,246
Average Peak Monthly Trips		7,312
Peak %		0.40

Month	Scouter's Car Monthly Ave (Divide by 2)	Scouter's Mountain Monthly averages (car trips)
Jan	518	1,035
Feb	663	1,326
Mar	852	1,704
Apr	1,004	2,007
May	1,236	2,472
Jun	1,188	2,377
Jul	1,550	3,099
Aug	1,282	2,564
Sep	975	1,950
Oct	873	1,746
Nov	664	1,328
Dec	479	958
TOTAL	**11,283**	**22,565**
Peak Counts	5,256	10,512
Average Peak Monthly Trips		2,628
Peak %		0.47

Summer Hourly Averages

The data below highlight hourly vehicle counts and trips during the peak months (May - August) for 2016 and 2017 for four Metro parks.
Parking capacity at Cooper Mountain Nature Park is twice what is being planned for Burlington, thus ADT for Burlington is expected to be lower than the four park average suggests.

Vehicle Counts May 1, 2017 - August 31, 2017

Hour	Cooper Mountain	Graham Oaks	Mt. Talbert	Scouter's Mountain
00:00	0.0	0.0	0.0	0.0
01:00	0.0	0.0	0.0	0.0
02:00	0.0	0.0	0.0	0.0
03:00	0.0	0.0	0.0	0.0
04:00	0.0	0.2	0.4	0.0
05:00	0.4	1.8	1.8	0.4
06:00	3.7	4.5	4.1	1.2
07:00	7.5	5.3	6.4	1.9
08:00	14.0	7.7	8.0	3.3
09:00	14.5	8.3	8.6	4.0
10:00	14.2	8.6	9.9	3.9
11:00	14.3	9.0	11.8	3.6
12:00	12.4	8.5	9.8	4.0
13:00	11.6	7.5	9.0	4.1
14:00	11.9	6.9	8.9	3.8
15:00	12.6	6.0	8.6	3.8
16:00	11.4	5.5	8.5	3.1
17:00	11.5	4.8	8.7	3.7
18:00	13.4	5.1	7.3	3.5
19:00	13.0	5.0	4.7	2.9
20:00	8.3	2.3	1.7	0.6
21:00	2.0	0.1	0.2	0.2
22:00	0.1	0.1	0.1	0.1
23:00	0.0	0.0	0.0	0.0
Weekends				
00:00	0.0	0.0	0.0	0.1
01:00	0.0	0.0	0.0	0.0
02:00	0.0	0.0	0.0	0.0
03:00	0.0	0.0	0.0	0.0
04:00	0.0	0.0	0.4	0.0
05:00	0.3	0.8	1.3	0.5
06:00	2.9	2.5	3.7	1.0
07:00	10.4	3.1	5.8	1.5
08:00	13.9	5.3	8.5	2.9
09:00	17.4	7.3	10.5	4.5
10:00	18.9	8.4	9.8	5.2
11:00	17.8	6.9	11.4	4.8
12:00	14.6	6.7	11.2	4.8
13:00	15.6	6.6	9.6	6.2
14:00	18.1	5.5	9.8	5.7
15:00	17.1	5.6	8.0	6.0
16:00	13.1	5.1	7.2	4.1
17:00	12.9	4.8	7.4	4.1
18:00	13.0	4.7	6.5	3.7
19:00	13.4	5.3	3.9	3.3
20:00	8.8	2.1	1.6	0.5
21:00	2.5	0.2	0.2	0.1
22:00	0.1	0.1	0.1	0.1
23:00	0.0	0.0	0.0	0.0
Weekdays				
00:00	0.0	0.0	0.0	0.0
01:00	0.0	0.0	0.0	0.0
02:00	0.0	0.0	0.0	0.0
03:00	0.0	0.0	0.0	0.0
04:00	0.0	0.3	0.5	0.0
05:00	0.5	2.2	2.0	0.4
06:00	4.0	5.3	4.3	1.3
07:00	6.3	6.1	6.7	2.1
08:00	14.1	8.6	7.9	3.4
09:00	13.3	8.6	7.9	3.8
10:00	12.4	8.7	10.0	3.4
11:00	12.9	9.8	12.0	3.2
12:00	11.6	9.2	9.3	3.7
13:00	10.0	7.9	8.7	3.3
14:00	9.5	7.4	8.6	3.1
15:00	10.8	6.1	8.8	3.0
16:00	10.8	5.6	9.1	2.7
17:00	11.0	4.9	9.2	3.6
18:00	13.5	5.3	7.6	3.4
19:00	12.9	4.9	5.0	2.7
20:00	8.2	2.3	1.7	0.7
21:00	1.9	0.1	0.2	0.2
22:00	0.1	0.0	0.0	0.1
23:00	0.0	0.0	0.0	0.1

Vehicle Counts May 1, 2016 - August 31, 2016

Hour	Cooper Mountain	Graham Oaks	Mt. Talbert	Scouter's Mountain	Four Park Hourly Average Trips (x2 for trips)	Three Park Hourly Average Trips (x2 for trips)
00:00	0.0	0.0	0.1	0.0	0.0	0.0
01:00	0.0	0.0	0.0	0.0	0.0	0.0
02:00	0.0	0.0	0.0	0.0	0.0	0.0
03:00	0.0	0.0	0.0	0.0	0.0	0.0
04:00	0.0	0.0	0.1	0.0	0.2	0.3
05:00	0.8	1.2	1.5	0.3	2.1	2.4
06:00	3.5	4.3	3.8	0.7	6.5	6.2
07:00	6.7	4.6	6.9	1.6	10.2	8.9
08:00	12.0	5.8	8.3	2.0	15.3	11.7
09:00	13.7	6.9	9.6	2.8	17.1	13.4
10:00	13.2	7.2	10.4	2.8	17.5	14.2
11:00	13.7	7.5	11.7	3.1	18.7	15.6
12:00	12.2	7.2	10.0	3.0	16.8	14.2
13:00	12.0	7.2	9.8	3.4	16.2	13.7
14:00	11.9	6.9	9.3	3.4	15.8	13.1
15:00	12.2	4.9	9.2	3.3	15.1	11.9
16:00	12.1	4.7	8.9	2.9	14.3	11.2
17:00	11.3	4.3	7.9	2.9	13.8	10.7
18:00	12.7	4.8	7.3	2.8	14.2	10.3
19:00	12.5	4.5	5.4	2.0	12.5	8.2
20:00	9.2	2.5	1.4	0.3	6.6	2.9
21:00	2.2	0.2	0.1	0.0	1.3	0.3
22:00	0.1	0.0	0.1	0.0	0.1	0.1
23:00	0.0	0.0	0.0	0.0	0.0	0.0
Weekends						
00:00	0.0	0.0	0.0	0.0	0.0	0.0
01:00	0.0	0.0	0.0	0.0	0.0	0.0
02:00	0.0	0.0	0.0	0.0	0.0	0.0
03:00	0.0	0.0	0.0	0.0	0.0	0.0
04:00	0.0	0.0	0.1	0.0	0.1	0.2
05:00	0.7	1.0	1.0	0.2	1.5	1.6
06:00	2.9	2.3	3.1	0.7	4.7	4.4
07:00	6.8	2.5	5.4	1.3	9.2	6.5
08:00	10.8	4.4	8.2	2.0	14.0	10.4
09:00	14.6	6.1	10.9	3.5	18.7	14.2
10:00	16.9	6.5	11.0	3.7	20.1	14.9
11:00	16.0	6.1	10.3	4.2	19.4	14.6
12:00	14.3	5.8	10.3	3.7	17.9	14.2
13:00	15.4	5.1	10.1	4.5	18.3	14.0
14:00	16.3	5.9	9.8	4.9	19.0	13.9
15:00	14.0	5.0	8.8	4.4	17.3	12.6
16:00	13.5	4.6	7.0	3.8	14.6	10.6
17:00	11.5	3.8	6.3	3.1	13.5	9.8
18:00	12.5	4.9	6.1	2.6	13.5	9.5
19:00	10.7	4.3	4.6	2.1	11.9	7.8
20:00	8.6	2.5	1.1	0.2	6.4	2.7
21:00	1.7	0.3	0.1	0.0	1.3	0.3
22:00	0.0	0.1	0.0	0.0	0.1	0.1
23:00	0.0	0.0	0.1	0.0	0.0	0.0
Weekdays						
00:00	0.0	0.0	0.1	0.0	0.0	0.0
01:00	0.0	0.0	0.1	0.0	0.0	0.0
02:00	0.0	0.0	0.0	0.0	0.0	0.0
03:00	0.0	0.0	0.0	0.0	0.0	0.0
04:00	0.0	0.0	0.1	0.0	0.2	0.3
05:00	0.8	1.3	1.7	0.4	2.3	2.6
06:00	3.8	5.1	4.1	0.7	7.1	6.9
07:00	6.7	5.5	7.5	1.6	10.6	9.8
08:00	12.5	6.3	8.4	2.0	15.8	12.2
09:00	13.4	7.2	9.0	2.5	16.4	13.0
10:00	11.7	7.4	10.1	2.4	16.5	14.0
11:00	12.7	8.1	12.2	2.6	18.4	16.0
12:00	11.3	7.7	9.9	2.8	16.3	14.2
13:00	10.6	8.1	9.6	3.0	15.3	13.6
14:00	10.1	7.3	9.1	2.8	14.5	12.8
15:00	11.4	4.8	9.4	2.9	14.3	11.6
16:00	11.5	4.8	9.6	2.6	14.2	11.5
17:00	11.2	4.4	8.5	2.8	13.9	11.1
18:00	12.9	4.7	7.8	2.9	14.5	10.6
19:00	13.3	4.6	5.7	1.9	12.7	8.3
20:00	9.4	2.5	1.5	0.3	6.6	3.0
21:00	2.4	0.2	0.1	0.0	1.3	0.3
22:00	0.1	0.0	0.2	0.0	0.1	0.1
23:00	0.0	0.0	0.0	0.0	0.0	0.0

Hour	Cooper Mountain	Graham Oaks	Mt. Talbert	Scouter's Mountain	Four Park Hourly Average Trips (x2 for trips)	Three Park Hourly Average Trips (x2 for trips)

Annual Trends

The data below indicate the change in visitation to six Metro parks on an annual basis.
The rate of change was found to be an increase of 7% per year for all years with data.
Visitation rates taper off with time with the average increase being 2% over the most recent year.
Factors like weather, word of mouth and park promotion will influence visitation rates.

Year	Site	Annual # of Vehicles	% change	Days with data	Year start	Year end
June 2009	*Cooper Mountain Nature Park opened.*					
2013	Cooper Mountain	34,284		364	2013-01-01	2014-01-01
2014	Cooper Mountain	39,375	*0.15*	308	2014-01-01	2015-01-01
2015	Cooper Mountain	43,919	*0.12*	363	2015-01-01	2016-01-01
2016	Cooper Mountain	48,673	*0.11*	323	2016-01-01	2017-01-01
2017	Cooper Mountain	50,151	*0.03*	355	2017-01-01	2018-01-01
	Average rate of change.		*0.10*			
Sept 2009	*Graham Oaks Nature Park opened.*					
2015	Graham Oaks	22,856		189	2015-01-01	2016-01-01
2016	Graham Oaks	27,173	*0.19*	360	2016-01-01	2017-01-01
2017	Graham Oaks	31,462	*0.16*	365	2017-01-01	2018-01-01
	Average rate of change.		*0.17*			
Oct 2007	*Mt. Talbert Nature Park opened.*					
2016	Mt. Talbert	35,348		366	2016-01-01	2017-01-01
2017	Mt. Talbert	34,479	*-0.02*	365	2017-01-01	2018-01-01
	Average rate of change.		*-0.02*			
Aug 2014	*Scouter's Mountain Nature Park opened.*					
2015	Scouter's Mountain	9,855		190	2015-01-01	2016-01-01
2016	Scouter's Mountain	10,614	*0.08*	361	2016-01-01	2017-01-01
2017	Scouter's Mountain	12,045	*0.13*	365	2017-01-01	2018-01-01
	Average rate of change.		*0.11*			
Early 2001	*Smith and Bybee Wetlands visitor improvements constructed.*					
2015	Smith and Bybee	28,349		*190*	2015-01-01	2016-01-01
2016	Smith and Bybee	33,039	*0.17*	*366*	2016-01-01	2017-01-01
2017	Smith and Bybee	34,056	*0.03*	*365*	2017-01-01	2018-01-01
	Average rate of change.		*0.10*			
1994	*Howell Territorial Park management transferred to Metro.*					
2015	Howell Territorial Park	8,760		*190*	2015-01-01	2016-01-01
2016	Howell Territorial Park	10,248	*0.17*	*346*	2016-01-01	2017-01-01
2017	Howell Territorial Park	8,030	*-0.22*	*365*	2017-01-01	2018-01-01
	Average rate of change.		*-0.02*			

0.07	Average rate of change over time (all years).
0.02	Average rate of change for most recent year (2016 - 2017).

Notes: Most counters were acquired and deployed in June of 2015. Thus, the data were interpolated to determine annual counts for most sites for 2015.

North Tualatin Mountains
Burlington Creek Forest
METRO

SITE TRIP ESTIMATE

	Hour	Cooper Mountain	Graham Oaks	Scouter's Mountain	Mt. Talbert	Hour	Cooper Mountain	Graham Oaks	Scouter's Mountain	Mt. Talbert	Four Park Hourly Average Trips (x2 for trips)	2017 Weighted Average Hourly Trips Per Acre	2016 Weighted Average Hourly Trips Per Acre	Weighted Average Hourly Trips Per Acre
	0:00	0	0	0	0	0:00	0	0	0.1	0	0	0.000	0.000	0.000
	1:00	0	0	0	0	1:00	0	0	0	0	0	0.000	0.000	0.000
	2:00	0	0	0	0	2:00	0	0	0	0	0	0.000	0.000	0.000
	3:00	0	0	0	0	3:00	0	0	0	0	0	0.000	0.000	0.000
	4:00	0	0.2	0.4	0	4:00	0	0	0.1	0	0.2	0.001	0.000	0.001
	5:00	0.4	1.8	1.8	0.4	5:00	0.8	1.2	1.5	0.3	2.1	0.011	0.009	0.010
	6:00	3.7	4.5	4.1	1.2	6:00	3.5	4.3	3.8	0.7	6.5	0.033	0.030	0.031
	7:00	7.5	5.3	6.4	1.9	7:00	6.7	4.6	6.9	1.6	10.2	0.051	0.048	0.049
	8:00	14	7.7	8	3.3	8:00	12	5.8	8.3	2	15.3	0.080	0.068	0.074
	9:00	14.5	8.3	8.6	4	9:00	13.7	6.9	9.6	2.8	17.1	0.085	0.080	0.083
	10:00	14.2	8.6	9.9	3.9	10:00	13.2	7.2	10.4	2.8	17.5	0.088	0.081	0.085
	11:00	14.3	9	11.8	3.6	11:00	13.7	7.5	11.7	3.1	18.7	0.093	0.087	0.090
	12:00	12.4	8.5	9.8	4	12:00	12.2	7.2	10	3	16.8	0.084	0.078	0.081
	13:00	11.6	7.5	9	4.1	13:00	12	7.2	9.8	3.4	16.2	0.078	0.078	0.078
	14:00	11.9	6.9	8.9	3.8	14:00	11.9	6.9	9.3	3.4	15.8	0.076	0.076	0.076
	15:00	12.6	6	8.6	3.8	15:00	12.2	4.9	9.2	3.3	15.1	0.075	0.071	0.073
	16:00	11.4	5.5	8.5	3.1	16:00	12.1	4.7	8.9	2.9	14.3	0.069	0.069	0.069
	17:00	11.5	4.8	8.7	3.7	17:00	11.3	4.3	7.9	2.9	13.8	0.069	0.064	0.066
	18:00	13.4	5.1	7.3	3.5	18:00	12.7	4.8	7.3	2.8	14.2	0.071	0.067	0.069
	19:00	13	5	4.7	2.9	19:00	12.5	4.5	5.4	2	12.5	0.062	0.059	0.060
	20:00	8.3	2.3	1.7	0.6	20:00	9.2	2.5	1.4	0.3	6.6	0.031	0.032	0.032
	21:00	2	0.1	0.2	0.2	21:00	2.2	0.2	0.1	0	1.3	0.006	0.006	0.006
	22:00	0.1	0.1	0.1	0.1	22:00	0.1	0	0.1	0	0.1	0.001	0.000	0.001
	23:00	0	0	0	0	23:00	0	0	0	0	0	0.000	0.000	0.000
Weekends	0:00	0	0	0	0.1	0:00	0	0	0	0	0	0.000	0.000	0.000
	1:00	0	0	0	0	1:00	0	0	0	0	0	0.000	0.000	0.000
	2:00	0	0	0	0	2:00	0	0	0	0	0	0.000	0.000	0.000
	3:00	0	0	0	0	3:00	0	0	0	0	0	0.000	0.000	0.000
	4:00	0	0	0.4	0	4:00	0	0	0.1	0	0.1	0.001	0.000	0.001
	5:00	0.3	0.8	1.3	0.5	5:00	0.7	1	1	0.2	1.5	0.007	0.007	0.007
	6:00	2.9	2.5	3.7	1	6:00	2.9	2.3	3.1	0.7	4.7	0.024	0.022	0.023
	7:00	10.4	3.1	5.8	1.5	7:00	6.8	2.5	5.4	1.3	9.2	0.050	0.039	0.044
	8:00	13.9	5.3	8.5	2.9	8:00	10.8	4.4	8.2	2	14	0.074	0.061	0.068
	9:00	17.4	7.3	10.5	4.5	9:00	14.6	6.1	10.9	3.5	18.7	0.096	0.085	0.090
	10:00	18.9	8.4	9.8	5.2	10:00	16.9	6.5	11	3.7	20.1	0.102	0.092	0.097
	11:00	17.8	6.9	11.4	4.8	11:00	16	6.1	10.3	4.2	19.4	0.099	0.088	0.093
	12:00	14.6	6.7	11.2	4.8	12:00	14.3	5.8	10.3	3.7	17.9	0.090	0.082	0.086
	13:00	15.6	6.6	9.6	6.2	13:00	15.4	5.1	10.1	4.5	18.3	0.092	0.085	0.088
	14:00	18.1	5.5	9.8	5.7	14:00	16.3	5.9	9.8	4.9	19	0.094	0.089	0.092
	15:00	17.1	5.6	8	6	15:00	14	5	8.8	4.4	17.3	0.089	0.078	0.083
	16:00	13.1	5.1	7.2	4.1	16:00	13.5	4.6	7	3.8	14.6	0.071	0.070	0.070
	17:00	12.9	4.8	7.4	4.1	17:00	11.5	3.8	6.3	3.1	13.5	0.070	0.060	0.065
	18:00	13	4.7	6.5	3.7	18:00	12.5	4.9	6.1	2.6	13.5	0.067	0.063	0.065
	19:00	13.4	5.3	3.9	3.3	19:00	10.7	4.3	4.6	2.1	11.9	0.062	0.052	0.057
	20:00	8.8	2.1	1.6	0.5	20:00	8.6	2.5	1.1	0.2	6.4	0.031	0.030	0.031
	21:00	2.5	0.2	0.2	0.1	21:00	1.7	0.3	0.1	0	1.3	0.007	0.005	0.006
	22:00	0.1	0.1	0.1	0.1	22:00	0	0.1	0	0	0.1	0.001	0.000	0.001
	23:00	0	0	0	0	23:00	0	0	0.1	0	0	0.000	0.000	0.000
Weekdays	0:00	0	0	0	0	0:00	0	0	0.1	0	0	0.000	0.000	0.000
	1:00	0	0	0	0	1:00	0	0	0.1	0	0	0.000	0.000	0.000
	2:00	0	0	0	0	2:00	0	0	0	0	0	0.000	0.000	0.000
	3:00	0	0	0	0	3:00	0	0	0	0	0	0.000	0.000	0.000
	4:00	0	0.3	0.5	0	4:00	0	0	0.1	0	0.2	0.002	0.000	0.001
	5:00	0.5	2.2	2	0.4	5:00	0.8	1.3	1.7	0.4	2.3	0.012	0.010	0.011
	6:00	4	5.3	4.3	1.3	6:00	3.8	5.1	4.1	0.7	7.1	0.036	0.033	0.034
	7:00	6.3	6.1	6.7	2.1	7:00	6.7	5.5	7.5	1.6	10.6	0.051	0.051	0.051
	8:00	14.1	8.6	7.9	3.4	8:00	12.5	6.3	8.4	2	15.8	0.082	0.070	0.076
	9:00	13.3	8.6	7.9	3.8	9:00	13.4	7.2	9	2.5	16.4	0.081	0.077	0.079
	10:00	12.4	8.7	10	3.4	10:00	11.7	7.4	10.1	2.4	16.5	0.083	0.076	0.080
	11:00	12.9	9.8	12	3.2	11:00	12.7	8.1	12.2	2.6	18.4	0.091	0.086	0.089
	12:00	11.6	9.2	9.3	3.7	12:00	11.3	7.7	9.9	2.8	16.3	0.082	0.076	0.079
	13:00	10	7.9	8.7	3.3	13:00	10.6	8.1	9.6	3	15.3	0.072	0.076	0.074
	14:00	9.5	7.4	8.6	3.1	14:00	10.1	7.3	9.1	2.8	14.5	0.069	0.071	0.070
	15:00	10.8	6.1	8.8	3	15:00	11.4	4.8	9.4	2.9	14.3	0.069	0.069	0.069
	16:00	10.8	5.6	9.1	2.7	16:00	11.5	4.8	9.6	2.6	14.2	0.068	0.069	0.068
	17:00	11	4.9	9.2	3.6	17:00	11.2	4.4	8.5	2.8	13.9	0.069	0.065	0.067
	18:00	13.5	5.3	7.6	3.4	18:00	12.9	4.7	7.8	2.9	14.5	0.072	0.068	0.070
	19:00	12.9	4.9	5	2.7	19:00	13.3	4.6	5.7	1.9	12.7	0.062	0.062	0.062
	20:00	8.2	2.3	1.7	0.7	20:00	9.4	2.5	1.5	0.3	6.6	0.031	0.033	0.032
	21:00	1.9	0.1	0.2	0.2	21:00	2.4	0.2	0.1	0	1.3	0.006	0.007	0.006
	22:00	0.1	0	0	0.1	22:00	0.1	0	0.2	0	0.1	0.000	0.001	0.001
	23:00	0	0	0	0.1	23:00	0	0	0	0	0	0.000	0.000	0.000

Park	Acre
Cooper Mountain	230
Graham Oaks	246
Scouter's Mountain	100
Mount Talbert NaturePark	253
Burlington Creek Forest	208

Trips to adjacent roads at system peak hour

		Rate	Trips
Weekday	PM (4:15-5:15)	0.068	14
Weekend	PM (1:20 -2:20)	0.090	19

Site Trips per Acre	
Weekday system peak hour	0.068
Site Trips per Acre	
Weekend system peak hour	0.09

BURLINGTON CREEK FOREST NATURE PARK
ESTIMATED DAILY TRIPS

Days	Cooper Mountain	Graham Oaks	Scouter's Mountain	Mt. Talbert	Weighted Average Daily Trips Per Acre	Burlington Park Estimated Daily Trips
Weekday	330	194	80	231	1.007	210
Weekend day	399	153	105	244	1.087	226

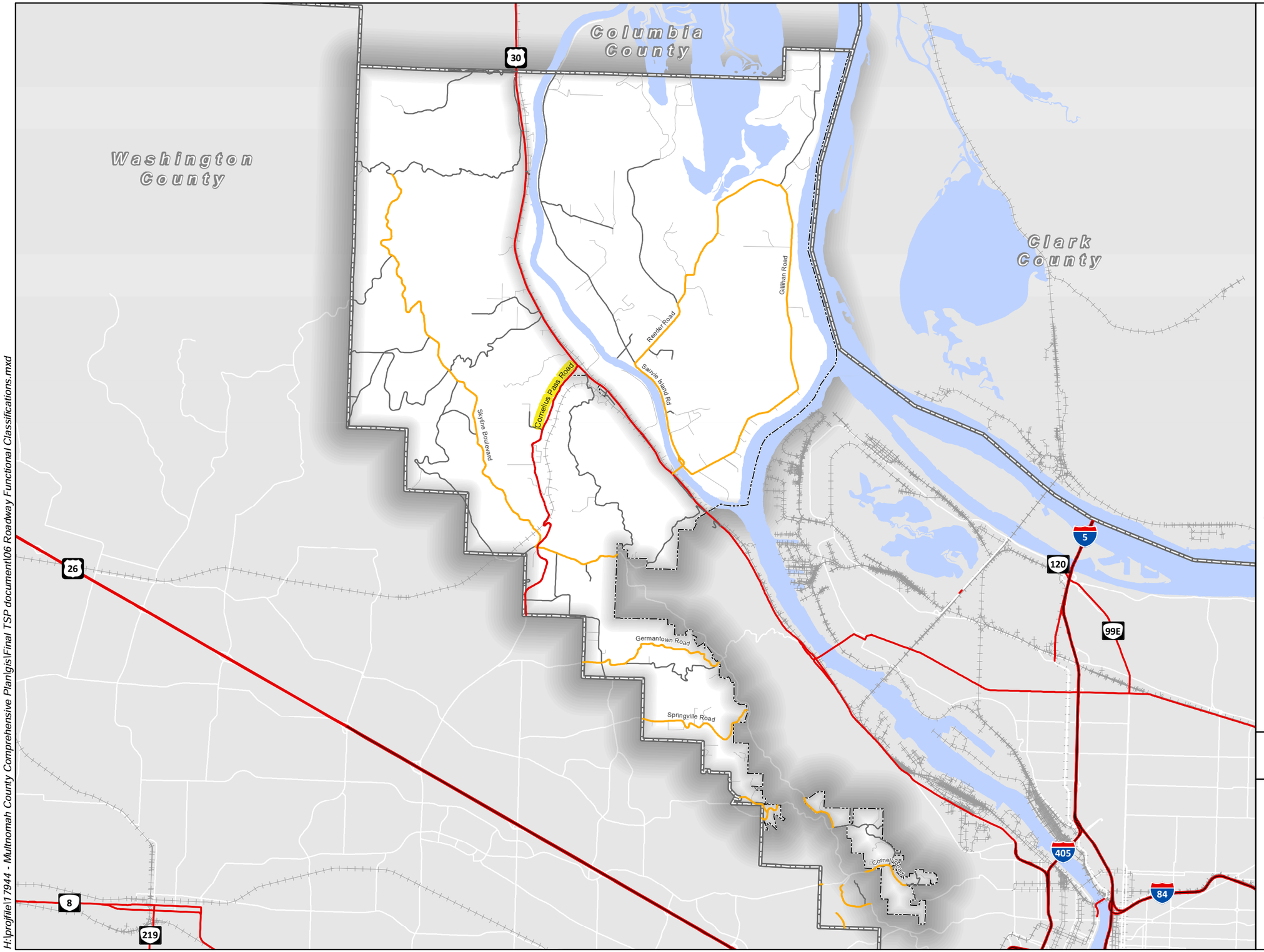
EXHIBIT D - Roadway Classification Map
- Multnomah County ADT

Multnomah County

Comprehensive Plan

Figure 6A

Roadway Functional Classifications



Roadway Functional Classification (MultCo)

- Intersate / Expressway
- Arterials
- Collectors
- Local
- Local (not maintained by county)
- Railroad (ODOT)
- Plan Areas
- County Boundaries

0 0.5 1 2 Miles

Prepared By:
Kittelson & Associates, Inc.

Date:
8/29/2016

Coordinate System:
NAD 1983 HARN State Plane Oregon North FIPS 3601

Disclaimer:
This map is intended for informational purposes only. While this map represents the best data available at the time of publication, Multnomah County makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.

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Multnomah County
Comprehensive Plan

Figure 11A
Average Daily Traffic

Columbia County

Washington County

Clark County

30

26

8

219

5

120

99E

405

84

Cornelius Pass Road

Skyline Boulevard

Reeder Road

Sauvie Island Road

Gillihan Road

Germantown Road

Springville Road

Average Daliy Traffic
(records from 2006 to 2014)

- <1,5000
- 1,500 - 3,000
- 3,001 - 5,000
- 5,001 - 10,000
- >10,000
- Plan Areas
- County Boundaries

0 0.5 1 2 Miles

Prepared By:
Kittelson & Associates, Inc.

Date:
6/8/2015

Coordinate System:
NAD 1983 HARN State Plane Oregon North FIPS 3601

Disclaimer:
This map is intended for informational purposes only. While this map represents the best data available at the time of publication, Multnomah County makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.

H:\profile\17944 - Multnomah County Comprehensive Plan\gis\11 Average Daily Traffic.mxd

EXHIBIT E - 2014 KPFF Intersection Sight Distance Evaluation Memorandum

- 2018 KPFF Intersection Sight Distance Evaluation Memorandum

DATE: May 5, 2014

PROJECT: 312064.50-Metro North Tualatin Mountain Access

SUBJECT: Intersection Sight Distance Evaluation

TO: Robert Spurlock
Metro
PHONE: (503)813-7560
EMAIL: Robert.Spurlock@oregonmetro.gov

FROM: Curt Vanderzanden, PE, Principal
KPFF Consulting Engineers
PHONE: 503-542-3808
EMAIL: curt.vanderzanden@kpffcivil.com

Introduction

At the request of Metro, KPFF has completed an intersection site distance evaluation for five existing access points located in the Tualatin Mountains; two along NW McNamee Road, one on NW Newberry Road, and two along Skyline Boulevard. The purpose of this evaluation is to determine if existing conditions provide adequate sight distance to meet Multnomah County standards and to identify what improvements would be necessary to meet those standards.

Field Work

On April 3, 2014, KPFF staff performed a site visit, documenting, through photos and field measurements, the available sight distance. At each location, and in each travel direction, measurements of the available sight distance were taken, from a point 15 feet from the edge of pavement, and a height of eye of 3.5 feet, to the center of each approaching travel lane, with a height of object of 4.25 feet. To assist in the sight distance evaluation, Kittelson and Associates performed a speed study to determine the 85th percentile speeds in each direction of travel at each access point. The speed study was completed on April 18, 2014, and is included as Appendix A. A summary of the results of the field work and speed study can be found in Table 1 below.

Measured Sight Distances and Standards

Per Multnomah County Design Standards, intersection sight distance shall be in accordance with the procedures stated in current AASHTO Standards. The following Table 1 summarizes the five sites' measured and required intersection sight distance per AASHTO *Table 9-6 Design Intersection Sight Distance – Case B1, Left Turn from Stop* and *Table 9-8 Design Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver*.

Table 1: Intersection Sight Distances

Location	Direction	85th Percentile Speed	Intersection Sight Distance (ISD)			
			Measured	AASHTO Requirement	Adequate? (Yes/No)	Reasoning
Site #1 Burlington Creek Forest (NW McNamee Rd)	NB	38 mph	290 ft	365 ft (right turn)	No	Hillside, Horizontal Curve
	SB	35 mph	330 ft	390 ft (left turn)	No	Trees/Vegetation

Table 1: Intersection Sight Distances (continued)

Location	Direction	85th Percentile Speed	Intersection Sight Distance (ISD)			
			Measured	AASHTO Requirement	Adequate? (Yes/No)	Reasoning
Site #2 Ennis Creek Forest (NW Newberry Rd)	NB	46 mph	95 ft	510 ft (left turn)	No	Hillside
	SB	45 mph	70 ft	430 ft (right turn)	No	Hillside, Vertical Curve
Site #3 McCarthy Creek (NW McNamee Rd)	EB	36 mph	635 ft	345 ft (right turn)	Yes	None
	WB	37 mph	375 ft	410 ft (left turn)	No	Trees
Site #4 McCarthy Creek (NW Skyline Blvd)	EB	51 mph	470 ft	565 ft (left turn)	No	Vegetation
	WB	49 mph	260 ft	470 ft (right turn)	No	Hillside/Vegetation, Vertical Curve
Site #5 North Abbey Creek (NW Skyline Blvd)	EB	44 mph	20 ft	425 ft (right turn)	No	Minor vegetation
	WB	44 mph	80 ft	490 ft (left turn)	No	Minor vegetation

The Multnomah County Design Standards and AASHTO Standards state that when minimum intersection sight distance cannot be met, the minimum sight distance should be no less than the stopping sight distance on the major street. The required stopping sight distances were calculated for the five sites and are summarized below in Table 2.

Table 2: Stopping Sight Distances

Location	Direction	85th Percentile Speed	Measured Sight Distance	Stopping Sight Distance (SSD)		
				Measured Average Slope	AASHTO Recommendation	Adequate? (Yes/No)
Site #1 Burlington Creek Forest (NW McNamee Rd)	NB	38 mph	290 ft	-12.5%	360 ft	No
	SB	35 mph	330 ft	12.8%	215 ft	Yes
Site #2 Ennis Creek Forest (NW Newberry Rd)	NB	46 mph	95 ft	-5.5%	410 ft	No
	SB	45 mph	70 ft	-1.2%	370 ft	No
Site #3 McCarthy Creek (NW McNamee Rd)	EB	36 mph	635 ft	1.5%	255 ft	Yes
	WB	37 mph	375 ft	3.7%	255 ft	Yes
Site #4 McCarthy Creek (NW Skyline Blvd)	EB	51 mph	470 ft	5.5%	405 ft	Yes
	WB	49 mph	260 ft	-1.7%	425 ft	No
Site #5 North Abbey Creek (NW Skyline Blvd)	EB	44 mph	20 ft	3.6%	330 ft	No
	WB	44 mph	80 ft	-2.8%	365 ft	No

Access Evaluation

As discussed previously, five existing driveway access points have been evaluated to determine what improvements are necessary to meet Multnomah County access standards. Maps for each site are provided in Appendix B. Conceptual cost estimates are provided in Appendix C. The estimated costs at each site include costs for addressing sight distance issues as well as upgrades to the existing access points which may include grading, paving and culvert installations where needed.

Site #1: Burlington Creek Forest (NW McNamee Road)

A. Sight distance (measured at 15 feet from the eastern pavement edge of NW McNamee Road) is currently restricted to the south at approximately 290 feet due to a horizontal curve in the road and a hillside on the west side of the roadway. Sight distance is currently restricted to the north at approximately 330 feet due to roadside trees and vegetation on the east side of the roadway.

Site #1 Access looking south

Site #1 Access looking north

B. Cutting the easterly hillside down, and recording a restrictive sight distance easement over a portion of what appears to be private property, leased or owned by the power line company, will improve available sight distance somewhat to the south.

C. Removing the roadside trees and vegetation, and recording a restrictive sight distance easement over a portion of what appears to be Metro-owned property, will improve available sight distance somewhat to the north.

D. By making these modifications, it is likely that the required intersection sight distance can be attained in either direction. See Table 3 for a summary of the measured and required sight distances.

Table 3: Sight Distance (SD) Summary – Site #1

Traffic Direction	Measured SD	Required ISD	Required SSD	SD with Improvements	Meets ISD? (Yes/No)
NB	290 ft	365 ft	360 ft	>365 ft	Yes
SB	330 ft	390 ft	215 ft	>390 ft	Yes

E. The estimated construction costs to achieve the required intersection sight distance, in both directions, is approximately **$87,000**. This cost includes clearing and grubbing, grading, aggregate base, asphalt paving and other miscellaneous items required to meet Multnomah County standards. This does not include costs associated with the acquisition of required easements. If Multnomah County allows, this cost can be reduced by approximately **$5,000** if stopping sight distance is used to the north of the access.

Site #2: Ennis Creek Forest (NW Newberry Road)

A. Sight distance (measured at 15 feet from the western pavement edge of NW Newberry Road) is currently restricted to the south at approximately 95 feet due to roadside vegetation and an embankment. Sight distance is currently restricted to the north at approximately 70 feet due to roadside vegetation, an embankment and the vertical curvature of the roadway.

Site #2 Access looking south

Memorandum

DATE: June 12, 2018

PROJECT: 312064.50 – Metro North Tualatin Mountain Access

SUBJECT: Burlington Creek Forest Sight Distance Evaluation

TO: Karen Vitkay
Metro
PHONE: 503-797-1874
EMAIL: karen.vitkay@oregonmetro.gov

FROM: Curt Vanderzanden
KPFF Consulting Engineers
PHONE: 503-542-3808
EMAIL: curt.vanderzanden@kpff.com

Introduction

In 2014, at Metro's request, KPFF completed an intersection sight distance evaluation for five existing access points located in the Tualatin Mountains. The results of that effort were documented in a memorandum dated May 5, 2014. At Metro's request, Multnomah County completed a review of the 2014 analysis specifically relating to proposed improvements at the Burlington Creek Forest site and identified the following concerns related to the access of the Burlington Creek site:

- The 2014 analysis utilized the 85th percentile speed as the design speed. The County is requesting that the analysis be completed utilizing the posted speed of 55 mph.
- The 2014 analysis utilized an object height of 4.25 feet (as stated in the County's design standards). The County is requesting that the analysis utilize an object height of 3.5 feet to meet AASHTO requirements.
- The County has requested that a sight distance analysis for a southwest traveling vehicle wanting to turn left to the proposed access of the Burlington Creek Forest Nature Park be included.

At the request of Metro, KPFF has completed an updated intersection sight distance evaluation at Burlington Creek Forest along NW McNamee Road to address Multnomah County comments. The purpose of this evaluation is to determine if existing conditions provide adequate sight distance to meet Multnomah County standards and to identify what improvements would be necessary to meet those standards.

Field Work

On May 24, 2018, KPFF staff performed a site visit, documenting the available sight distance through photos and field measurements. For cases B1 and B2, the measurements of the available sight distance were taken from a point 15 feet from the edge of pavement and a height of eye of 3.5 feet, to the center of each approaching travel lane, with a height of object of 3.5 feet. For Case F, the height of eye and object are the same as cases B1 and B2, but the measurements were taken 29 feet from the intersection (15 feet plus the width of the lane departing from the intersection). The results of this effort are depicted in Exhibit "A" attached and in the following tables.

Measured Sight Distances and Standards

The following tables document available sight distances based on field observations and provide a

comparison to Multnomah County standards, as well as guidelines provided in the 2011 AASHTO A Policy on Geometric Design of Highways and Streets (Green Book). Per request of Multnomah County, the sight distances shown are based on a design speed of 55 mph.

Access looking south

Access looking north

The following table summarizes the measured and required intersection sight distance per Multnomah County Design and Construction Manual (MCDCM) *Table 2.3.2 Minimum Corner Intersection Sight Distance.*

Table 1: MCDCM Intersection Sight Distances

Case	Design Speed	Measured	Standard Requirement (55 MPH)	Meets Standard?	Sight Obstruction
B1, Left turn from Stop - MCDS	55 mph	293 ft (NB) 300 ft (SB)	250 ft	Yes	N/A
B2, Right Turn from Stop - MCDS	55 mph	300 ft	250 ft	Yes	N/A
F, Left Turn from the Major Road - MCDS	55 mph	270 ft	250 ft	Yes	N/A

While the above table shows that the current condition provides sight distances meeting the requirements documented in the County's design standards, we also conducted an evaluation utilizing the current AASHTO standards. The following table summarizes the measured and required intersection sight distance per the AASHTO Green Book, *Table 9-6 Design Intersection Sight Distance – Case B1, Left Turn from Stop,* Table *9-8 Design Intersection Sight Distance – Case B2, Right Turn from Stop and Case B3, Crossing Maneuver, and Case F, Left Turn from the Major Road.*

Table 2: AASHTO Intersection Sight Distances

Intersection Sight Distance (ISD)						
Case	**Design Speed**	**Measured**	**Standard Requirement (55 MPH)**	**Meets Standard?** (Yes/No)	**Design Speed Achieved Under Current Conditions**	**Sight Obstruction**
B1, Left Turn from Stop - AASHTO	55 mph	293 ft (NB) 300 ft (SB)	610 ft	No	26.5 MPH	Hillside, Horizontal Curve
B2, Right Turn from Stop - AASHTO	55 mph	300 ft	530 ft	No	27.2 MPH	Trees and Vegetation
F, Left Turn from the Major Road - AASHTO	55 mph	270 ft	610 ft	No	33.4 MPH	Hillside, Horizontal Curve

Summary

- The existing conditions do provide ISD meeting the requirements of MCDCM Table 2.3.2 for a 55 mph design speed for all cases.
- The existing conditions do not, however, meet AASHTO ISD requirements for a 55 mph design speed. Based on AASHTO guidelines, design speeds achieved given the existing conditions are in the range of 26.5 to 33.4 mph.
- Sight distance (measured at 15 feet from the eastern pavement edge of NW McNamee Road) is currently restricted to the south at approximately 300 feet, due to a horizontal curve in the road and a hillside on the west side of the roadway.
- Sight distance is currently restricted to the north at approximately 293 feet, due to roadside trees and vegetation on the east side of the roadway.

Improvements to Meet Standard

The following improvements would be required to achieve ISD requirements for a 55 mph design speed based on AASHTO. A graphical representation of these requirements is included in Exhibit "A".

- Removing the roadside trees and vegetation and recording a restrictive sight distance easement over Metro-owned property north of the proposed access, to improve available ISD as needed to meet the required 55 mph design speed.
- Significant construction would be required to meet ISD for 55 mph south of the proposed access. This work would include excavation of the hillside west of McNamee Road. In addition, routine maintenance would be required on property owned by PGE.
- By making the modifications identified above, the required ISD based on AASHTO could be attained in all directions. See Table 3 for a summary of the measured and required sight distances.

Table 3: Sight Distance (SD) Summary – AASHTO

Traffic Direction	Measured SD	Required ISD (AASHTO)	With Trees and Vegetation Cleared	Vegetation Clearance Meets SD? (Yes/No)	Hillside Cleared and Leveled	Hillside Adjustments Meets SD? (Yes/No)
NB	300 ft	610 ft	>305 ft	No	>700 ft	Yes
SB	293 ft	530 ft	>560 ft	Yes	>560 ft	Yes

The estimated construction cost to achieve the required intersection sight distance, based on a 55 mph design speed in both directions, is approximately $1,550,000. This cost includes clearing and grubbing, grading, aggregate base, asphalt paving and other miscellaneous items required to meet AASHTO ISD requirements. This does not include costs associated with the acquisition of required easements or costs associated with removal of rock or other obstructions that could be encountered with such a significant excavation. A concept level cost estimate is provided as Exhibit "B".

Preliminary Recommendations:

We recommend that clearing of vegetation to the north of the proposed access be completed to achieve the recommended ISD for 55 mph. However, based on the significant costs associated with meeting recommended ISD for 55 mph south of the proposed access, we recommend exploring other options with the County, which could include:

- Achieve a reduction in the design speed to 25 mph through the incorporation of regulatory signage or other traffic control methods. This would significantly reduce the amount of work required south of the access and would not require construction on property not under Metro ownership.
- If the above outcome is not acceptable, move forward with the improvements identified in our 2014 memorandum for this site to achieve a design speed of 38 mph. This would result in a significant reduction in the amount of construction and the associated costs from what would be required to meet the 55 mph design speed. It would, however, still require work on property owned by PGE.

We do understand that either of the options identified above may require the acquisition of a variance from the County. As documented in our 2014 analysis, motorists are not currently traveling 55 mph through this access intersection as road conditions (curves) and topography greatly restrict travel speeds. As such, requiring improvements to meet a 55 mph design speed would be unduly burdensome, while disturbing an unnecessary amount of land and slopes. In our professional opinion, reducing the regulatory speed to 25 mph through signage or improving intersectional site distance to reflect the documented 85th percentile speeds of 38 mph is most appropriate.

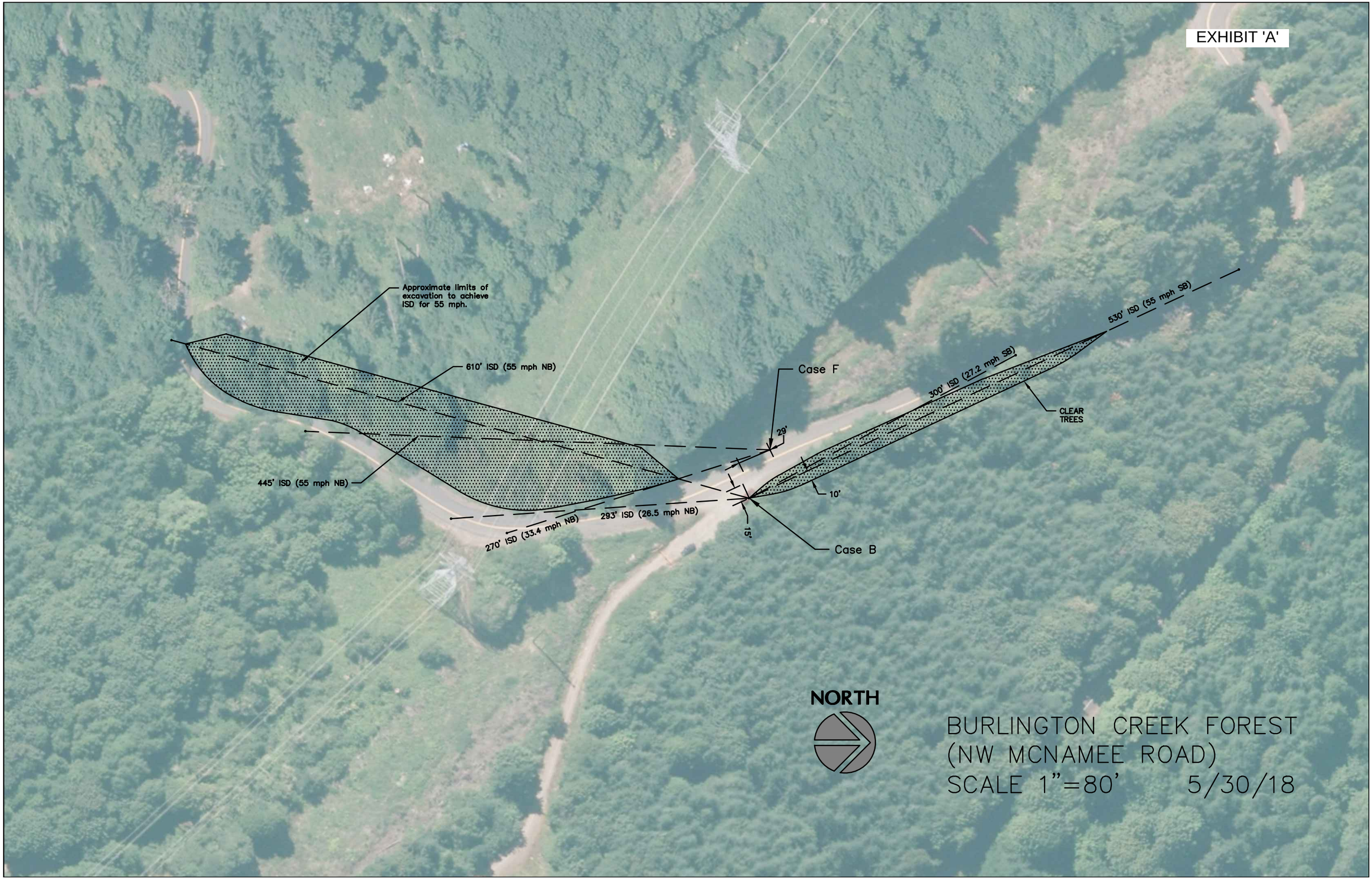
Please do not hesitate to contact us if you have any questions regarding the information provided here.

Sincerely,
KPFF Consulting Engineers

Curtis C. Vanderzanden, PE
Principal

Attachments: Appendix A – Site Maps
Appendix B – Estimates

EXHIBIT 'A'



BURLINGTON CREEK FOREST
(NW MCNAMEE ROAD)
SCALE 1"=80' 5/30/18

kpff Consulting Engineers

TOTAL CONSTRUCTION COSTS
for
Burlington Creek Forest
(NW McNamee Road)

EXHIBIT B
CONCEPTUAL Estimate: 5/30/18
METRO: North Tualatin Access Study

ITEM NUMBER	ITEM DESCRIPTION	QUANTITY	UNIT		UNIT COST		ITEM COST
PART 00200 - TEMPORARY FEATURES AND APPURTENANCES							
0210-0100000A	MOBILIZATION	1	LS	$	110,595.00	$	110,595.00
0225-0101000A	TEMPORARY WORK ZONE TRAFFIC CONTROL, COMPLETE	1	LS	$	110,595.00	$	110,595.00
0280-0100000A	EROSION CONTROL	1	LS	$	22,119.00	$	22,119.00
					Subtotal	**$**	**243,309.00**
PART 00300 - ROADWORK							
0305-0100000A	CONSTRUCTION SURVEY WORK	1	LS	$	44,238.00	$	44,238.00
0320-0100000R	CLEARING AND GRUBBING	4	ACRE	$	8,000.00	$	32,000.00
0330-0105000K	GENERAL EXCAVATION	38,100	CUYD	$	20.00	$	762,000.00
0330-0123000K	EMBANKMENT IN PLACE	500	CUYD	$	15.00	$	7,500.00
					Subtotal	**$**	**845,738.00**
PART 00400 - DRAINAGE AND SEWERS							
0445-010012AF	12 INCH CULVERT PIPE, 5 FT DEPTH	0	FOOT	$	55.00	$	-
0445-0700120E	SLOPED END SECTIONS, 12 INCH	0	EACH	$	400.00	$	-
					Subtotal	**$**	**-**
PART 00600 - BASES							
0641-0102000M	AGGREGATE BASE	160	TON	$	20.00	$	3,200.00
					Subtotal	**$**	**3,200.00**
PART 00700 - WEARING SURFACES							
0744-0302000M	LEVEL 3, 1/2 INCH DENSE MHMAC MIXTURE	20	TON	$	120.00	$	2,400.00
					Subtotal	**$**	**2,400.00**
PART 00900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS							
0910-0100000K	WOOD SIGN POSTS	20	FBM	$	8.00	$	160.00
0940-0134000J	TYPE "Y1" SIGNS IN PLACE	22	SQFT	$	20.00	$	440.00
					Subtotal	**$**	**600.00**
PART 01000 - RIGHT OF WAY DEVELOPMENT AND CONTROL							
1030-0102000E	SEEDING MOBILIZATION	1	EACH	$	700.00	$	700.00
1030-0108000R	PERMANENT SEEDING	4.0	ACRE	$	2,500.00	$	10,000.00
					Subtotal	**$**	**10,700.00**
					CONSTRUCTION SUBTOTAL	**$**	**1,105,947.00**
					CONTINGENCY (40.0%)	**$**	**442,378.80**
					ESTIMATE TOTAL	**$**	**1,548,325.80**

Notes:

1. Estimate based on standard measurement and payment practices as specified in the 2008 Oregon Standard Specificaitons for Construction
2. Unit costs based on ODOT Weighted Average Item Prices - Calendar Year 2013;
3. Estimate does not include costs for Right-of-Way Takings and Easements;
4. Estimate does not include costs for design and construction of utility relocations;

EXHIBIT F

Year 2018 Traffic Counts/ Balancing Worksheet

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: NW McNamee -- Project Site Access

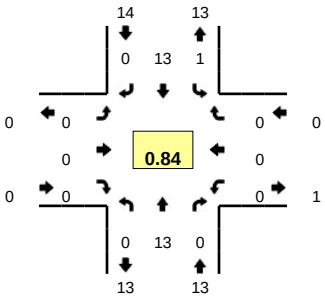
QC JOB #: 14735210

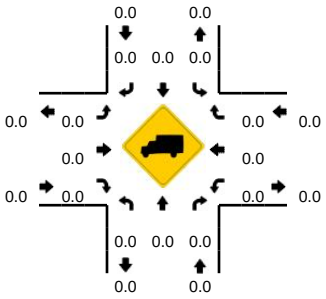
CITY/STATE: Portland, OR

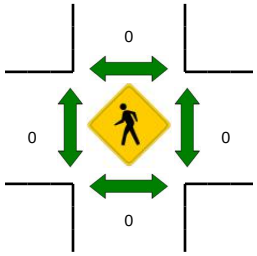
DATE: Sat, Jun 30 2018

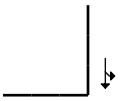
Peak-Hour: 5:10 PM -- 6:10 PM

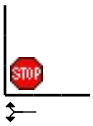
Peak 15-Min: 5:25 PM -- 5:40 PM

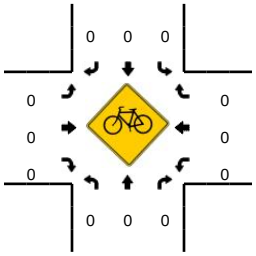


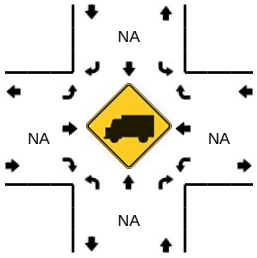


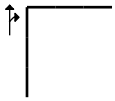


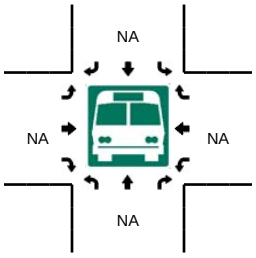












5-Min Count Period Beginning At	NW McNamee (Northbound)				NW McNamee (Southbound)				Project Site Access (Eastbound)				Project Site Access (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:40 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20
4:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	21
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
4:55 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	17
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
5:05 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	17
5:10 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	18
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
5:25 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	17
5:30 PM	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	4	18
5:35 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17
5:40 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	18
5:45 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	19
5:50 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	21
5:55 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	23
6:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	25
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6:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
6:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	24
6:25 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	23
6:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20
6:35 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	20

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	20	0	0	4	8	0	0	0	0	0	0	0	0	0	0	32
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

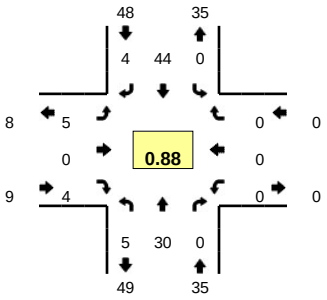
Method for determining peak hour: Total Entering Volume

LOCATION: NW Skyline Blvd -- NW McNamee Rd

QC JOB #: 14735211

CITY/STATE: Portland, OR

DATE: Sat, Jun 30 2018



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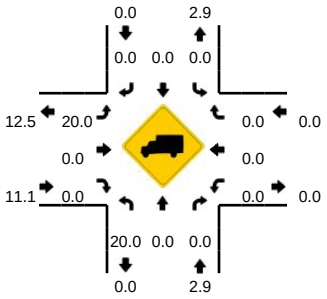
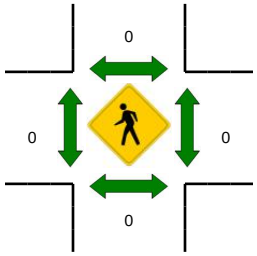
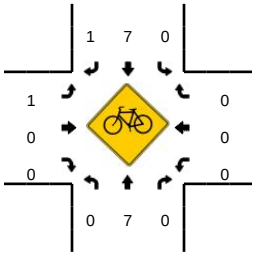
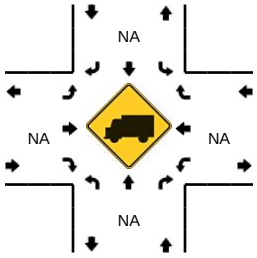
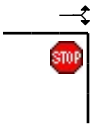
Peak 15-Min: 1:35 PM -- 1:50 PM

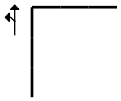


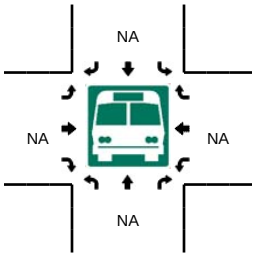












5-Min Count Period Beginning At	NW Skyline Blvd (Northbound)				NW Skyline Blvd (Southbound)				NW McNamee Rd (Eastbound)				NW McNamee Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:40 PM	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3	73
12:45 PM	0	1	0	0	0	7	0	0	0	0	0	0	0	0	0	0	8	76
12:50 PM	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	70
12:55 PM	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3	65
1:00 PM	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	64
1:05 PM	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5	61
1:10 PM	0	3	0	0	0	8	0	0	0	0	1	0	0	0	0	0	12	65
1:15 PM	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	66
1:20 PM	0	1	0	0	0	7	0	0	0	0	1	0	0	0	0	0	9	65
1:25 PM	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7	66
1:30 PM	0	1	0	0	0	2	0	0	1	0	0	0	0	0	0	0	4	67
1:35 PM	0	1	0	0	0	4	2	0	0	0	0	0	0	0	0	0	7	71
1:40 PM	0	3	0	1	0	5	0	0	1	0	2	0	0	0	0	0	12	80
1:45 PM	1	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	7	79
1:50 PM	1	2	0	0	0	2	1	0	0	0	0	0	0	0	0	0	6	80
1:55 PM	0	4	0	0	0	3	1	0	1	0	0	0	0	0	0	0	9	86
2:00 PM	0	5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	7	89
2:05 PM	0	3	0	0	0	3	0	0	2	0	0	0	0	0	0	0	8	92
2:10 PM	1	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	5	85
2:15 PM	0	2	0	0	0	1	0	0	0	0	1	0	0	0	0	0	4	85
2:20 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	5	81
2:25 PM	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	3	77
2:30 PM	0	2	0	0	0	4	1	1	0	0	1	0	0	0	0	0	9	82
2:35 PM	1	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	7	82

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	24	0	4	0	52	8	0	4	0	8	0	0	0	0	0	104
Heavy Trucks	4	0	0		0	0	0		0	0	0		0	0	0		4
Pedestrians		0				0				0				0			0
Bicycles	0	2	0		0	4	0		0	0	0		0	0	0		6
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

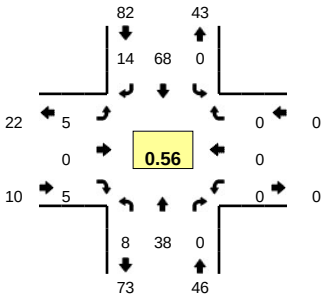
LOCATION: NW Skyline Blvd -- NW McNamee Rd

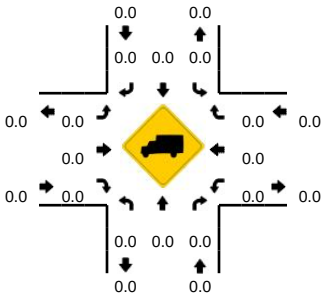
QC JOB #: 14735218

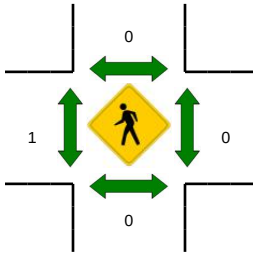
CITY/STATE: Portland, OR

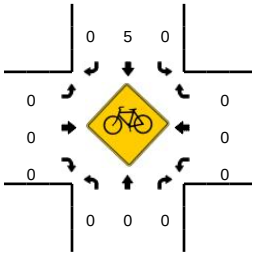
DATE: Thu, Jun 28 2018

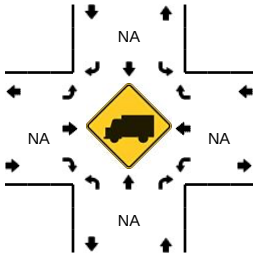
Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:10 PM -- 4:25 PM

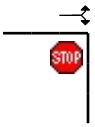


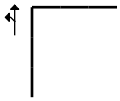


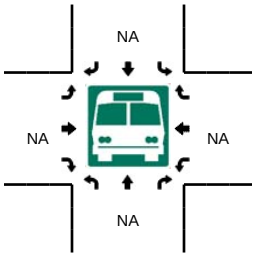












5-Min Count Period Beginning At	NW Skyline Blvd (Northbound)				NW Skyline Blvd (Southbound)				NW McNamee Rd (Eastbound)				NW McNamee Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:40 PM	2	2	0	0	0	5	0	0	0	0	1	0	0	0	0	0	10	
3:45 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	
3:50 PM	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	
3:55 PM	0	5	0	0	0	1	1	0	1	0	1	0	0	0	0	0	9	81
4:00 PM	1	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	8	82
4:05 PM	0	3	0	0	0	8	0	0	0	0	0	0	0	0	0	0	11	86
4:10 PM	0	4	0	0	0	17	1	0	0	0	0	0	0	0	0	0	22	101
4:15 PM	1	3	0	0	0	18	9	0	0	0	1	0	0	0	0	0	32	126
4:20 PM	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0	0	8	129
4:25 PM	0	1	0	0	0	1	0	0	2	0	2	0	0	0	0	0	6	127
4:30 PM	1	3	0	0	0	1	1	0	2	0	0	0	0	0	0	0	8	126
4:35 PM	0	5	0	0	0	5	0	0	0	0	1	0	0	0	0	0	11	132
4:40 PM	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	126
4:45 PM	1	1	0	0	0	3	1	0	0	0	0	0	0	0	0	0	6	129
4:50 PM	0	4	0	0	0	4	2	0	0	0	0	0	0	0	0	0	10	135
4:55 PM	1	3	0	0	0	3	0	0	1	0	0	0	0	0	0	0	8	134
5:00 PM	1	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	9	135
5:05 PM	1	5	0	0	0	7	0	0	0	0	1	0	0	0	0	0	14	138
5:10 PM	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	120
5:15 PM	1	2	0	0	0	2	0	0	2	0	2	0	0	0	0	0	9	97
5:20 PM	0	2	0	0	0	3	0	0	0	0	2	0	0	0	0	0	7	96
5:25 PM	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	94
5:30 PM	0	2	0	0	0	5	0	0	1	0	2	0	0	0	0	0	10	96
5:35 PM	1	3	0	0	0	5	1	0	0	0	0	0	0	0	0	0	10	95

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	40	0	0	0	160	40	0	0	0	4	0	0	0	0	0	248
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

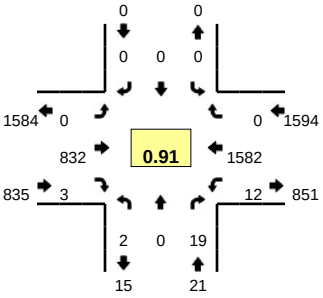
LOCATION: NW McNamee Rd -- NW Saint Helens Rd

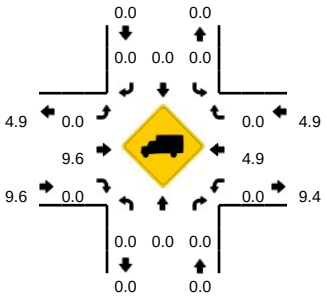
QC JOB #: 14735219

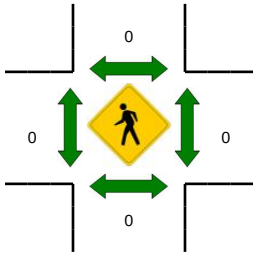
CITY/STATE: Portland, OR

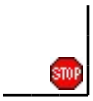
DATE: Thu, Jun 28 2018

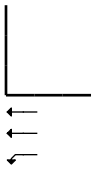
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:20 PM -- 4:35 PM

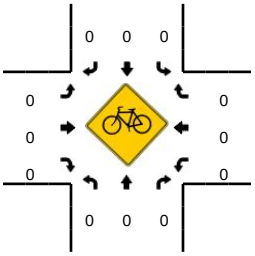


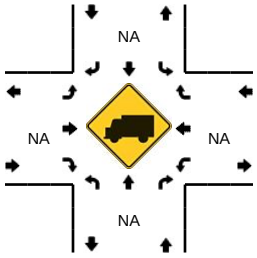


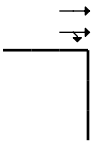


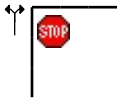


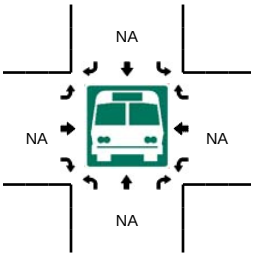












5-Min Count Period Beginning At	NW McNamee Rd (Northbound)				NW McNamee Rd (Southbound)				NW Saint Helens Rd (Eastbound)				NW Saint Helens Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:45 PM	0	0	2	0	0	0	0	0	0	57	0	0	2	154	0	0	215	
3:50 PM	0	0	0	0	0	0	0	0	0	64	0	0	1	102	0	0	167	
3:55 PM	0	0	1	0	0	0	0	0	0	65	0	0	0	113	0	0	179	1972
4:00 PM	0	0	1	0	0	0	0	0	0	61	0	0	0	117	0	0	179	2007
4:05 PM	0	0	1	0	0	0	0	0	0	35	0	0	1	97	0	0	134	1997
4:10 PM	0	0	2	0	0	0	0	0	0	59	0	0	1	102	0	0	164	2007
4:15 PM	0	0	1	0	0	0	0	0	0	68	0	0	0	128	0	0	197	2049
4:20 PM	0	0	2	0	0	0	0	0	0	79	0	0	2	139	0	0	222	2101
4:25 PM	1	0	9	0	0	0	0	0	0	105	0	0	1	130	0	0	246	2194
4:30 PM	0	0	0	0	0	0	0	0	0	82	1	0	0	124	0	0	207	2258
4:35 PM	0	0	2	0	0	0	0	0	0	72	0	0	0	134	0	0	208	2271
4:40 PM	0	0	0	0	0	0	0	0	0	71	0	0	1	106	0	0	178	2296
4:45 PM	0	0	0	0	0	0	0	0	0	67	1	0	0	148	0	0	216	2297
4:50 PM	1	0	2	0	0	0	0	0	0	58	0	0	3	145	0	0	209	2339
4:55 PM	0	0	0	0	0	0	0	0	0	53	0	0	2	154	0	0	209	2369
5:00 PM	0	0	1	0	0	0	0	0	0	52	0	0	2	115	0	0	170	2360
5:05 PM	0	0	0	0	0	0	0	0	0	60	1	0	1	127	0	0	189	2415
5:10 PM	0	0	2	0	0	0	0	0	0	65	0	0	0	132	0	0	199	2450
5:15 PM	1	0	0	0	0	0	0	0	0	63	0	0	2	120	0	0	186	2439
5:20 PM	1	0	0	0	0	0	0	0	0	51	1	0	1	147	0	0	201	2418
5:25 PM	0	0	0	0	0	0	0	0	0	60	0	0	1	126	0	0	187	2359
5:30 PM	0	0	0	0	0	0	0	0	0	59	0	0	1	134	0	0	194	2346
5:35 PM	1	0	2	0	0	0	0	0	0	60	0	0	0	159	0	0	222	2360
5:40 PM	1	0	0	0	0	0	0	0	0	62	0	0	0	135	0	0	198	2380

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	0	44	0	0	0	0	0	0	1064	4	0	12	1572	0	0	2700
Heavy Trucks	0	0	0		0	0	0		0	104	0		0	80	0		184
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

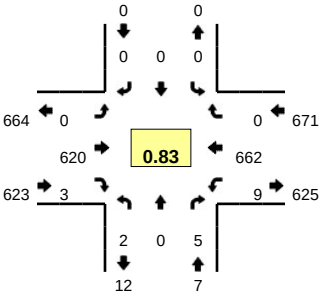
LOCATION: NW McNamee Rd -- NW Saint Helens Rd

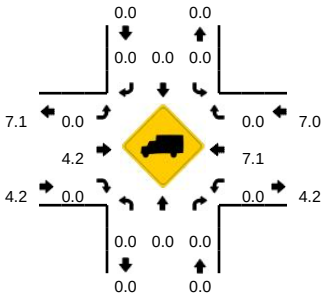
QC JOB #: 14735220

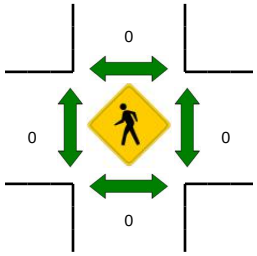
CITY/STATE: Portland, OR

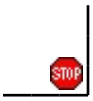
DATE: Sat, Jun 30 2018

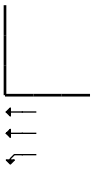
Peak-Hour: 2:10 PM -- 3:10 PM
Peak 15-Min: 2:10 PM -- 2:25 PM

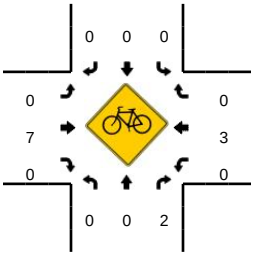


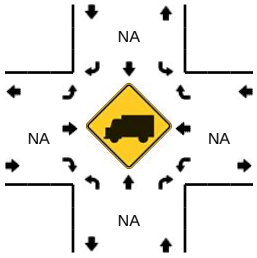


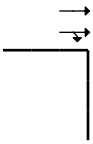


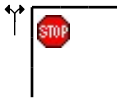


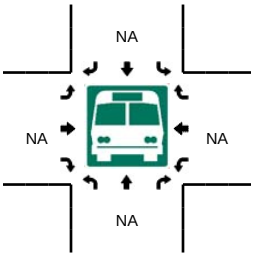












5-Min Count Period Beginning At	NW McNamee Rd (Northbound)				NW McNamee Rd (Southbound)				NW Saint Helens Rd (Eastbound)				NW Saint Helens Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
1:40 PM	0	0	2	0	0	0	0	0	0	47	0	0	2	51	0	0	102	1181
1:45 PM	0	0	1	0	0	0	0	0	0	61	0	0	0	66	0	0	128	1218
1:50 PM	0	0	1	0	0	0	0	0	0	47	0	0	0	51	0	0	99	1225
1:55 PM	0	0	0	0	0	0	0	0	0	55	1	0	2	63	0	0	121	1228
2:00 PM	0	0	0	0	0	0	0	0	0	45	0	0	0	40	0	0	85	1224
2:05 PM	0	0	0	0	0	0	0	0	0	31	0	0	0	38	0	0	69	1192
2:10 PM	0	0	2	0	0	0	0	0	0	62	0	0	0	68	0	0	132	1235
2:15 PM	0	0	0	0	0	0	0	0	0	65	0	0	1	62	0	0	128	1263
2:20 PM	0	0	0	0	0	0	0	0	0	65	0	0	1	67	0	0	133	1290
2:25 PM	0	0	0	0	0	0	0	0	0	40	0	0	0	37	0	0	77	1269
2:30 PM	0	0	0	0	0	0	0	0	0	52	0	0	2	55	0	0	109	1271
2:35 PM	0	0	1	0	0	0	0	0	0	47	2	0	0	46	0	0	96	1279
2:40 PM	0	0	0	0	0	0	0	0	0	46	0	0	0	56	0	0	102	1279
2:45 PM	0	0	0	0	0	0	0	0	0	48	0	0	2	50	0	0	100	1251
2:50 PM	1	0	2	0	0	0	0	0	0	34	0	0	1	59	0	0	97	1249
2:55 PM	0	0	0	0	0	0	0	0	0	62	1	0	1	58	0	0	122	1250
3:00 PM	0	0	0	0	0	0	0	0	0	52	0	0	0	42	0	0	94	1259
3:05 PM	1	0	0	0	0	0	0	0	0	47	0	0	1	62	0	0	111	1301
3:10 PM	1	0	0	0	0	0	0	0	0	40	0	0	0	41	0	0	82	1251
3:15 PM	0	0	0	0	0	0	0	0	0	44	0	0	2	52	0	0	98	1221
3:20 PM	1	0	1	0	0	0	0	0	0	54	2	0	1	42	0	0	101	1189
3:25 PM	0	0	1	0	0	0	0	0	0	45	0	0	0	64	0	0	110	1222
3:30 PM	1	0	1	0	0	0	0	0	0	35	0	0	0	61	0	0	98	1211
3:35 PM	0	0	0	0	0	0	0	0	0	43	0	0	0	49	0	0	92	1207

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	8	0	0	0	0	0	0	768	0	0	8	788	0	0	1572
Heavy Trucks	0	0	0		0	0	0		0	24	0		0	36	0		60
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

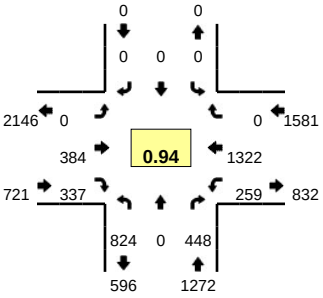
Method for determining peak hour: Total Entering Volume

LOCATION: NW Cornelius Pass Rd -- NW Saint Helens Rd

QC JOB #: 14735222

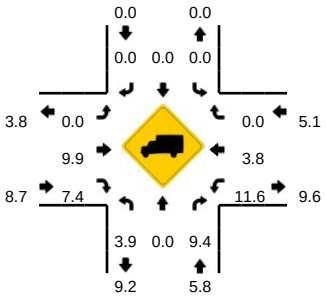
CITY/STATE: Portland, OR

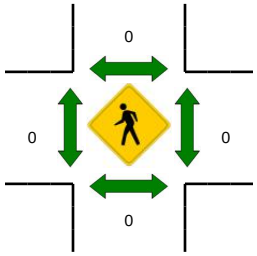
DATE: Thu, Jun 28 2018

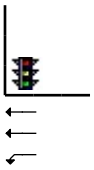


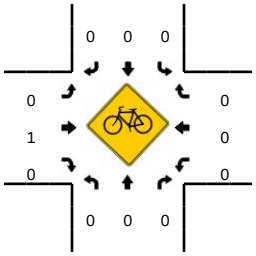
Peak-Hour: 4:15 PM -- 5:15 PM

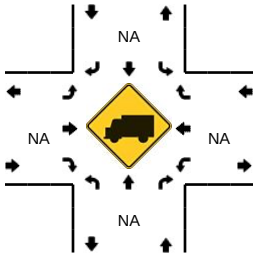
Peak 15-Min: 4:25 PM -- 4:40 PM

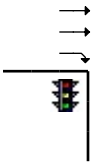


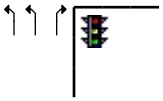


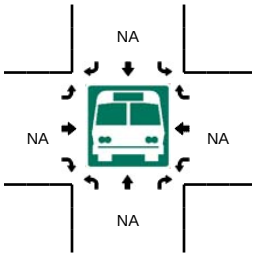












5-Min Count Period Beginning At	NW Cornelius Pass Rd (Northbound)				NW Cornelius Pass Rd (Southbound)				NW Saint Helens Rd (Eastbound)				NW Saint Helens Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:45 PM	57	0	20	0	0	0	0	0	0	36	21	0	22	115	0	0	271	
3:50 PM	54	0	33	0	0	0	0	0	0	37	13	0	11	101	0	0	249	
3:55 PM	65	0	25	0	0	0	0	0	0	37	28	0	17	109	0	0	281	2831
4:00 PM	74	0	24	0	0	0	0	0	0	40	20	0	19	94	0	0	271	2889
4:05 PM	64	0	16	0	0	0	0	0	0	18	21	0	5	76	0	0	200	2896
4:10 PM	56	0	33	0	0	0	0	0	0	27	32	0	17	86	0	0	251	2946
4:15 PM	42	0	38	0	0	0	0	0	0	28	48	0	28	107	0	0	291	3018
4:20 PM	77	0	44	0	0	0	0	0	0	38	19	0	23	96	0	0	297	3059
4:25 PM	53	0	54	0	0	0	0	0	0	47	29	0	23	114	0	0	320	3161
4:30 PM	79	0	47	0	0	0	0	0	0	38	30	0	8	106	0	0	308	3263
4:35 PM	69	0	44	0	0	0	0	0	0	27	32	0	25	129	0	0	326	3303
4:40 PM	79	0	45	0	0	0	0	0	0	28	26	0	25	86	0	0	289	3354
4:45 PM	65	0	43	0	0	0	0	0	0	24	26	0	26	116	0	0	300	3383
4:50 PM	83	0	36	0	0	0	0	0	0	24	18	0	18	121	0	0	300	3434
4:55 PM	68	0	28	0	0	0	0	0	0	27	13	0	23	124	0	0	283	3436
5:00 PM	84	0	17	0	0	0	0	0	0	33	38	0	19	93	0	0	284	3449
5:05 PM	66	0	28	0	0	0	0	0	0	35	29	0	21	105	0	0	284	3533
5:10 PM	59	0	24	0	0	0	0	0	0	35	29	0	20	125	0	0	292	3574
5:15 PM	49	0	27	0	0	0	0	0	0	39	33	0	22	92	0	0	262	3545
5:20 PM	61	0	18	0	0	0	0	0	0	36	33	0	19	120	0	0	287	3535
5:25 PM	84	0	25	0	0	0	0	0	0	34	22	0	20	101	0	0	286	3501
5:30 PM	55	0	19	0	0	0	0	0	0	39	26	0	23	104	0	0	266	3459
5:35 PM	64	0	24	0	0	0	0	0	0	36	31	0	22	135	0	0	312	3445
5:40 PM	39	0	22	0	0	0	0	0	0	39	29	0	17	141	0	0	287	3443

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	804	0	580	0	0	0	0	0	0	448	364	0	224	1396	0	0	3816
Heavy Trucks	32	0	28		0	0	0		0	52	16		16	60	0		204
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

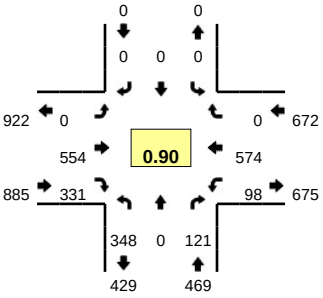
LOCATION: NW Cornelius Pass Rd -- NW Saint Helens Rd

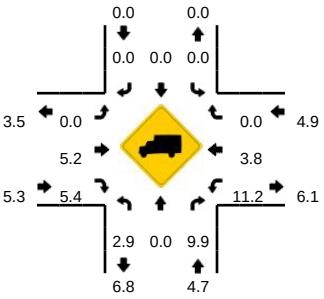
QC JOB #: 14735223

CITY/STATE: Portland, OR

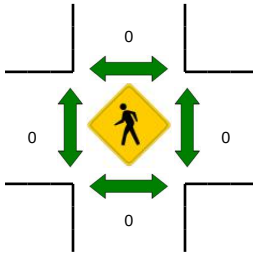
DATE: Sat, Jun 30 2018

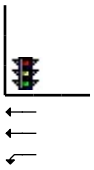
Peak-Hour: 1:25 PM -- 2:25 PM
Peak 15-Min: 2:10 PM -- 2:25 PM

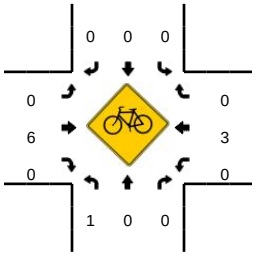


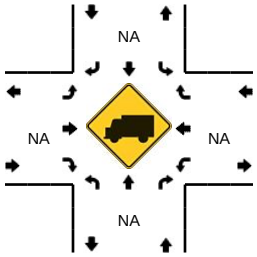


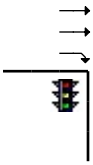
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

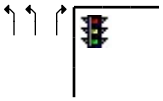


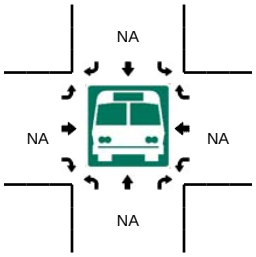












5-Min Count Period Beginning At	NW Cornelius Pass Rd (Northbound)				NW Cornelius Pass Rd (Southbound)				NW Saint Helens Rd (Eastbound)				NW Saint Helens Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:55 PM	16	0	8	0	0	0	0	0	0	58	29	0	7	33	0	0	151	1877
1:00 PM	19	0	10	0	0	0	0	0	0	35	17	0	6	49	0	0	136	1887
1:05 PM	24	0	8	0	0	0	0	0	0	39	34	0	3	52	0	0	160	1922
1:10 PM	32	0	12	0	0	0	0	0	0	43	19	0	5	47	0	0	158	1934
1:15 PM	21	0	5	0	0	0	0	0	0	54	31	0	9	50	0	0	170	1933
1:20 PM	38	0	10	0	0	0	0	0	0	42	24	0	7	34	0	0	155	1921
1:25 PM	39	0	12	0	0	0	0	0	0	52	38	0	8	36	0	0	185	1954
1:30 PM	29	0	8	0	0	0	0	0	0	50	24	0	14	50	0	0	175	1957
1:35 PM	33	0	11	0	0	0	0	0	0	50	37	0	7	46	0	0	184	1962
1:40 PM	26	0	10	0	0	0	0	0	0	50	33	0	6	41	0	0	166	1973
1:45 PM	27	0	7	0	0	0	0	0	0	53	26	0	6	63	0	0	182	1985
1:50 PM	28	0	9	0	0	0	0	0	0	40	33	0	11	48	0	0	169	1991
1:55 PM	16	0	13	0	0	0	0	0	0	40	15	0	10	45	0	0	139	1979
2:00 PM	23	0	8	0	0	0	0	0	0	40	24	0	6	43	0	0	144	1987
2:05 PM	33	0	4	0	0	0	0	0	0	27	22	0	5	31	0	0	122	1949
2:10 PM	29	0	17	0	0	0	0	0	0	45	21	0	4	53	0	0	169	1960
2:15 PM	27	0	12	0	0	0	0	0	0	54	25	0	10	58	0	0	186	1976
2:20 PM	38	0	10	0	0	0	0	0	0	53	33	0	11	60	0	0	205	2026
2:25 PM	23	0	5	0	0	0	0	0	0	36	30	0	4	29	0	0	127	1968
2:30 PM	52	0	7	0	0	0	0	0	0	45	28	0	6	55	0	0	193	1986
2:35 PM	20	0	8	0	0	0	0	0	0	41	28	0	6	39	0	0	142	1944
2:40 PM	44	0	7	0	0	0	0	0	0	40	21	0	4	47	0	0	163	1941
2:45 PM	25	0	3	0	0	0	0	0	0	45	24	0	4	45	0	0	146	1905
2:50 PM	30	0	9	0	0	0	0	0	0	27	26	0	11	49	0	0	152	1888

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	376	0	156	0	0	0	0	0	0	608	316	0	100	684	0	0	2240
Heavy Trucks	20	0	4		0	0	0		0	24	4		4	28	0		84
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

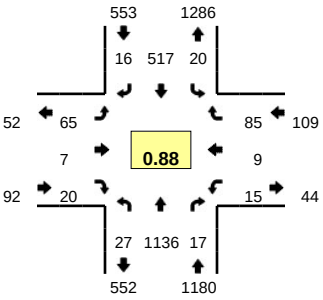
LOCATION: NW Cornelius Pass Rd -- NW Skyline Blvd

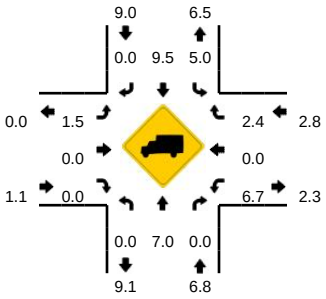
QC JOB #: 14735225

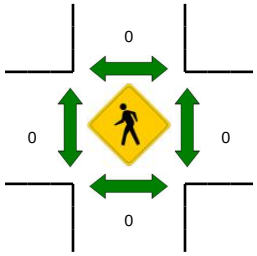
CITY/STATE: Portland, OR

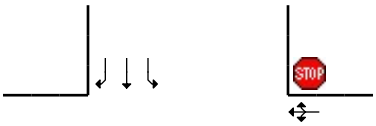
DATE: Thu, Jun 28 2018

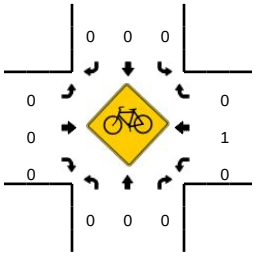
Peak-Hour: 3:55 PM -- 4:55 PM
Peak 15-Min: 4:20 PM -- 4:35 PM

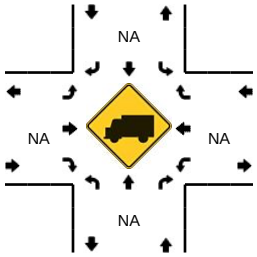


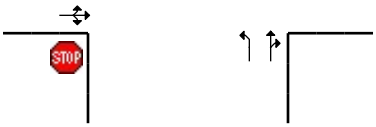


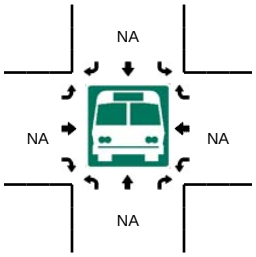












5-Min Count Period Beginning At	NW Cornelius Pass Rd (Northbound)				NW Cornelius Pass Rd (Southbound)				NW Skyline Blvd (Eastbound)				NW Skyline Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:25 PM	1	63	2	0	1	39	0	0	1	0	8	0	1	1	2	0	119	
3:30 PM	1	69	2	0	2	33	1	0	3	1	0	0	1	2	2	0	117	
3:35 PM	2	90	1	0	0	16	1	0	2	0	0	0	0	0	7	0	119	
3:40 PM	2	75	1	0	3	61	1	0	4	0	2	0	0	2	5	0	156	
3:45 PM	2	79	2	0	1	35	1	0	4	0	0	0	2	1	5	0	132	
3:50 PM	2	87	3	0	0	43	3	0	3	1	1	0	0	2	2	0	147	
3:55 PM	2	95	2	0	1	37	1	0	2	2	1	0	1	2	6	0	152	1464
4:00 PM	4	78	0	0	0	39	1	0	6	0	2	0	1	0	4	0	135	1509
4:05 PM	1	84	1	0	1	30	2	0	5	1	0	0	0	0	7	0	132	1531
4:10 PM	0	88	3	0	0	32	2	0	3	0	3	0	1	1	9	0	142	1561
4:15 PM	3	89	1	0	0	35	0	0	3	1	2	0	1	1	20	0	156	1619
4:20 PM	1	104	0	0	1	55	0	0	6	1	3	0	1	1	15	0	188	1695
4:25 PM	1	95	0	0	5	59	2	0	10	1	0	0	0	3	6	0	182	1758
4:30 PM	1	110	4	0	4	47	3	0	6	0	2	0	2	0	2	0	181	1822
4:35 PM	1	105	0	0	2	34	1	0	8	0	0	0	3	1	3	0	158	1861
4:40 PM	2	105	1	0	3	40	2	0	8	0	4	0	1	0	4	0	170	1875
4:45 PM	6	104	1	0	0	42	0	0	3	1	3	0	2	0	7	0	169	1912
4:50 PM	5	79	4	0	3	67	2	0	5	0	0	0	2	0	2	0	169	1934
4:55 PM	2	81	2	0	2	42	0	0	1	0	1	0	0	1	6	0	138	1920
5:00 PM	0	83	4	0	2	25	0	0	2	0	0	0	1	0	5	0	122	1907
5:05 PM	1	74	0	0	2	52	1	0	1	0	0	0	1	0	6	0	138	1913
5:10 PM	1	85	0	0	2	51	2	0	4	2	1	0	3	2	6	0	159	1930
5:15 PM	1	80	1	0	1	45	2	1	1	0	4	0	1	0	4	0	141	1915
5:20 PM	1	84	0	0	3	51	1	0	4	1	0	0	4	0	5	0	154	1881

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	1236	16	0	40	644	20	0	88	8	20	0	12	16	92	0	2204
Heavy Trucks	0	48	0		4	68	0		0	0	0		0	0	0		120
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

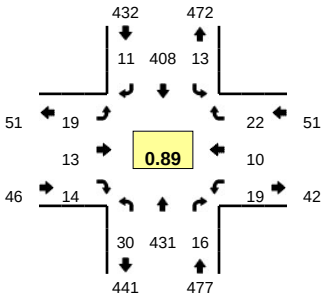
LOCATION: NW Cornelius Pass Rd -- NW Skyline Blvd

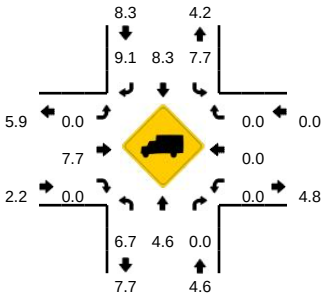
QC JOB #: 14735226

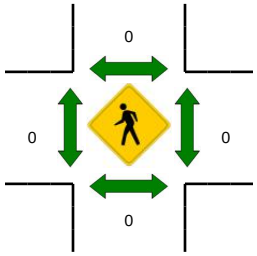
CITY/STATE: Portland, OR

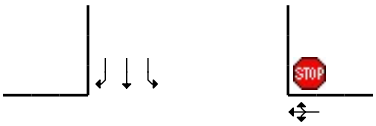
DATE: Sat, Jun 30 2018

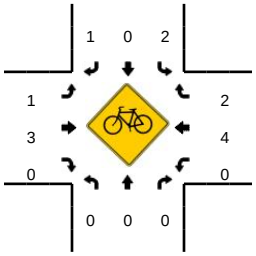
Peak-Hour: 1:20 PM -- 2:20 PM
Peak 15-Min: 1:20 PM -- 1:35 PM

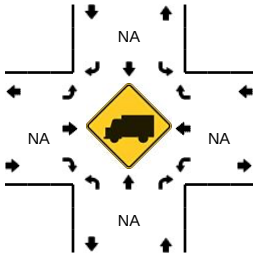


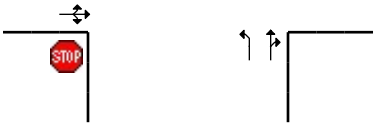


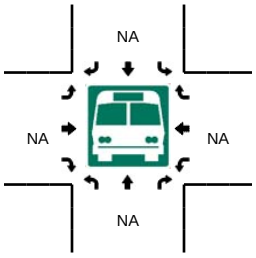












5-Min Count Period Beginning At	NW Cornelius Pass Rd (Northbound)				NW Cornelius Pass Rd (Southbound)				NW Skyline Blvd (Eastbound)				NW Skyline Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
12:50 PM	2	27	0	0	0	40	2	0	0	0	3	0	1	2	0	0	77	880
12:55 PM	1	32	0	0	2	27	2	0	2	0	0	0	2	0	0	0	68	889
1:00 PM	0	24	1	0	3	35	1	0	1	1	2	0	0	2	0	0	70	907
1:05 PM	0	36	3	0	1	21	1	0	3	1	1	0	1	1	0	0	69	890
1:10 PM	1	32	1	0	1	39	0	0	1	2	2	0	1	0	0	0	80	900
1:15 PM	1	38	1	0	0	25	2	0	1	0	3	0	2	2	0	0	75	905
1:20 PM	5	47	2	0	2	40	2	0	1	2	0	0	1	0	3	0	105	926
1:25 PM	2	38	2	0	1	26	2	0	1	0	0	0	4	0	1	0	77	921
1:30 PM	1	46	1	0	0	47	1	0	0	1	0	0	2	0	2	0	101	950
1:35 PM	4	24	1	0	1	34	0	0	1	0	0	0	2	0	4	0	71	934
1:40 PM	0	30	1	0	2	41	2	0	4	2	1	0	2	1	3	0	89	956
1:45 PM	4	32	4	0	1	35	3	0	1	1	1	0	0	1	1	0	84	966
1:50 PM	3	31	1	0	0	32	0	0	1	1	1	0	0	0	2	0	72	961
1:55 PM	0	32	2	0	2	48	0	0	3	2	3	0	3	2	0	0	97	990
2:00 PM	2	36	1	0	1	16	1	0	2	2	2	0	0	2	2	0	67	987
2:05 PM	3	40	1	0	2	31	0	0	3	1	0	0	2	2	2	0	87	1005
2:10 PM	3	30	0	0	1	35	0	0	0	0	2	0	1	2	1	0	75	1000
2:15 PM	3	45	0	0	0	23	0	0	2	1	4	0	2	0	1	0	81	1006
2:20 PM	1	24	1	0	0	30	0	0	3	0	5	0	1	1	0	0	66	967
2:25 PM	1	55	0	0	2	30	0	0	0	0	3	0	4	1	4	0	100	990
2:30 PM	6	42	2	0	0	42	0	0	1	0	2	0	2	2	1	0	100	989
2:35 PM	3	34	4	0	0	29	0	0	0	2	0	0	3	0	3	0	78	996
2:40 PM	1	26	3	0	2	42	1	0	0	2	1	0	0	1	1	0	80	987
2:45 PM	7	39	2	0	0	29	0	0	1	0	0	0	1	1	0	0	80	983

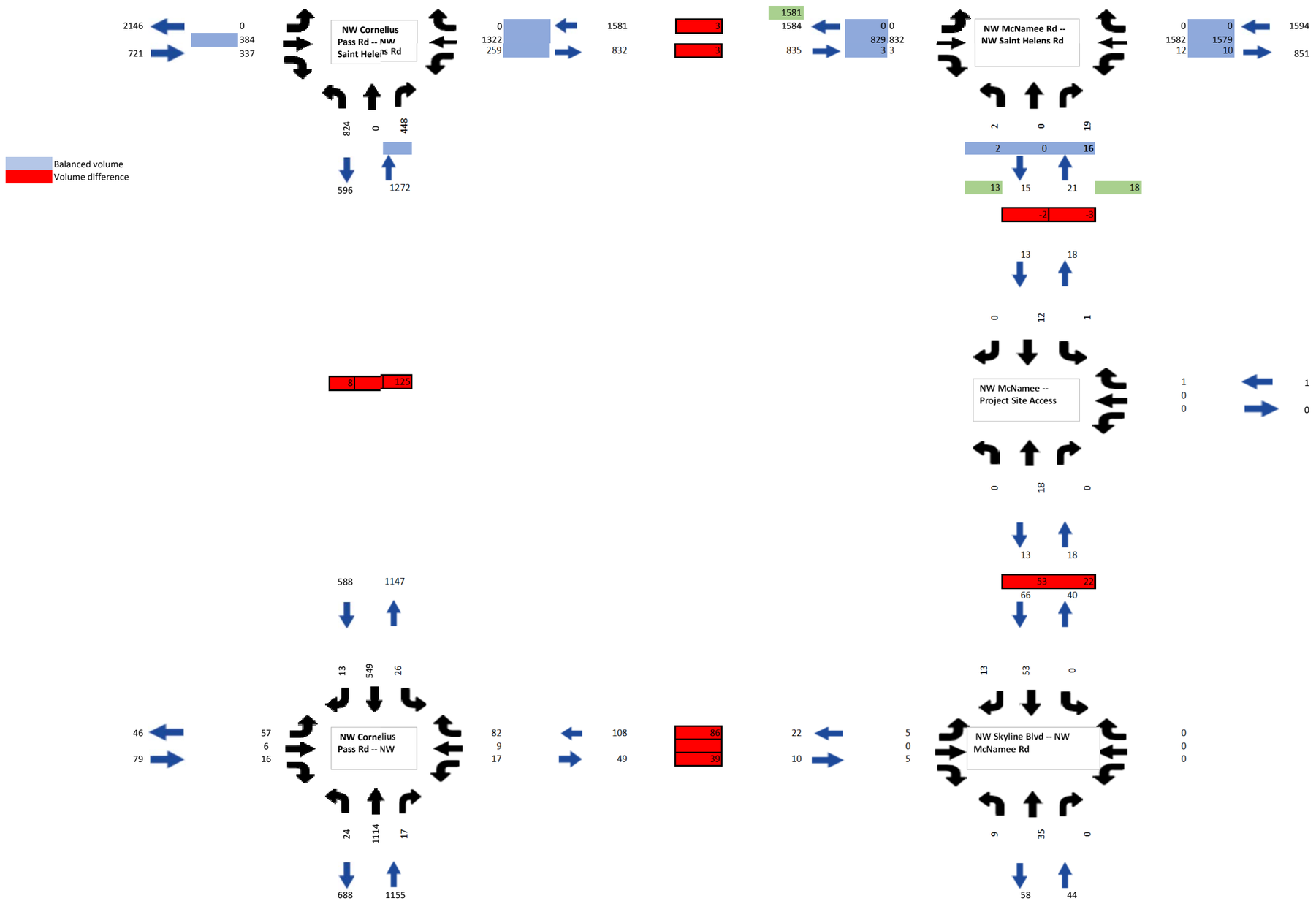
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	524	20	0	12	452	20	0	8	12	0	0	28	0	24	0	1132
Heavy Trucks	4	24	0		0	36	0		0	0	0		0	0	0		64
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		2	0	0		0	0	0		0	1	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 7/18/2018 3:14 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Year 2018 Weekday Traffic Volume Balancing Worksheet



Year 2018 Balancing Worksheet

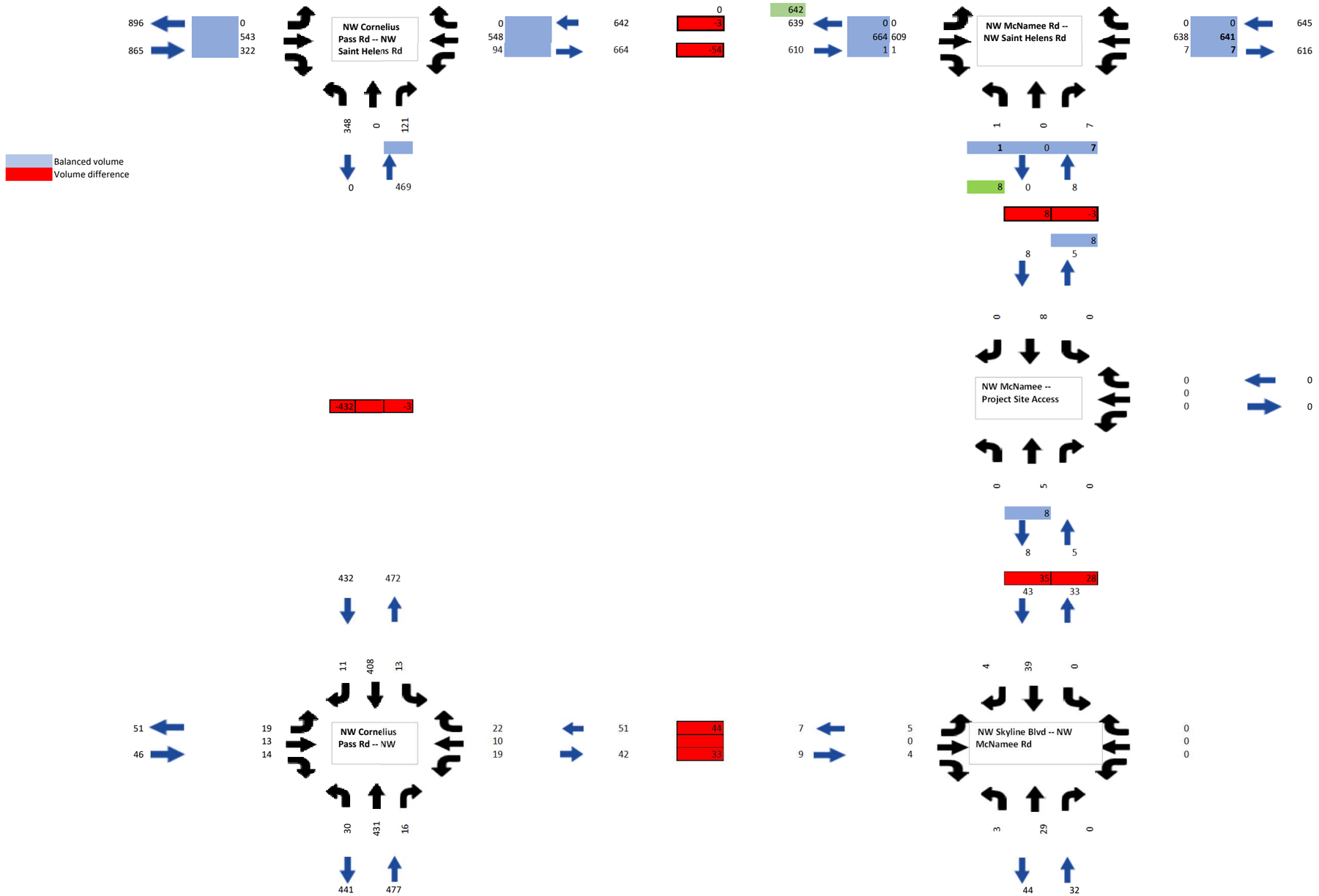


EXHIBIT G

YEAR 2018 WEEKDAY SYNCHRO WORKSHEET

YEAR 2018 WEEKEND DAY SYNCHRO WORKSHEEET

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	385	340	260	1325	825	450
Future Volume (vph)	385	340	260	1325	825	450
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	418	370	283	1440	897	489
RTOR Reduction (vph)	0	296	0	0	0	218
Lane Group Flow (vph)	418	74	283	1440	897	271
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	5	
Permitted Phases		4				5
Actuated Green, G (s)	15.3	15.3	16.9	38.2	27.1	27.1
Effective Green, g (s)	15.3	15.3	16.9	38.2	27.1	27.1
Actuated g/C Ratio	0.20	0.20	0.22	0.50	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	705	315	389	1760	1211	558
v/s Ratio Prot	0.12		0.16	c0.41	c0.26	
v/s Ratio Perm		0.05				0.17
v/c Ratio	0.59	0.23	0.73	0.82	0.74	0.49
Uniform Delay, d1	27.9	25.8	27.8	16.4	21.8	19.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.4	6.7	3.1	2.5	0.7
Delay (s)	29.3	26.2	34.5	19.4	24.2	20.1
Level of Service	C	C	C	B	C	C
Approach Delay (s)	27.8			21.9	22.8	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	830	5	10	1580	0	5	0	20	0	0	0
Future Vol, veh/h	0	830	5	10	1580	0	5	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	902	5	11	1717	0	5	0	22	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1717	0	0	907	0	0	1786	2644	454	2190	2646	859
Stage 1	-	-	-	-	-	-	905	905	-	1739	1739	-
Stage 2	-	-	-	-	-	-	881	1739	-	451	907	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	365	-	-	746	-	0	51	23	553	25	23	300
Stage 1	-	-	-	-	-	0	298	353	-	90	140	-
Stage 2	-	-	-	-	-	0	308	140	-	557	353	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	365	-	-	746	-	-	50	23	553	24	23	300
Mov Cap-2 Maneuver	-	-	-	-	-	-	50	23	-	24	23	-
Stage 1	-	-	-	-	-	-	298	353	-	90	138	-
Stage 2	-	-	-	-	-	-	303	138	-	535	353	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	553	365	-	-	746	-	-
HCM Lane V/C Ratio	0.039	-	-	-	0.015	-	-
HCM Control Delay (s)	11.8	0	-	-	9.9	-	0
HCM Lane LOS	B	A	-	-	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	0	0	0	5	0	20	0	0	15	0
Future Vol, veh/h	0	0	0	0	0	5	0	20	0	0	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	22	0	0	16	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	41	38	16	38	38	22	16	0	0	22	0	0
Stage 1	16	16	-	22	22	-	-	-	-	-	-	-
Stage 2	25	22	-	16	16	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	963	854	1063	967	854	1055	1602	-	-	1593	-	-
Stage 1	1004	882	-	996	877	-	-	-	-	-	-	-
Stage 2	993	877	-	1004	882	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	958	854	1063	967	854	1055	1602	-	-	1593	-	-
Mov Cap-2 Maneuver	958	854	-	967	854	-	-	-	-	-	-	-
Stage 1	1004	882	-	996	877	-	-	-	-	-	-	-
Stage 2	988	877	-	1004	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.4	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	-	1055	1593	-	-
HCM Lane V/C Ratio	-	-	-	-	0.005	-	-	-
HCM Control Delay (s)	0	-	-	0	8.4	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	35	55	15	5	5
Future Vol, veh/h	10	35	55	15	5	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	38	60	16	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	76	0	-	0	128	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	60	-
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	1523	-	-	-	866	995
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	963	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1523	-	-	-	860	995
Mov Cap-2 Maneuver	-	-	-	-	860	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	963	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1523	-	-	-	923
HCM Lane V/C Ratio	0.007	-	-	-	0.012
HCM Control Delay (s)	7.4	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	60

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	5	15	20	10	80	25	1115	20	25	550	15
Future Vol, veh/h	60	5	15	20	10	80	25	1115	20	25	550	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	5	16	22	11	87	27	1212	22	27	598	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1986	1948	606	1948	1945	1223	614	0	0	1234	0	0
Stage 1	660	660	-	1277	1277	-	-	-	-	-	-	-
Stage 2	1326	1288	-	671	668	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 46	65	497	49	65	219	965	-	-	565	-	-
Stage 1	452	460	-	204	237	-	-	-	-	-	-	-
Stage 2	192	234	-	446	456	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 23	60	497	42	60	219	965	-	-	565	-	-
Mov Cap-2 Maneuver	~ 23	60	-	42	60	-	-	-	-	-	-	-
Stage 1	439	438	-	198	230	-	-	-	-	-	-	-
Stage 2	107	227	-	406	434	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	1186.8	189.4	0.2	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	965	-	-	29	109	565	-	-
HCM Lane V/C Ratio	0.028	-	-	2.999	1.097	0.048	-	-
HCM Control Delay (s)	8.8	-	-	$ 1186.8	189.4	11.7	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	10.4	7.4	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	545	325	95	550	350	125
Future Volume (veh/h)	545	325	95	550	350	125
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	592	353	103	598	380	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1218	543	146	1997	602	
Arrive On Green	0.34	0.34	0.08	0.56	0.17	0.00
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	592	353	103	598	380	0
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	5.7	8.2	2.5	3.9	4.4	0.0
Cycle Q Clear(g_c), s	5.7	8.2	2.5	3.9	4.4	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1218	543	146	1997	602	
V/C Ratio(X)	0.49	0.65	0.71	0.30	0.63	
Avail Cap(c_a), veh/h	2527	1127	613	4239	2101	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.3	12.1	19.5	5.0	16.7	0.0
Incr Delay (d2), s/veh	0.3	1.3	6.2	0.1	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	2.1	1.1	0.6	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.6	13.4	25.7	5.1	17.8	0.0
LnGrp LOS	B	B	C	A	B	
Approach Vol, veh/h	945			701	380	A
Approach Delay, s/veh	12.3			8.1	17.8	
Approach LOS	B			A	B	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.1	9.6	20.9		30.5
Change Period (Y+Rc), s		5.5	6.0	6.0		6.0
Max Green Setting (Gmax), s		26.5	15.0	31.0		52.0
Max Q Clear Time (g_c+I1), s		6.4	4.5	10.2		5.9
Green Ext Time (p_c), s		1.2	0.1	4.7		3.9

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	665	0	15	645	0	5	0	10	0	0	0
Future Vol, veh/h	0	665	0	15	645	0	5	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	723	0	16	701	0	5	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	701	0	0	723	0	0	1106	1456	362	1095	1456	351
Stage 1	-	-	-	-	-	-	723	723	-	733	733	-
Stage 2	-	-	-	-	-	-	383	733	-	362	723	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	892	-	-	875	-	-	165	129	635	168	129	645
Stage 1	-	-	-	-	-	-	384	429	-	378	424	-
Stage 2	-	-	-	-	-	-	611	424	-	629	429	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	892	-	-	875	-	-	163	127	635	163	127	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	163	127	-	163	127	-
Stage 1	-	-	-	-	-	-	384	429	-	378	416	-
Stage 2	-	-	-	-	-	-	600	416	-	618	429	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	16.7	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	323	892	-	-	875	-	-	-
HCM Lane V/C Ratio	0.05	-	-	-	0.019	-	-	-
HCM Control Delay (s)	16.7	0	-	-	9.2	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	0	0	0	0	0	10	0	0	10	0
Future Vol, veh/h	0	0	0	0	0	0	0	10	0	0	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	11	0	0	11	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	22	22	11	22	22	11	11	0	0	11	0	0
Stage 1	11	11	-	11	11	-	-	-	-	-	-	-
Stage 2	11	11	-	11	11	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	990	872	1070	990	872	1070	1608	-	-	1608	-	-
Stage 1	1010	886	-	1010	886	-	-	-	-	-	-	-
Stage 2	1010	886	-	1010	886	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	990	872	1070	990	872	1070	1608	-	-	1608	-	-
Mov Cap-2 Maneuver	990	872	-	990	872	-	-	-	-	-	-	-
Stage 1	1010	886	-	1010	886	-	-	-	-	-	-	-
Stage 2	1010	886	-	1010	886	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1608	-	-	-	-	1608	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	30	40	5	5	5
Future Vol, veh/h	5	30	40	5	5	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	33	43	5	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	48	0	-	0	89	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	43	-
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	1559	-	-	-	912	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1559	-	-	-	909	1023
Mov Cap-2 Maneuver	-	-	-	-	909	-
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	979	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1559	-	-	-	963
HCM Lane V/C Ratio	0.003	-	-	-	0.011
HCM Control Delay (s)	7.3	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	20	15	20	10	25	30	435	20	15	410	10
Future Vol, veh/h	15	20	15	20	10	25	30	435	20	15	410	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	22	16	22	11	27	33	473	22	16	446	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1053	1045	452	1053	1039	484	457	0	0	495	0	0
Stage 1	484	484	-	550	550	-	-	-	-	-	-	-
Stage 2	569	561	-	503	489	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	204	229	608	204	231	583	1104	-	-	1069	-	-
Stage 1	564	552	-	519	516	-	-	-	-	-	-	-
Stage 2	507	510	-	551	549	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	181	219	608	177	221	583	1104	-	-	1069	-	-
Mov Cap-2 Maneuver	181	219	-	177	221	-	-	-	-	-	-	-
Stage 1	547	544	-	503	501	-	-	-	-	-	-	-
Stage 2	459	495	-	507	541	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.3	21.8	0.5	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1104	-	-	251	273	1069	-	-
HCM Lane V/C Ratio	0.03	-	-	0.217	0.219	0.015	-	-
HCM Control Delay (s)	8.4	-	-	23.3	21.8	8.4	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.8	0	-	-

EXHIBIT H - CRASH DATA

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

NW McNamee Rd & NW Skyline Blvd plus 200 feet
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2014														
HEAD-ON	0	1	0	1	0	2	0	1	0	1	0	0	0	0
2014 TOTAL	0	1	0	1	0	2	0	1	0	1	0	0	0	0
YEAR: 2011														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	0	1	0	0	1
2011 TOTAL	0	0	1	1	0	0	0	0	1	0	1	0	0	1
YEAR: 2009														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	1	0	1	0	1
2009 TOTAL	0	0	1	1	0	0	0	0	1	1	0	1	0	1
YEAR: 2008														
SIDESWIPE - MEETING	0	0	1	1	0	0	0	0	1	1	0	0	0	0
2008 TOTAL	0	0	1	1	0	0	0	0	1	1	0	0	0	0
FINAL TOTAL	0	1	3	4	0	2	0	1	3	3	1	1	0	2

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF PORTLAND NW, MULTNOMAH COUNTY

NW McNamee Rd & NW Skyline Blvd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	FC / DISTNC	CITY STREET / FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
90010	Y	N	N			01/22/2009	17	NW MCNAMEE RD	INTER	3-LEG	N	Y	CLR	FIX OBJ	01	NONE 0	STRGHT										057,079	01
NO RPT						Thu 11A	0	NW SKYLINE BLVD	NW		UNKNOWN	N	WET	FIX		PRVTE	SE NW									000	057,079	00
No						*45 36 26.47* *-122 50 9.56*	1		05	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	17	M	OR-Y OR<25		047,080,081	017		01
05166	Y	N	N	N	N	05/22/2014	17	NW SKYLINE BLVD	CURVE		N	N	CLR	O-STRGHT	01	NONE 0	STRGHT										010	05,01,32
CITY						Thu 9A	185	NW MCNAMEE RD	NE	(NONE)	UNKNOWN	N	DRY	HEAD		PRVTE	NE SW									000	010	00
No						*45 36 26.63* *-122 50 6.72*	1		07			N	DAY	INJ		MTRCYCLE		01	DRVR	INJB	22	M	OR-Y OR<25		044,047,052	000		05,01,32
										(02)																		
															02	NONE 0	STRGHT											
																PRVTE	SW NE									000		00
																PSNGR CAR		01	DRVR	INJB	52	F	OR-Y OR<25		000	000		00
13657	Y	N	N			12/16/2011	17	NW SKYLINE BLVD	CURVE		N	Y	FOG	FIX OBJ	01	NONE 0	STRGHT										079	01
NONE						Fri 8P	195	NW MCNAMEE RD	NE	(NONE)	UNKNOWN	N	WET	FIX		PRVTE	NE SW									000	079	00
No						*45 36 26.76* *-122 50 6.98*	1		08	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	22	M	OR-Y OR<25		047,080	000		01
										(02)																		
14473	Y	N	N			12/14/2008	17	NW SKYLINE BLVD	CURVE		N	N	SNOW	O-STRGHT	01	NONE 0	STRGHT										124	01
NONE						Sun 3P	200	NW MCNAMEE RD	SE	(NONE)	UNKNOWN	N	SNO	SS-M		PRVTE	NW SE									000	124	00
No						*45 36 26.78* *-122 50 7.01*	1		07			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	65	M	OR-Y OR<25		080,039	017		01
										(02)																		
															02	NONE 0	STRGHT											
																PRVTE	SE NW									000		00
																PSNGR CAR		01	DRVR	NONE	43	M	OR-Y OR<25		000	000		00

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

NW McNamee Rd South of US 30 Lower Columbia River Hwy (092)
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

NW Skyline Blvd & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2016														
ANGLE	0	1	0	1	0	1	0	0	1	1	0	1	0	0
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	1	0	0	1	0	0	1
2016 TOTAL	0	1	1	2	0	1	0	1	1	1	1	1	0	1
YEAR: 2015														
ANGLE	0	0	1	1	0	0	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	1	1	0	1	0	1	0	0
2015 TOTAL	0	0	2	2	0	0	1	2	0	2	0	2	0	0
YEAR: 2014														
ANGLE	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FIXED / OTHER OBJECT	0	1	0	1	0	2	0	1	0	0	1	0	0	1
2014 TOTAL	0	1	1	2	0	2	0	2	0	1	1	1	0	1
YEAR: 2013														
ANGLE	0	1	0	1	0	3	0	1	0	1	0	1	0	0
SIDESWIPE - MEETING	0	0	1	1	0	0	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	1	2	3	0	3	0	2	1	3	0	3	0	0
YEAR: 2012														
ANGLE	0	2	0	2	0	5	0	2	0	1	1	2	0	0
SIDESWIPE - MEETING	0	1	0	1	0	2	0	1	0	1	0	0	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2012 TOTAL	0	3	1	4	0	7	0	4	0	3	1	3	0	0
YEAR: 2010														
SIDESWIPE - MEETING	0	0	1	1	0	0	1	0	1	0	1	0	0	0
2010 TOTAL	0	0	1	1	0	0	1	0	1	0	1	0	0	0
YEAR: 2009														
FIXED / OTHER OBJECT	0	1	1	2	0	2	0	0	1	1	1	1	0	2
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2009 TOTAL	0	1	2	3	0	2	0	1	1	2	1	2	0	2
YEAR: 2007														
ANGLE	0	0	3	3	0	0	1	2	1	3	0	3	0	0
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	1	0	0	1	0	0	1
NON-COLLISION	0	0	1	1	0	0	1	1	0	1	0	0	0	0
2007 TOTAL	0	0	5	5	0	0	2	4	1	4	1	3	0	1
FINAL TOTAL	0	7	15	22	0	15	4	16	5	16	6	15	0	5

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

MULTNOMAH COUNTY

NW Skyline Blvd & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
01520	Y	N	N	N	N	2/13/2009		NW CORNELIUS PASS RD	GRADE		N	Y	CLR	FIX OBJ	01	NONE 0	STRGHT									042		01
COUNTY						Fri 3P	4	NW SKYLINE BLVD	N	(NONE)	NONE	N	WET	FIX		PRVTE	N S									000	042	00
No						45 36 48.71 -122 51 33.00	1		01			N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	75	F	OR-Y		047,080,081	017		01
										(02)													OR<25					
																		02	PSNG	INJC	72	F			000	000		00
04309	Y	N	N	N	N	4/23/2010		NW CORNELIUS PASS RD	CURVE		N	N	RAIN	O-STRGHT	01	NONE 0	STRGHT									124		01
COUNTY						Fri 7P	4	NW SKYLINE BLVD	N	(NONE)	NONE	N	WET	SS-M		PRVTE	N S									000		00
No						45 36 30.91 -122 51 48.18	1		05			N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	20	F	OR-Y		047,080	017		01
										(02)													OR<25					
															02	NONE 1	STRGHT									000		00
																PRVTE	S N									000		00
																SEMI TOW		01	DRVR	NONE	58	M	OR-Y		000	000		00
																							OR>25					
12362	N	N	N			10/12/2007		NW CORNELIUS PASS RD	CURVE		N	Y	CLR	FIX OBJ	01	NONE 0	STRGHT									035,079		10
NONE						Fri 2A	0	NW SKYLINE BLVD	S	(NONE)	UNKNOWN	N	DRY	FIX		PRVTE	N S									007	035,079	00
No						45 36 5.15 -122 51 40.72	1		00			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	21	M	OR-Y		080,081	017		10
										(02)													OR>25					
12905	Y	N	N	N	N	11/18/2012		NW CORNELIUS PASS RD	CURVE		N	N	CLR	O-STRGHT	01	NONE 0	STRGHT									079		05
COUNTY						Sun 9A	3	NW SKYLINE BLVD	S	(NONE)	NONE	N	DRY	SS-M		PRVTE	N S									000		00
No						45 36 17.74 -122 51 36.96	1		03			N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	18	M	OR-Y		047,080	017		05
										(02)													OR>25					
															02	NONE 0	STRGHT									000	079	00
																PRVTE	S N									000		00
																PSNGR CAR		01	DRVR	NONE	35	M	OTH-Y		000	000		00
																							N-RES					
																		02	PSNG	INJC	28	F			000	000		00
01309	N	N	N	N	N	2/2/2007		NW CORNELIUS PASS RD	CURVE		N	N	CLR	OVERTURN	01	NONE 2	STRGHT									028		10
COUNTY						Fri 10A	0	NW SKYLINE BLVD	S	(NONE)	NONE	N	DRY	NCOL		PRVTE	N S									000	028	00
No						45 36 29.12 -122 51 48.70	1		05			N	DAY	PDO		SEMI TOW		01	DRVR	NONE	39	M	OR-Y		017	017		10
										(02)													OR>25					
03594	N	N	N			4/15/2009		NW CORNELIUS PASS RD	INTER	5-LEG	N	N	CLR	S-1TURN	01	NONE 0	STRGHT											06
NONE						Wed 1P	0	NW SKYLINE BLVD	S		STOP SIGN	N	DRY	TURN		PRVTE	S N									031		00
No						45 36 29.09 -122 51 48.69	1		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	34	M	OR-Y		031,034	000		06
																							OR<25					
															02	NONE 1	TURN-R									000		00
																PRVTE	S E									000		00
																PSNGR CAR		01	DRVR	NONE	46	F	OR-Y		000	000		00
																							OR<25					
09044	N	N	N	N	N	9/2/2014		NW CORNELIUS PASS RD	STRGHT		N	Y	CLR	FIX OBJ	01	NONE 0	STRGHT									035,062		10
COUNTY						Tue 11P	0	NW SKYLINE BLVD	S	(NONE)	UNKNOWN	N	DRY	FIX		PRVTE	S N									007	035,062	00
No						45 36 20.16 -122 51 42.46	1		07	0		N	DARK	INJ		PSNGR CAR		01	DRVR	INJC	47	F	OR-Y		080	000		10
										(02)													OR<25					

MULTNOMAH COUNTY

NW Skyline Blvd & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																		02	PSNG	INJC	24	M			000	000		00
07834	Y	Y	N			8/2/2009		NW CORNELIUS PASS RD	INTER	CROSS	N	Y	UNK	FIX OBJ	01	NONE 0	TURN-L											053	01
NO RPT						Sun 1A	0	NW SKYLINE BLVD	W		UNKNOWN	N	UNK	FIX		PRVTE	S W									000	053	00
No						*45 36 29.09 -122 51 48.69*	1		05	0		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	45	M	OR-Y OR>25		047,080,081	017		01
83882	N	N	N			7/18/2013		NW CORNELIUS PASS RD	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	STRGHT											02
NONE						Thu 5P	0	NW SKYLINE BLVD	CN		FLASHBCN-R	N	DRY	TURN		PRVTE	N S									000		00
No						*45 36 29.09 -122 51 48.69*	1		01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	31	M	OR-Y OR<25		000	000		00
															02	NONE 0	TURN-L											
																PRVTE	S W									000		00
																PSNGR CAR		01	DRVR	NONE	00	F	UNK UNK		004,028	000		02
01030	N	N	N			1/19/2007		NW CORNELIUS PASS RD	INTER	5-LEG	N	N	FOG	ANGL-OTH	01	NONE 1	STRGHT											02
NONE						Fri 3P	0	NW SKYLINE BLVD	CN		STOP SIGN	N	WET	ANGL		PRVTE	S N									000		00
No						*45 36 29.09 -122 51 48.70*	1		02	0		N	DAY	PDO		SEMI TOW		01	DRVR	NONE	52	M	OR-Y OR<25		000	000		00
															02	NONE 0	STRGHT											
																PRVTE	E W									000		00
																PSNGR CAR		01	DRVR	NONE	63	F	OR-Y OR<25		028	000		02
00387	N	N	N	N	N	1/13/2014		NW CORNELIUS PASS RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY						Mon 11A	0	NW SKYLINE BLVD	CN		STOP SIGN	N	DRY	ANGL		PRVTE	E W									000		00
No						*45 36 29.09 -122 51 48.69*	1		02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	22	F	OR-Y OR<25		028	000		02
															02	NONE 0	STRGHT											
																PRVTE	S N									000		00
																PSNGR CAR		01	DRVR	NONE	44	F	OR-Y OR<25		000	000		00
88996	N	N	N	N	N	12/29/2016		NW CORNELIUS PASS RD	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY						Thu 10A	0	NW SKYLINE BLVD	CN		STOP SIGN	N	WET	ANGL		PRVTE	E W									000		00
No						*45 36 29.09 -122 51 48.69*	1		02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	33	M	NONE OR<25		028	000		02
															02	NONE 0	STRGHT											
																PRVTE	S N									000		00
																PSNGR CAR		01	DRVR	NONE	78	M	OR-Y OR<25		000	000		00
																		02	PSNG	NO<5	01	F			000	000		00
05168	N	N	N	N	N	5/3/2007		NW CORNELIUS PASS RD	INTER	5-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											03
COUNTY						Thu 11A	0	NW SKYLINE BLVD	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W E									000		00
No						*45 36 29.09 -122 51 48.70*	1		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	79	M	OR-Y OR<25		000	000		00

MULTNOMAH COUNTY

NW Skyline Blvd & NW Cornelius Pass Rd plus 200 feet

January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
															02	NONE 0 PRVTE	STRGHT N S									000		00
																PSNGR CAR		01	DRVR	NONE	52	F	OTH-Y N-RES		021	000		03
05794	N	N	N	N	N	6/3/2012		NW CORNELIUS PASS RD	INTER	5-LEG	N		N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY						Sun 9P	0	NW SKYLINE BLVD	CN		FLASHBCN-R		N	DRY	ANGL		PRVTE	N S									000		00
No						*45 36 29.09 -122 51 48.69*	1		03	0			N	DARK	INJ		PSNGR CAR		01	DRVR	INJC	34	M	OR-Y OR<25		000	000		00
																			02	PSNG	INJC	31	F			000	000		00
																			03	PSNG	INJB	17	F			000	000		00
																			04	PSNG	NO<5	02	M			000	000		00
																			05	PSNG	INJC	07	M			000	000		00
															02	NONE 0 PRVTE	STRGHT W E									015		00
																PSNGR CAR		01	DRVR	NONE	18	M	OR-Y OR<25		028	000		02
12472	N	N	N	N	N	11/15/2013		NW CORNELIUS PASS RD	INTER	CROSS	N		N	CLR	ANGL-OTH	01	NONE 0	STRGHT											03
COUNTY						Fri 12P	0	NW SKYLINE BLVD	CN		STOP SIGN		N	DRY	ANGL		PRVTE	N S									000		00
No						*45 36 29.09 -122 51 48.69*	1		03	0			N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	61	M	OR-Y OR<25		000	000		00
																			02	PSNG	INJC	49	F			000	000		00
															02	NONE 0 PRVTE	STRGHT W E									000		00
																PSNGR CAR		01	DRVR	INJC	35	M	OR-Y OR<25		021	000		03
10840	N	N	N	N	N	9/12/2007		NW CORNELIUS PASS RD	INTER	5-LEG	N		N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
NONE						Wed 8A	0	NW SKYLINE BLVD	CN		STOP SIGN		N	DRY	ANGL		PRVTE	S N									000		00
No						*45 36 29.09 -122 51 48.70*	1		04	0			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	21	F	OR-Y OR<25		000	000		00
															02	NONE 0 PRVTE	STRGHT W E									000		00
																PSNGR CAR		01	DRVR	NONE	57	M	OR-Y OR<25		028	000		02
06514	N	N	N	N	N	6/20/2012		NW CORNELIUS PASS RD	INTER	5-LEG	N		N	CLR	ANGL-OTH	01	NONE 0	STRGHT										058,053	02
CITY						Wed 5P	0	NW SKYLINE BLVD	CN		STOP SIGN		N	DRY	ANGL		PRVTE	S N									000	058,053	00
No						*45 36 29.09 -122 51 48.69*	1		04	0			N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	48	M	OR-Y OR>25		000	000		00
															02	NONE 0 PRVTE	STRGHT W E									015		00
																PSNGR CAR		01	DRVR	NONE	36	F	OR-Y OR<25		028	000		02

MULTNOMAH COUNTY

NW Skyline Blvd & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
11097	N	N	N			10/11/2012		NW CORNELIUS PASS RD	INTER	5-LEG	N	N	CLR	S-1TURN	01	NONE 0	STRGHT											07
NONE						Thu 4P	0	NW SKYLINE BLVD	CN		UNKNOWN	N	DRY	TURN		UNKN	S N										000		00
No						*45 36 29.09 -122 51 48.69*	1	1	04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y OR<25		042	000		07
															02	NONE 0	TURN-R											
																PRVTE	S E										000		00
																PSNGR CAR		01	DRVR	NONE	54	M	OTH-Y N-RES		000	000		00
83342	N	N	N			6/23/2013		NW CORNELIUS PASS RD	INTER	CROSS	N	N	RAIN	O-STRGHT	01	UNKN 0	STRGHT											05
NONE						Sun 12P	0	NW SKYLINE BLVD	CN		NONE	N	WET	SS-M		PRVTE	N S										000		00
No						*45 36 29.09 -122 51 48.69*	1	1	04	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	F	UNK UNK		039,044	000		05
															02	NONE 0	STRGHT											
																PRVTE	S N										000		00
																PSNGR CAR		01	DRVR	NONE	22	F	OR-Y OR>25		000	000		00
01617	N	N	N			2/15/2015		NW CORNELIUS PASS RD	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02,40
NONE						Sun 9A	0	NW SKYLINE BLVD	CN		STOP SIGN	N	DRY	ANGL		PRVTE	S N										000		00
No						*45 36 29.09 -122 51 48.69*	1	1	04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	61	F	OR-Y OR<25		000	000		00
															02	NONE 0	STRGHT											
																PRVTE	W E										000		00
																PSNGR CAR		01	DRVR	NONE	58	M	OR-Y OR<25		028	026		02,40
06306	N	N	N			6/17/2015		NW CORNELIUS PASS RD	INTER	CROSS	N	N	CLR	S-1TURN	01	NONE 0	TURN-R											14
NO RPT						Wed 12P	0	NW SKYLINE BLVD	CN		L-GRN-SIG	N	DRY	TURN		PRVTE	S E										000		00
No						*45 36 29.09 -122 51 48.69*	1	1	04	0		N	DAY	PDO		TRUCK		01	DRVR	NONE	56	M	OR-Y OR<25		003	000		14
															02	NONE 0	STRGHT											
																PRVTE	S N										000		00
																PSNGR CAR		01	DRVR	NONE	37	F	OR-Y OR<25		000	000		00
																		02	PSNG	NO<5	04	M			000	000		00
06569	Y	N	N			6/6/2016		NW SKYLINE BLVD	CURVE		N	Y	CLR	FIX OBJ	01	NONE 9	STRGHT										062	01
NO RPT						Mon 11P	1	NW CORNELIUS PASS RD	W	(NONE)	UNKNOWN	N	DRY	FIX		N/A	E W										000		00
No						*45 36 29.36 -122 51 50.23*	1	1	01	(02)		N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK UNK		000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	DRUG	ALC	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
12647	N	N	N	N	N	11/21/2013	MULTNOMAH	1 02		STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07,16
COUNTY						Thu 3P		MN 0		UN	(NONE)	NONE	N	DRY	REAR		PRVTE	E W									000		00
								13.20		03			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	50	M	OR-Y		026	025		07,16
No	45	39	5.40	-122	51	4.66		009200100S00			(04)													OR>25					
																02	NONE 0	STOP											
																	PRVTE	E W									011	013	00
																	PSNGR CAR		01	DRVR	NONE	54	M	OR-Y		000	000		00
																								OR>25					
																03	NONE 0	STOP											
																	PRVTE	E W									022		00
																	PSNGR CAR		01	DRVR	NONE	55	M	OR-Y		000	000		00
																								OR<25					
																			02	PSNG	INJC	53	F			000	000		00
80548	N	N	N			12/19/2016	MULTNOMAH	1 14		STRGHT		N	N	SNOW	S-STRGHT	01	NONE 9	STRGHT										124	06
NONE						Mon 6A		MN 0		UN	(NONE)	UNKNOWN	N	ICE	SS-O		N/A	W E									000		00
							PORTLAND UA	13.20		06			N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
No	45	39	5.39	-122	51	4.64		009200100S00			(04)													UNK					
																02	NONE 9	STRGHT											
																	N/A	W E									000		00
																	PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																								UNK					
80398	N	N	N			10/23/2007	MULTNOMAH	1 02		STRGHT		N	N	UNK	S-1STOP	01	NONE 0	STRGHT											07
NONE						Tue 7A		MN 0		E	(NONE)	UNKNOWN	N	UNK	REAR		PRVTE	S N									000		00
								13.20		04			N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	76	M	OR-Y		026	000		07
No	45	39	5.35	-122	51	4.60		009200100S00			(04)													OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																								UNK					
11154	N	N	N			10/22/2014	MULTNOMAH	1 02		STRGHT		N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											07
NONE						Wed 6P		MN 0		UN	(NONE)	TRF SIGNAL	N	WET	REAR		PRVTE	E W									000		00
								13.22		03			N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	M	OR-Y		026	000		07
No	45	39	5.97	-122	51	5.62		009200100S00			(04)													UNK					
																02	NONE 0	STOP											
																	PRVTE	E W									011		00
																	PSNGR CAR		01	DRVR	NONE	59	F	OTH-Y		000	000		00
																								N-RES					
05790	N	N	N			06/09/2014	MULTNOMAH	1 02		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											13
NONE						Mon 11A		MN 0		UN		TRF SIGNAL	N	DRY	SS-O		PRVTE	W E									000		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		045	000		13
No	45	39	5.97	-122	51	5.62		009200100S00																OR<25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																02	NONE 0 PRVTE	STOP W E									011		00
																	PSNGR CAR		01	DRVR	NONE	37	M	OTH-Y N-RES		000	000		00
05431 COUNTY	Y	N	N	N	N	05/27/2015 Wed 7P	MULTNOMAH	1 14 MN 0		INTER UN	3-LEG	N TRF SIGNAL	Y N	CLR DRY	FIX OBJ FIX	01	NONE 0 PRVTE	TURN-R W S										062 000	062	08,01,32 00
							PORTLAND UA	13.22		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	42	M	OR-Y OR<25		001,047,052	017		08,01,32
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00											02	PSNG	INJB	07	F			000	000		00
06963 NONE	N	N	N			07/05/2010 Mon 2P	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	CLR DRY	S-1STOP REAR	01	NONE 0 PRVTE	STRGHT N S										013 000		07 00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	66	F	OR-Y OR<25		026	000		07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00								02	NONE 0 PRVTE	STOP N S									011	013	00
																	PSNGR CAR		01	DRVR	NONE	41	M	OR-Y OR<25		000	000		00
																03	NONE 0 PRVTE	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	00	U	OR-Y UNK		000	000		00
09814 NONE	N	N	N			09/14/2010 Tue UNK	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	CLR DRY	S-1STOP REAR	01	UNKN 0 UNKN	STRGHT N S												07 00
								13.22		06	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	M	OR-Y UNK		026	000		07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00								02	NONE 0 PRVTE	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	00	M	UNK OR<25		000	000		00
04153 COUNTY	Y	N	N	N	N	04/24/2011 Sun 12P	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	CLR WET	S-1STOP REAR	01	NONE 0 UNKN	STRGHT N S												01,07 00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	33	M	OR-Y OR<25		047,026	000		01,07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00								02	NONE 0 PRVTE	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	40	M	OR-Y OR<25		000	000		00
																			02	PSNG	NO<5	03	F			000	000		00
																			03	PSNG	NO<5	03	M			000	000		00
02163 NONE	N	N	N			03/05/2013 Tue 6A	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	RAIN WET	S-STRGHT REAR	01	NONE 0 PRVTE	STRGHT N S												07 00
								13.22		06	0		N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	29	M	OR-Y OR<25		042	000		07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00																					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																02	NONE 0 PRVTE	STRGHT N S									000		00
																	PSNGR CAR		01	DRVR	NONE	47	M	OR-Y OR<25		000	000		00
06196 NONE	N	N	N			06/19/2014 Thu 6A	MULTNOMAH	1 02 MN 0 13.22		INTER N 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	NONE	29	M	OR-Y OR<25		026	000 000	013	07 00 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																02	NONE 0 PRVTE	STOP N S									011	013	00
																	PSNGR CAR		01	DRVR	INJC	44	M	OR-Y OR<25		000	000		00
																03	NONE 0 UNKN	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	00	M	UNK UNK		000	000		00
09776 STATE	N	Y	N	N	N	09/07/2012 Fri 8P	MULTNOMAH	1 02 MN 0 13.22		INTER E 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DUSK	S-1STOP REAR PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT E W	01	DRVR	NONE	32	M	OR-Y OR>25		043	000 000		07 00 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																02	NONE 0 PRVTE	STOP E W									011		00
																	PSNGR CAR		01	DRVR	NONE	50	M	OR-Y OR>25		000	000		00
08327 COUNTY	N	N	N	N	N	07/19/2016 Tue 5P	MULTNOMAH PORTLAND UA	1 14 MN 0 13.22		INTER SE 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT SE NW	01	DRVR	NONE	22	M	OR-Y OR<25		016,026	000 038		27,29 00 27,29
No	*45 39 5.97*		*-122 51 5.62*					009200100S00											02	PSNG	INJB	14	M			000	000		00
																			03	PSNG	INJB	10	M			000	000		00
																			04	PSNG	INJB	08	M			000	000		00
																02	NONE 0 PRVTE	STOP SE NW									011		00
																	PSNGR CAR		01	DRVR	INJC	46	F	OR-Y OR<25		000	000		00
00650 STATE	N	Y	N	N	N	01/19/2012 Thu 5P	MULTNOMAH	1 02 MN 0 13.22		INTER S 05	3-LEG 0	N TRF SIGNAL	Y N N	RAIN WET DUSK	FIX OBJ FIX PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	NONE	33	M	OTH-Y OR<25		051,020,080	000 000	043,013 043,013	33,04 00 33,04
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																02	NONE 0 PRVTE	TURN-R W S									000		00
																	PSNGR CAR		01	DRVR	NONE	45	M	OTH-Y N-RES		000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
06123	Y	N	N	N	N	06/20/2013	MULTNOMAH	1 02		INTER	3-LEG	N	Y	CLR	FIX OBJ	01	NONE 0	TURN-L										079	01,08
COUNTY						Thu 9P		MN 0		S		NONE	N	DRY	FIX		PRVTE	N E									000	079	00
								13.22		05	0		N	DUSK	INJ		MTRCYCLE		01	DRVR	INJB	55	M	OR-Y		047,080	017		01,08
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																OR>25					
06532	N	N	N	N	N	06/01/2007	MULTNOMAH	1 02		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
STATE						Fri 5P		MN 0		S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N									000		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	70	M	OTH-Y		026	000		07
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																N-RES					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	PSNGR CAR		01	DRVR	NONE	60	M	OR-Y		000	000		00
																								OR<25					
07678	Y	N	N	N	N	06/28/2007	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 1	STRGHT										124	01,07
STATE						Thu 3P		MN 0		S		TRF SIGNAL	N	WET	REAR		PRVTE	S N									000	124	00
								13.22		06	0		N	DAY	INJ		SEMI TOW		01	DRVR	NONE	48	M	OTH-Y		047,026	017		01,07
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																N-RES					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	BOBTAIL		01	DRVR	INJC	60	M	OTH-Y		000	000		00
																								N-RES					
11596	Y	N	N			09/30/2007	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										124	01,07
NONE						Sun 2P		MN 0		S		TRF SIGNAL	N	WET	REAR		PRVTE	S N									000	124	00
								13.22		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	60	F	OR-Y		047,026	017		01,02
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																OR>25					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	PSNGR CAR		01	DRVR	INJC	51	F	OR-Y		000	000		00
																								OR<25					
00313	N	N	N			01/02/2008	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											07
NONE						Wed 9A		MN 0		S		TRF SIGNAL	N	WET	REAR		PRVTE	S N									000		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		026	000		07
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N									013		00
																	PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		000	000		00
																								OR<25					
07131	N	N	N			06/25/2008	MULTNOMAH	1 02		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											27
NO RPT						Wed 7P		MN 0		S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N									088		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	27	F	OR-Y		026	088		27
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																OR<25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR	SURF	LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	47	M	OR-Y / OR<25		000	011 / 000		00 / 00
02395	N	N	N	N	N	03/15/2009 / Sun 6P	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	CLD / DRY / DAY	S-1STOP / REAR / PDO	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N	01	DRVR	NONE	34	M	OR-Y / OR>25		026	000 / 000		07 / 00 / 07
COUNTY																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	29	F	OR-Y / OR>25		000	011 / 000		00 / 00
05537	Y	N	N	N	N	05/28/2010 / Fri 12P	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	RAIN / WET / DAY	S-1STOP / REAR / INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N	01	DRVR	NONE	45	M	OR-Y / OR<25		050,026	000 / 000		30,07 / 00 / 30,07
STATE																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	INJC	22	M	OR-Y / OR>25		000	011 / 000		00 / 00
14972	N	N	N			10/26/2010 / Tue 5P	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	CLD / WET / DAY	S-1STOP / REAR / INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N	01	DRVR	NONE	49	F	OR-Y / OR<25		026	000 / 000	013	07 / 00 / 07
NO RPT																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	INJC	59	M	OR-Y / OR<25		000	011 / 000	013	00 / 00
																			03	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	38	M	OR-Y / OR>25		000	011 / 000		00 / 00
12566	Y	N	N			11/13/2010 / Sat 11A	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	RAIN / WET / DAY	ANGL-STP / TURN / INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / W E	01	DRVR	NONE	52	M	OR-Y / OR<25		050,020,080	000 / 017	013	30,04 / 00 / 30,04
COUNTY																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	39	M	OR-Y / OR<25		000	011 / 000	013	00 / 00
																						02	PSNG	NO<5	03	M			000	000		00
																						03	PSNG	NO<5	01	M			000	000		00
																						04	PSNG	INJC	31	F			000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS / RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																	03	NONE 0 PRVTE	STOP S N									011		00
																		PSNGR CAR		01	DRVR	NONE	37	M	OR-Y OR<25		000	000		00
13490 STATE	Y	N	N	N	N	12/12/2011 Mon 11A	MULTNOMAH	1 MN 0 13.22	02	NW CORNELIUS PASS RD LOWER COL RIVER HY	INTER W 05	3-LEG 0	N TRF SIGNAL	Y N	CLR ICE DAY	FIX OBJ FIX INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-L S W	01	DRVR	INJC	38	F	OR-Y OR<25		047,080	000 000	124,043 124,043	01 00 01
No	*45 39 5.97*		*-122 51 5.62*					009200100S00		1																			
14719 NO RPT	Y	N	N			11/28/2007 Wed 2P	MULTNOMAH	1 MN 0 13.22	02		INTER W 06	3-LEG 0	N TRF SIGNAL	N N	RAIN WET DAY	ANGL-STP TURN INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-L S W	01	DRVR	NONE	59	F	OR-Y OR>25		047,080	000 017		01,10 00 01,10
No	*45 39 5.99*		*-122 51 5.62*					009200100S00												02	PSNG	INJB	16	F			000	000		00
																	02	NONE 0 PRVTE	STOP W E									011		00
																		BOBTAIL		01	DRVR	NONE	24	M	OR-Y OR>25		000	000		00
08123 NONE	N	N	N			08/02/2010 Mon 6P	MULTNOMAH	1 MN 0 13.22	02		INTER W 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	00	F	OR-Y OR<25		026	000 000		07 00 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																	02	NONE 0 PRVTE	STOP W E									012		00
																		PSNGR CAR		01	DRVR	NONE	28	M	OR-Y OR<25		000	000		00
80024 NONE	N	N	N			01/22/2012 Sun 2P	MULTNOMAH	1 MN 0 13.22	02		INTER W 06	3-LEG 0	N NONE	N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	23	M	OR-Y OR>25		026	001 000		07,22 22 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																	02	NONE 0 PRVTE	STOP W E									013		00
																		PSNGR CAR		01	DRVR	INJC	48	F	OR-Y OR>25		000	000		00
80401 NONE	N	N	N			11/02/2015 Mon 6A	MULTNOMAH PORTLAND UA	1 MN 0 13.22	14		INTER W 06	3-LEG 0	N TRF SIGNAL	N N	RAIN WET DAWN	S-1STOP REAR PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	30	M	OR-Y OR<25		026	000 000		29 00 29
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																	02	NONE 0 PRVTE	STOP W E									011		00
																		PSNGR CAR		01	DRVR	NONE	00	F	UNK OR>25		000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUG	SCH	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
10275	N	N	N			08/30/2016	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLD	S-1STOP	01	NONE 0	STRGHT										29
STATE						Tue 7A		MN 0		NW CORNELIUS PASS RD	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W E									000	00
							PORTLAND UA	13.22		LOWER COL RIVER HY	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	24	F	OR-Y		026	000	29
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00		1															OR<25				
																	02	NONE 0	STOP									011	00
																		PRVTE	W E										
																		PSNGR CAR		01	DRVR	NONE	45	M	OR-Y		000	000	00
																									OR<25				
02246	N	N	N	N	N	03/05/2014	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT										04
STATE						Wed 7A		MN 0		NW CORNELIUS PASS RD	CN		TRF SIGNAL	N	WET	TURN		PRVTE	N S									000	00
								13.22		LOWER COL RIVER HY	01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	20	M	OR-Y		020,004	000	04
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00		1															OR<25				
																	02	NONE 0	TURN-L									000	00
																		PRVTE	S W										
																		PSNGR CAR		01	DRVR	NONE	55	M	OR-Y		000	000	00
																									OR<25				
80389	N	N	N			11/04/2014	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLR	S-OTHER	01	NONE 0	TURN-L										08
NONE						Tue 8P		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	S W									000	00
								13.22			01	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		002	000	08
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00																	UNK				
																	02	NONE 0	TURN-L									000	00
																		PRVTE	S W										
																		PSNGR CAR		01	DRVR	NONE	68	F	OR-Y		000	000	00
																									OR<25				
03723	N	N	N			03/31/2015	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										29
NONE						Tue 6A		MN 0			CN		TRF SIGNAL	N	DRY	REAR		PRVTE	W E									000	00
							PORTLAND UA	13.22			01	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	19	M	OR-Y		026	000	29
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00																	OR>25				
																	02	NONE 0	STOP									011	00
																		PRVTE	W E										
																		PSNGR CAR		01	DRVR	INJC	52	F	OR-Y		000	000	00
																									OR>25				
																				02	PSNG	INJC	52	M			000	000	00
02156	N	N	N			02/25/2008	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
NONE						Mon 8P		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N S									000	00
								13.22			03	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	55	F	OR-Y		020	000	04
No	*45 39*	*5.99*	*-122 51*	*5.62*				009200100S00																	OR>25				
																	02	NONE 0	TURN-L									000	00
																		PRVTE	W N										
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000	00
																									UNK				

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALCOHL	DRUGS	SCHL WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS / RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02458	Y	N	N	N	03/01/2008	MULTNOMAH	1	02		INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT									000		30,04
STATE					Sat 10A		MN 0			CN		TRF SIGNAL	N	WET	TURN		PRVTE	N S									000		00
							13.22			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	42	M	OR-Y		050,020	000		30,02
No	*45 39 5.99*				*-122 51 5.62*		009200100S00																	OR>25					
																02	NONE 0	TURN-L											
																	PRVTE	W N									000		00
																	PSNGR CAR		01	DRVR	NONE	27	M	OR-Y		000	000		00
																								OR>25					
03158	N	N	N	N	03/18/2008	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 1	STRGHT										010,021	04
COUNTY					Tue 6P		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N S									000	010,021	00
							13.22			03	0		N	DUSK	FAT		PSNGR CAR		01	DRVR	NONE	68	M	OR-Y		020	000		02
No	*45 39 5.99*				*-122 51 5.62*		009200100S00																	OR>25					
																02	NONE 0	TURN-L											
																	PRVTE	W N									000		00
																	PSNGR CAR		01	DRVR	KILL	62	M	OR-Y		000	000		00
																								OR>25					
																03	NONE 0	STOP											
																	PRVTE	N S									011	081	00
																	PSNGR CAR		01	DRVR	NONE	53	M	OR-Y		000	000	081	00
																								OR<25					
11523	Y	N	N		10/20/2012	MULTNOMAH	1	02		INTER	3-LEG	N	N	RAIN	OVERTURN	01	NONE 0	STRGHT										124	01
STATE					Sat 9P		MN 0		NW CORNELIUS PASS RD	CN		TRF SIGNAL	N	WET	NCOL		PRVTE	W E									000	124	00
							13.22		LOWER COL RIVER HY	03	0		N	DARK	INJ		MTRCYCLE		01	DRVR	INJC	66	M	OR-Y		047	000		01
No	*45 39 5.97*				*-122 51 5.62*		009200100S00		1															OR<25					
03854	N	N	N	N	04/17/2014	MULTNOMAH	1	02		INTER	3-LEG	N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT											07
STATE					Thu 6A		MN 0			CN		TRF SIGNAL	N	WET	REAR		PRVTE	W E									000		00
							13.22			03	0		N	DAWN	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		042,043	000		07
No	*45 39 5.97*				*-122 51 5.62*		009200100S00																	OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	W E									000		00
																	PSNGR CAR		01	DRVR	INJC	22	M	OR-Y		000	000		00
																								OR<25					
00949	N	N	N	N	01/28/2015	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLD	ANGL-OTH	01	NONE 0	TURN-R											02
STATE					Wed 11A		MN 0			CN		TRF SIGNAL	N	WET	TURN		PRVTE	W S									000		00
						PORTLAND UA	13.22			03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	57	F	OR-Y		028	000		02
No	*45 39 5.97*				*-122 51 5.62*		009200100S00																	OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N S									000		00
																	PSNGR CAR		01	DRVR	NONE	74	M	OR-Y		000	000		00
																								OR<25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUG	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
13321	N	N	N			11/04/2016	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT										
NO RPT						Fri 5P		MN 0		NW CORNELIUS PASS RD	CN		TRF SIGNAL	N	DRY	TURN		N/A	N S								000	00
							PORTLAND UA	13.22		LOWER COL RIVER HY	04	0		N	DUSK	PDO		MTRCYCLE		01	DRVR	NONE	00	U	UNK		000	000	00
No	*45 39*		*5.97*	*-122 51*		*5.62*		009200100S00		1															UNK				
																	02	NONE 9	TURN-L										
																		N/A	W N									013	00
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000	00
																									UNK				
13348	N	N	N			11/05/2016	MULTNOMAH	1	14		INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										
COUNTY						Sat 10A		MN 0			CN		TRF SIGNAL	N	WET	TURN		PRVTE	W E								000	00
							PORTLAND UA	13.22			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	17	F	OR-Y		020	000	04
No	*45 39*		*5.97*	*-122 51*		*5.62*		009200100S00																	OR<25				
																	02	NONE 0	TURN-L										
																		PRVTE	S W									000	00
																		PSNGR CAR		01	DRVR	INJC	66	F	OR-Y		000	000	00
																									OR<25				
																				02	PSNG	INJC	67	M			000	000	00
01198	Y	N	N	N	N	02/03/2009	MULTNOMAH	1	02		STRGHT		N	N	CLR	S-STRGHT	01	NONE 0	STRGHT										
COUNTY						Tue 1P		MN 0			UN	(NONE)	NONE	N	DRY	REAR		PRVTE	SE NW								000	00
								13.23			03			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	29	M	OR-Y		042	000	01
No	*45 39*		*6.40*	*-122 51*		*6.22*		009200100S00				(02)													OR<25				
																				02	PSNG	INJC	00	F			000	000	00
																	02	NONE 0	STRGHT										
																		PRVTE	SE NW									000	00
																		PSNGR CAR		01	DRVR	NONE	44	M	OR-Y		000	000	00
																									OR<25				
80050	N	N	N	N	N	02/21/2012	MULTNOMAH	1	02		STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										
STATE						Tue 6P		MN 0			UN	(NONE)	L-TURN REF	N	DRY	REAR		PRVTE	E W								000	00
								13.23			05			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	66	F	OR-Y		043	000	07
No	*45 39*		*6.40*	*-122 51*		*6.22*		009200100S00				(05)													OR<25				
																	02	NONE 0	STOP										
																		PRVTE	E W									012	00
																		PSNGR CAR		01	DRVR	NONE	38	M	OR-Y		000	000	00
																									OR>25				
11971	N	N	N			10/30/2012	MULTNOMAH	1	02		STRGHT		Y	N	RAIN	S-1STOP	01	NONE 0	STRGHT										
NONE						Tue 7A		MN 0			UN	(NONE)	UNKNOWN	N	WET	REAR		UNKN	N S								000	00
								13.24			03	0		N	DAWN	INJ		PSNGR CAR		01	DRVR	NONE	00	M	UNK		026	000	07
No	*45 39*		*6.84*	*-122 51*		*6.82*		009200100S00				(04)													UNK				
																	02	NONE 0	STOP										
																		PRVTE	N S									011	00
																		PSNGR CAR		01	DRVR	INJB	47	M	OR-Y		000	000	00
																									OR<25				

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALCHL	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
01857	Y	N	N	N	N	02/25/2013	MULTNOMAH	1 02		STRGHT		N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT										01
COUNTY						Mon 9A		MN 0		UN	(NONE)	NONE	N	WET	REAR		PRVTE	W E									000	00
								13.24		04			N	DAY	PDO		SEMI TOW		01	DRVR	NONE	37	M	OR-Y		047,080	017	01
No	*45 39*	*6.84*	*-122 51*	*6.82*				009200100S00			(04)													OR<25				
																02	NONE 0	STRGHT										
																	PRVTE	W E									000	00
																	PSNGR CAR		01	DRVR	NONE	61	M	OR-Y		000	000	00
																								OR<25				
08340	Y	N	N			07/20/2007	MULTNOMAH	1 02		STRGHT		Y	N	RAIN	S-1STOP	01	NONE 0	STRGHT										01
NO RPT						Fri 4P		MN 0		UN	(NONE)	UNKNOWN	N	WET	REAR		PRVTE	N S									000	00
								13.24		05			N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	17	F	OR-Y		047,026	000	01
No	*45 39*	*6.85*	*-122 51*	*6.82*				009200100S00			(04)													OR<25				
																02	NONE 0	STOP										
																	PRVTE	N S									011	00
																	PSNGR CAR		01	DRVR	NONE	33	M	OR-Y		000	000	00
																								OR<25				
11591	N	N	N	N	N	10/28/2011	MULTNOMAH	1 02		STRGHT		Y	N	FOG	S-1STOP	01	NONE 0	STRGHT										07
STATE						Fri 7A		MN 0		UN	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	N S									000	00
								13.24		05	0		N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	20	M	NONE		026	000	07
No	*45 39*	*6.84*	*-122 51*	*6.82*				009200100S00			(04)													OR<25				
																02	NONE 0	STOP										
																	PRVTE	N S									011	00
																	PSNGR CAR		01	DRVR	NONE	29	F	OR-Y		000	000	00
																								OR<25				

MULTNOMAH COUNTY

US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet

January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPE	ALC	DRG	SUS	WCH	ORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02511	N	N	N				3/15/2013		LOWER COL RIVER HY	INTER	3-LEG	N	N	CLR	S-1STOP	01	UNKN 0	STRGHT											07
NONE							Fri 1P	0	NW CORNELIUS PASS RD	S		TRF SIGNAL	N	DRY	REAR		UNKN	S N										000		00
No							*45 39 5.97 -122 51 5.62*	1	1	06	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	F	UNK		026	000		07
																									UNK					
																02	NONE 0	STOP											
																	PRVTE	S N										011		00
																	PSNGR CAR		01	DRVR	NONE	30	M	OR-Y		000	000		00
																									OR<25					
01035	Y	N	N	N	N		1/26/2008		NW CORNELIUS PASS RD	CURVE		N	Y	SLT	FIX OBJ	01	NONE 0	STRGHT											124,079,010	01,10
COUNTY							Sat 9A	2	LOWER COL RIVER HY	S	(NONE)	NONE	N	ICE	FIX		PRVTE	N S										000	124,079,010	00
No							*45 37 26.04 -122 51 50.69*	1	1	01			N	DAY	INJ		PSNGR CAR		01	DRVR	INJA	56	F	OR-Y		047,083,081	017		01,10
											(02)														OR<25					
																			02	PSNG	INJC	36	M			000	000		00
05495	N	N	N				5/28/2010		NW CORNELIUS PASS RD	STRGHT		N	N	RAIN	S-1STOP	01	NONE 9	STRGHT											06
NONE							Fri 5P	2	LOWER COL RIVER HY	S	(NONE)	UNKNOWN	N	WET	REAR		PRVTE	S N										000		00
No							*45 39 5.16 -122 51 6.37*	1	1	03			N	DAY	PDO		SEMI TOW		01	DRVR	NONE	33	M	OR-Y		032,038,026	000		06
											(02)														OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N										011		00
																	PSNGR CAR		01	DRVR	NONE	63	F	OR-Y		000	000		00
																									OR<25					
03256	N	N	N	N	N		3/31/2012		NW CORNELIUS PASS RD	STRGHT		N	N	CLR	S-1STOP	01	UNKN 9	STRGHT											07
COUNTY							Sat 9P	2	LOWER COL RIVER HY	S	(NONE)	NONE	N	DRY	REAR		UNKN	S N										000		00
No							*45 39 5.19 -122 51 6.35*	1	1	03			N	DARK	PDO		UNKNOWN		01	DRVR	NONE	00	U	UNK		026	000		07
											(02)														UNK					
																02	NONE 0	STOP											
																	PRVTE	S N										011		00
																	PSNGR CAR		01	DRVR	NONE	49	M	OR-Y		000	000		00
																									OR<25					
03021	N	N	N	N	N		3/26/2012		NW CORNELIUS PASS RD	STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07
NO RPT							Mon 11A	4	LOWER COL RIVER HY	S	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	S N										000		00
No							*45 39 4.35 -122 51 7.14*	1	1	03			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	48	M	OR-Y		026	000		07
											(02)														OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N										011	013	00
																	PSNGR CAR		01	DRVR	INJB	61	M	OR-Y		000	000		00
																									OR<25					
																03	NONE 0	STOP											
																	PRVTE	S N										022	013	00
																	PSNGR CAR		01	DRVR	NONE	25	F	OR-Y		000	000		00
																									OR>25					

MULTNOMAH COUNTY

US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPED	ALC	DRUG	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
															04	NONE 0	STOP											
																PRVTE	S N										011		00
																PSNGR CAR		01	DRVR	NONE	00	F	UNK		000	000		00
																							UNK					
02585	N	N	N	N	N	3/16/2013		NW CORNELIUS PASS RD	INTER	3-LEG	N	N	CLD	S-1STOP	01	NONE 1	STRGHT											07
STATE						Sat 11A	0	LOWER COL RIVER HY	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N										000		00
No						*45 39 5.97 -122 51 5.62*	1		06	0		N	DAY	PDO		SEMI TOW		01	DRVR	NONE	67	M	OR-Y		026	000		07
																							OR>25					
															02	NONE 0	STOP											
																PRVTE	S N										011		00
																PSNGR CAR		01	DRVR	NONE	49	M	OTH-Y		000	000		00
																							N-RES					
09866	N	N	N			9/23/2014		NW CORNELIUS PASS RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						Tue 1P	0	LOWER COL RIVER HY	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N										000		00
No						*45 39 5.97 -122 51 5.62*	1		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		026	000		07
																							OR>25					
															02	NONE 0	STOP											
																PRVTE	S N										011		00
																PSNGR CAR		01	DRVR	NONE	52	M	OR-Y		000	000		00
																							OR<25					
15002	N	N	N	N	N	12/12/2016		NW CORNELIUS PASS RD	STRGHT		N	Y	CLD	OVERTURN	01	NONE 9	STRGHT											17
COUNTY						Mon 4P	2	LOWER COL RIVER HY	W	(NONE)	UNKNOWN	N	DRY	NCOL		N/A	W E										006		00
No						*45 39 4.93 -122 51 6.59*	1		01			N	DUSK	PDO		SEMI TOW		01	DRVR	NONE	00	U	UNK		000	000		00
										(03)													UNK					
01290	N	N	N	N	N	2/2/2007		NW CORNELIUS PASS RD	CURVE		N	N	CLR	O-STRGHT	01	NONE 0	STRGHT											16,10
COUNTY						Fri 8P	2	LOWER COL RIVER HY	W	(NONE)	NONE	N	DRY	HEAD		PRVTE	S N										000		00
No						*45 39 5.19 -122 51 6.36*	1		03			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	74	M	OR-Y		016,080	025		16,10
										(02)													OR<25					
															02	NONE 0	STRGHT											
																PRVTE	N S										000		00
																PSNGR CAR		01	DRVR	NONE	56	M	OR-Y		000	000		00
																							OR>25					
03285	N	N	N			4/2/2009		NW CORNELIUS PASS RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						Thu 12P	0	LOWER COL RIVER HY	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W E										000		00
No						*45 39 5.99 -122 51 5.62*	1		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	43	M	OR-Y		026	000		07
																							OR>25					
															02	NONE 0	STOP											
																PRVTE	W E										011		00
																PSNGR CAR		01	DRVR	NONE	71	M	OR-Y		000	000		00
																							OR<25					

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY
134	TORRENTIAL	TORRENTIAL RAIN (EXCEPTIONALLY HEAVY RAIN)

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE
9	NONE	PARTICIPANT UNINJURED, OVER THE AGE OF 4

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY
9	PARKNG	PARKING MANEUVER

NON-MOTORIST LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING
095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
00	PDO	NOT COLLECTED FOR PDO CRASHES
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

US 30 Lower Columbia River Hwy (092) & NW McNamee Rd plus 200 feet
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2013														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	0	1	0	0	0
2013 TOTAL	0	0	1	1	0	0	0	0	1	0	1	0	0	0
YEAR: 2010														
SIDESWIPE - OVERTAKING	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2010 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	0
FINAL TOTAL	0	0	2	2	0	0	0	0	2	0	2	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

092 LOWER COLUMBIA RIVER

US 30 Lower Columbia River Hwy (092) & NW McNamee Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL BUS	WORK ZONE	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
10289	Y	N	N	N	N	09/28/2013	MULTNOMAH	1 02		STRGHT		N	N	RAIN	OTH OBJ	01	NONE 0	STRGHT										062	01
COUNTY						Sat 7P		MN 0		UN	(NONE)	NONE	N	WET	FIX		PRVTE	S N									000	062	00
								13.02		04	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	61	F	OR-Y		047	000		01
No						*45 38 59.16 -122 50 55.10*		009200100S00			(04)													OR<25					
13910	N	N	N			12/13/2010	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT											13
NONE						Mon 5P		MN 0		CN		UNKNOWN	N	WET	SS-O		PRVTE	S N									000		00
								13.03		04	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		045	000		13
No						*45 38 59.51 -122 50 55.63*		009200100S00																OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	S N									000		00
																	PSNGR CAR		01	DRVR	NONE	38	F	OR-Y		000	000		00
																								OR>25					

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

US 30 Lower Columbia River Hwy (092) & NW McNamee Rd plus 200 feet
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2013														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	0	1	0	0	0
2013 TOTAL	0	0	1	1	0	0	0	0	1	0	1	0	0	0
YEAR: 2010														
SIDESWIPE - OVERTAKING	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2010 TOTAL	0	0	1	1	0	0	0	0	1	0	1	1	0	0
FINAL TOTAL	0	0	2	2	0	0	0	0	2	0	2	1	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2016														
NON-COLLISION	0	0	1	1	0	0	1	1	0	0	1	0	0	1
REAR-END	0	2	0	2	0	5	0	2	0	2	0	2	0	0
SIDESWIPE - OVERTAKING	0	0	1	1	0	0	0	0	1	0	1	0	0	0
TURNING MOVEMENTS	0	1	1	2	0	3	0	1	1	1	1	2	0	0
2016 TOTAL	0	3	3	6	0	8	1	4	2	3	3	4	0	1
YEAR: 2015														
FIXED / OTHER OBJECT	0	1	0	1	0	2	0	1	0	1	0	1	0	1
REAR-END	0	1	1	2	0	2	0	1	1	0	2	2	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	0	1	1	0	1	0	0
2015 TOTAL	0	2	2	4	0	4	0	2	2	2	2	4	0	1
YEAR: 2014														
REAR-END	0	2	2	4	0	2	0	2	2	3	1	3	0	0
SIDESWIPE - OVERTAKING	0	0	1	1	0	0	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	2	2	0	0	0	1	1	1	1	2	0	0
2014 TOTAL	0	2	5	7	0	2	0	4	3	5	2	6	0	0
YEAR: 2013														
FIXED / OTHER OBJECT	0	1	0	1	0	1	0	1	0	0	1	1	0	1
REAR-END	0	1	4	5	0	1	2	3	2	4	1	3	0	0
2013 TOTAL	0	2	4	6	0	2	2	4	2	4	2	4	0	1
YEAR: 2012														
FIXED / OTHER OBJECT	0	0	1	1	0	0	0	0	1	0	1	1	0	1
NON-COLLISION	0	1	0	1	0	1	0	0	1	0	1	1	0	0
REAR-END	0	3	3	6	0	3	0	5	1	2	4	2	1	0
2012 TOTAL	0	4	4	8	0	4	0	5	3	2	6	4	1	1
YEAR: 2011														
FIXED / OTHER OBJECT	0	1	0	1	0	1	0	0	1	1	0	1	0	1
REAR-END	0	0	2	2	0	0	0	1	1	1	1	1	1	0
2011 TOTAL	0	1	2	3	0	1	0	1	2	2	1	2	1	1
YEAR: 2010														
REAR-END	0	2	4	6	0	2	1	3	3	6	0	5	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	0	1	1	0	1	0	0
2010 TOTAL	0	3	4	7	0	3	1	3	4	7	0	6	0	0
YEAR: 2009														
REAR-END	0	1	2	3	0	1	0	3	0	3	0	2	0	0
2009 TOTAL	0	1	2	3	0	1	0	3	0	3	0	2	0	0
YEAR: 2008														
FIXED / OTHER OBJECT	0	1	0	1	0	2	0	0	1	1	0	0	0	1
REAR-END	0	0	2	2	0	0	0	1	1	2	0	2	0	0
TURNING MOVEMENTS	1	1	1	3	1	1	0	2	1	1	2	3	0	0
2008 TOTAL	1	2	3	6	1	3	0	3	3	4	2	5	0	1

TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2007														
HEAD-ON	0	0	1	1	0	0	0	1	0	0	1	0	0	0
REAR-END	0	3	2	5	0	3	2	1	3	4	1	3	1	0
TURNING MOVEMENTS	0	1	0	1	0	1	1	0	1	1	0	1	0	0
2007 TOTAL	0	4	3	7	0	4	3	2	4	5	2	4	1	0
FINAL TOTAL	1	24	32	57	1	32	7	31	25	37	20	41	3	6

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092 LOWER COLUMBIA RIVER

US 30 Lower Columbia River Hwy (092) & NW McNamee Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALCOHOL	DRUGS	SCHL BUS	WORK ZONE	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
10289	Y	N	N	N	N	09/28/2013	MULTNOMAH	1 02		STRGHT		N	N	RAIN	OTH OBJ	01	NONE 0	STRGHT										062	01
COUNTY						Sat 7P		MN 0		UN	(NONE)	NONE	N	WET	FIX		PRVTE	S N									000	062	00
								13.02		04	0		N	DUSK	PDO		PSNGR CAR		01	DRVR	NONE	61	F	OR-Y		047	000		01
No						*45 38 59.16 -122 50 55.10*		009200100S00			(04)													OR<25					
13910	N	N	N			12/13/2010	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT											13
NONE						Mon 5P		MN 0		CN		UNKNOWN	N	WET	SS-O		PRVTE	S N									000		00
								13.03		04	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		045	000		13
No						*45 38 59.51 -122 50 55.63*		009200100S00																OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	S N									000		00
																	PSNGR CAR		01	DRVR	NONE	38	F	OR-Y		000	000		00
																								OR>25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	DRUG	ALC	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
12647	N	N	N	N	N	11/21/2013	MULTNOMAH	1 02		STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07,16
COUNTY						Thu 3P		MN 0		UN	(NONE)	NONE	N	DRY	REAR		PRVTE	E W									000		00
								13.20		03			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	50	M	OR-Y		026	025		07,16
No	45	39	5.40	-122	51	4.66		009200100S00			(04)													OR>25					
																02	NONE 0	STOP											
																	PRVTE	E W									011	013	00
																	PSNGR CAR		01	DRVR	NONE	54	M	OR-Y		000	000		00
																								OR>25					
																03	NONE 0	STOP											
																	PRVTE	E W									022		00
																	PSNGR CAR		01	DRVR	NONE	55	M	OR-Y		000	000		00
																								OR<25					
																			02	PSNG	INJC	53	F			000	000		00
80548	N	N	N			12/19/2016	MULTNOMAH	1 14		STRGHT		N	N	SNOW	S-STRGHT	01	NONE 9	STRGHT										124	06
NONE						Mon 6A		MN 0		UN	(NONE)	UNKNOWN	N	ICE	SS-O		N/A	W E									000		00
							PORTLAND UA	13.20		06			N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
No	45	39	5.39	-122	51	4.64		009200100S00			(04)													UNK					
																02	NONE 9	STRGHT											
																	N/A	W E									000		00
																	PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																								UNK					
80398	N	N	N			10/23/2007	MULTNOMAH	1 02		STRGHT		N	N	UNK	S-1STOP	01	NONE 0	STRGHT											07
NONE						Tue 7A		MN 0		E	(NONE)	UNKNOWN	N	UNK	REAR		PRVTE	S N									000		00
								13.20		04			N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	76	M	OR-Y		026	000		07
No	45	39	5.35	-122	51	4.60		009200100S00			(04)													OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000		00
																								UNK					
11154	N	N	N			10/22/2014	MULTNOMAH	1 02		STRGHT		N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											07
NONE						Wed 6P		MN 0		UN	(NONE)	TRF SIGNAL	N	WET	REAR		PRVTE	E W									000		00
								13.22		03			N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	M	OR-Y		026	000		07
No	45	39	5.97	-122	51	5.62		009200100S00			(04)													UNK					
																02	NONE 0	STOP											
																	PRVTE	E W									011		00
																	PSNGR CAR		01	DRVR	NONE	59	F	OTH-Y		000	000		00
																								N-RES					
05790	N	N	N			06/09/2014	MULTNOMAH	1 02		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											13
NONE						Mon 11A		MN 0		UN		TRF SIGNAL	N	DRY	SS-O		PRVTE	W E									000		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		045	000		13
No	45	39	5.97	-122	51	5.62		009200100S00																OR<25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																02	NONE 0 PRVTE	STOP W E									011		00
																	PSNGR CAR		01	DRVR	NONE	37	M	OTH-Y N-RES		000	000		00
05431 COUNTY	Y	N	N	N	N	05/27/2015 Wed 7P	MULTNOMAH	1 14 MN 0		INTER UN	3-LEG	N TRF SIGNAL	Y N	CLR DRY	FIX OBJ FIX	01	NONE 0 PRVTE	TURN-R W S										062 000	062	08,01,32 00
							PORTLAND UA	13.22		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	42	M	OR-Y OR<25		001,047,052	017		08,01,32
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00											02	PSNG	INJB	07	F			000	000		00
06963 NONE	N	N	N			07/05/2010 Mon 2P	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	CLR DRY	S-1STOP REAR	01	NONE 0 PRVTE	STRGHT N S										013 000		07 00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	66	F	OR-Y OR<25		026	000		07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00								02	NONE 0 PRVTE	STOP N S									011	013	00
																	PSNGR CAR		01	DRVR	NONE	41	M	OR-Y OR<25		000	000		00
																03	NONE 0 PRVTE	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	00	U	OR-Y UNK		000	000		00
09814 NONE	N	N	N			09/14/2010 Tue UNK	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	CLR DRY	S-1STOP REAR	01	UNKN 0 UNKN	STRGHT N S												07 00
								13.22		06	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	M	OR-Y UNK		026	000		07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00								02	NONE 0 PRVTE	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	00	M	UNK OR<25		000	000		00
04153 COUNTY	Y	N	N	N	N	04/24/2011 Sun 12P	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	CLR WET	S-1STOP REAR	01	NONE 0 UNKN	STRGHT N S												01,07 00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	33	M	OR-Y OR<25		047,026	000		01,07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00								02	NONE 0 PRVTE	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	40	M	OR-Y OR<25		000	000		00
																			02	PSNG	NO<5	03	F			000	000		00
																			03	PSNG	NO<5	03	M			000	000		00
02163 NONE	N	N	N			03/05/2013 Tue 6A	MULTNOMAH	1 02 MN 0		INTER N	3-LEG	N TRF SIGNAL	N N	RAIN WET	S-STRGHT REAR	01	NONE 0 PRVTE	STRGHT N S												07 00
								13.22		06	0		N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	29	M	OR-Y OR<25		042	000		07
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00																					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																02	NONE 0 PRVTE	STRGHT N S									000		00
																	PSNGR CAR		01	DRVR	NONE	47	M	OR-Y OR<25		000	000		00
06196 NONE	N	N	N			06/19/2014 Thu 6A	MULTNOMAH	1 02 MN 0 13.22		INTER N 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	NONE	29	M	OR-Y OR<25		026	000 000	013	07 00 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																02	NONE 0 PRVTE	STOP N S									011	013	00
																	PSNGR CAR		01	DRVR	INJC	44	M	OR-Y OR<25		000	000		00
																03	NONE 0 UNKN	STOP N S									011		00
																	PSNGR CAR		01	DRVR	NONE	00	M	UNK UNK		000	000		00
09776 STATE	N	Y	N	N	N	09/07/2012 Fri 8P	MULTNOMAH	1 02 MN 0 13.22		INTER E 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DUSK	S-1STOP REAR PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT E W	01	DRVR	NONE	32	M	OR-Y OR>25		043	000 000		07 00 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																02	NONE 0 PRVTE	STOP E W									011		00
																	PSNGR CAR		01	DRVR	NONE	50	M	OR-Y OR>25		000	000		00
08327 COUNTY	N	N	N	N	N	07/19/2016 Tue 5P	MULTNOMAH PORTLAND UA	1 14 MN 0 13.22		INTER SE 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT SE NW	01	DRVR	NONE	22	M	OR-Y OR<25		016,026	000 038		27,29 00 27,29
No	*45 39 5.97*		*-122 51 5.62*					009200100S00											02	PSNG	INJB	14	M			000	000		00
																			03	PSNG	INJB	10	M			000	000		00
																			04	PSNG	INJB	08	M			000	000		00
																02	NONE 0 PRVTE	STOP SE NW									011		00
																	PSNGR CAR		01	DRVR	INJC	46	F	OR-Y OR<25		000	000		00
00650 STATE	N	Y	N	N	N	01/19/2012 Thu 5P	MULTNOMAH	1 02 MN 0 13.22		INTER S 05	3-LEG 0	N TRF SIGNAL	Y N N	RAIN WET DUSK	FIX OBJ FIX PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT N S	01	DRVR	NONE	33	M	OTH-Y OR<25		051,020,080	000 000	043,013 043,013	33,04 00 33,04
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																02	NONE 0 PRVTE	TURN-R W S									000		00
																	PSNGR CAR		01	DRVR	NONE	45	M	OTH-Y N-RES		000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / LAT/LONG	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
06123	Y	N	N	N	N	06/20/2013	MULTNOMAH	1 02		INTER	3-LEG	N	Y	CLR	FIX OBJ	01	NONE 0	TURN-L										079	01,08
COUNTY						Thu 9P		MN 0		S		NONE	N	DRY	FIX		PRVTE	N E									000	079	00
								13.22		05	0		N	DUSK	INJ		MTRCYCLE		01	DRVR	INJB	55	M	OR-Y		047,080	017		01,08
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																OR>25					
06532	N	N	N	N	N	06/01/2007	MULTNOMAH	1 02		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
STATE						Fri 5P		MN 0		S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N									000		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	70	M	OTH-Y		026	000		07
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																N-RES					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	PSNGR CAR		01	DRVR	NONE	60	M	OR-Y		000	000		00
																								OR<25					
07678	Y	N	N	N	N	06/28/2007	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 1	STRGHT										124	01,07
STATE						Thu 3P		MN 0		S		TRF SIGNAL	N	WET	REAR		PRVTE	S N									000	124	00
								13.22		06	0		N	DAY	INJ		SEMI TOW		01	DRVR	NONE	48	M	OTH-Y		047,026	017		01,07
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																N-RES					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	BOBTAIL		01	DRVR	INJC	60	M	OTH-Y		000	000		00
																								N-RES					
11596	Y	N	N			09/30/2007	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT										124	01,07
NONE						Sun 2P		MN 0		S		TRF SIGNAL	N	WET	REAR		PRVTE	S N									000	124	00
								13.22		06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	60	F	OR-Y		047,026	017		01,02
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																OR>25					
																02	NONE 0	STOP											
																	PRVTE	S N									011		00
																	PSNGR CAR		01	DRVR	INJC	51	F	OR-Y		000	000		00
																								OR<25					
00313	N	N	N			01/02/2008	MULTNOMAH	1 02		INTER	3-LEG	N	N	RAIN	S-1STOP	01	NONE 0	STRGHT											07
NONE						Wed 9A		MN 0		S		TRF SIGNAL	N	WET	REAR		PRVTE	S N									000		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	24	M	OR-Y		026	000		07
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N									013		00
																	PSNGR CAR		01	DRVR	NONE	00	M	OR-Y		000	000		00
																								OR<25					
07131	N	N	N			06/25/2008	MULTNOMAH	1 02		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											27
NO RPT						Wed 7P		MN 0		S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N									088		00
								13.22		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	27	F	OR-Y		026	088		27
No	*45 39 5.99*		*-122 51 5.62*					009200100S00																OR<25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR	SURF	LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	47	M	OR-Y / OR<25		000	011 / 000		00 / 00
02395	N	N	N	N	N	03/15/2009 / Sun 6P	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	CLD / DRY / DAY	S-1STOP / REAR / PDO	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N	01	DRVR	NONE	34	M	OR-Y / OR>25		026	000 / 000		07 / 00 / 07
COUNTY																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	29	F	OR-Y / OR>25		000	011 / 000		00 / 00
05537	Y	N	N	N	N	05/28/2010 / Fri 12P	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	RAIN / WET / DAY	S-1STOP / REAR / INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N	01	DRVR	NONE	45	M	OR-Y / OR<25		050,026	000 / 000		30,07 / 00 / 30,07
STATE																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	INJC	22	M	OR-Y / OR>25		000	011 / 000		00 / 00
14972	N	N	N			10/26/2010 / Tue 5P	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	CLD / WET / DAY	S-1STOP / REAR / INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / S N	01	DRVR	NONE	49	F	OR-Y / OR<25		026	000 / 000	013	07 / 00 / 07
NO RPT																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	INJC	59	M	OR-Y / OR<25		000	011 / 000	013	00 / 00
																			03	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	38	M	OR-Y / OR>25		000	011 / 000		00 / 00
12566	Y	N	N			11/13/2010 / Sat 11A	MULTNOMAH	1 / MN 0 / 13.22	02		INTER / S / 06	3-LEG / 0	N / TRF SIGNAL /	N	RAIN / WET / DAY	ANGL-STP / TURN / INJ	01	NONE 0 / PRVTE / PSNGR CAR	STRGHT / W E	01	DRVR	NONE	52	M	OR-Y / OR<25		050,020,080	000 / 017	013	30,04 / 00 / 30,04
COUNTY																																
No						*45 39 5.97 -122 51 5.62*		009200100S00																									
																			02	NONE 0 / PRVTE / PSNGR CAR	STOP / S N	01	DRVR	NONE	39	M	OR-Y / OR<25		000	011 / 000	013	00 / 00
																						02	PSNG	NO<5	03	M			000	000		00
																						03	PSNG	NO<5	01	M			000	000		00
																						04	PSNG	INJC	31	F			000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS / RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
																	03	NONE 0 PRVTE	STOP S N									011		00
																		PSNGR CAR		01	DRVR	NONE	37	M	OR-Y OR<25		000	000		00
13490 STATE	Y	N	N	N	N	12/12/2011 Mon 11A	MULTNOMAH	1 MN 0 13.22	02	NW CORNELIUS PASS RD LOWER COL RIVER HY	INTER W 05	3-LEG 0	N TRF SIGNAL	Y N	CLR ICE DAY	FIX OBJ FIX INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-L S W	01	DRVR	INJC	38	F	OR-Y OR<25		047,080	000 000	124,043 124,043	01 00 01
No	*45 39 5.97*		*-122 51 5.62*					009200100S00		1																			
14719 NO RPT	Y	N	N			11/28/2007 Wed 2P	MULTNOMAH	1 MN 0 13.22	02		INTER W 06	3-LEG 0	N TRF SIGNAL	N N	RAIN WET DAY	ANGL-STP TURN INJ	01	NONE 0 PRVTE PSNGR CAR	TURN-L S W	01	DRVR	NONE	59	F	OR-Y OR>25		047,080	000 017		01,10 00 01,10
No	*45 39 5.99*		*-122 51 5.62*					009200100S00												02	PSNG	INJB	16	F			000	000		00
																	02	NONE 0 PRVTE	STOP W E									011		00
																		BOBTAIL		01	DRVR	NONE	24	M	OR-Y OR>25		000	000		00
08123 NONE	N	N	N			08/02/2010 Mon 6P	MULTNOMAH	1 MN 0 13.22	02		INTER W 06	3-LEG 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	00	F	OR-Y OR<25		026	000 000		07 00 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																	02	NONE 0 PRVTE	STOP W E									012		00
																		PSNGR CAR		01	DRVR	NONE	28	M	OR-Y OR<25		000	000		00
80024 NONE	N	N	N			01/22/2012 Sun 2P	MULTNOMAH	1 MN 0 13.22	02		INTER W 06	3-LEG 0	N NONE	N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	23	M	OR-Y OR>25		026	001 000		07,22 22 07
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																	02	NONE 0 PRVTE	STOP W E									013		00
																		PSNGR CAR		01	DRVR	INJC	48	F	OR-Y OR>25		000	000		00
80401 NONE	N	N	N			11/02/2015 Mon 6A	MULTNOMAH PORTLAND UA	1 MN 0 13.22	14		INTER W 06	3-LEG 0	N TRF SIGNAL	N N	RAIN WET DAWN	S-1STOP REAR PDO	01	NONE 0 PRVTE PSNGR CAR	STRGHT W E	01	DRVR	NONE	30	M	OR-Y OR<25		026	000 000		29 00 29
No	*45 39 5.97*		*-122 51 5.62*					009200100S00																					
																	02	NONE 0 PRVTE	STOP W E									011		00
																		PSNGR CAR		01	DRVR	NONE	00	F	UNK OR>25		000	000		00

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUG	SCH	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
10275	N	N	N			08/30/2016	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLD	S-1STOP	01	NONE 0	STRGHT										29
STATE						Tue 7A		MN 0		NW CORNELIUS PASS RD	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W E									000	00
							PORTLAND UA	13.22		LOWER COL RIVER HY	06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	24	F	OR-Y		026	000	29
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00		1															OR<25				
																	02	NONE 0	STOP									011	00
																		PRVTE	W E										
																		PSNGR CAR		01	DRVR	NONE	45	M	OR-Y		000	000	00
																									OR<25				
02246	N	N	N	N	N	03/05/2014	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLD	O-1 L-TURN	01	NONE 0	STRGHT										04
STATE						Wed 7A		MN 0		NW CORNELIUS PASS RD	CN		TRF SIGNAL	N	WET	TURN		PRVTE	N S									000	00
								13.22		LOWER COL RIVER HY	01	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	20	M	OR-Y		020,004	000	04
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00		1															OR<25				
																	02	NONE 0	TURN-L									000	00
																		PRVTE	S W										
																		PSNGR CAR		01	DRVR	NONE	55	M	OR-Y		000	000	00
																									OR<25				
80389	N	N	N			11/04/2014	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLR	S-OTHER	01	NONE 0	TURN-L										08
NONE						Tue 8P		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	S W									000	00
								13.22			01	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		002	000	08
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00																	UNK				
																	02	NONE 0	TURN-L									000	00
																		PRVTE	S W										
																		PSNGR CAR		01	DRVR	NONE	68	F	OR-Y		000	000	00
																									OR<25				
03723	N	N	N			03/31/2015	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										29
NONE						Tue 6A		MN 0			CN		TRF SIGNAL	N	DRY	REAR		PRVTE	W E									000	00
							PORTLAND UA	13.22			01	0		N	DLIT	INJ		PSNGR CAR		01	DRVR	NONE	19	M	OR-Y		026	000	29
No	*45 39*	*5.97*	*-122 51*	*5.62*				009200100S00																	OR>25				
																	02	NONE 0	STOP									011	00
																		PRVTE	W E										
																		PSNGR CAR		01	DRVR	INJC	52	F	OR-Y		000	000	00
																									OR>25				
																				02	PSNG	INJC	52	M			000	000	00
02156	N	N	N			02/25/2008	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										04
NONE						Mon 8P		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N S									000	00
								13.22			03	0		N	DLIT	PDO		PSNGR CAR		01	DRVR	NONE	55	F	OR-Y		020	000	04
No	*45 39*	*5.99*	*-122 51*	*5.62*				009200100S00																	OR>25				
																	02	NONE 0	TURN-L									000	00
																		PRVTE	W N										
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000	00
																									UNK				

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALCOHL	DRUGS	SCHL WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS / RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02458	Y	N	N	N	03/01/2008	MULTNOMAH	1	02		INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT									000		30,04
STATE					Sat 10A		MN 0			CN		TRF SIGNAL	N	WET	TURN		PRVTE	N S									000		00
							13.22			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	42	M	OR-Y		050,020	000		30,02
No	*45 39 5.99*				*-122 51 5.62*		009200100S00																	OR>25					
																02	NONE 0	TURN-L											
																	PRVTE	W N									000		00
																	PSNGR CAR		01	DRVR	NONE	27	M	OR-Y		000	000		00
																								OR>25					
03158	N	N	N	N	03/18/2008	MULTNOMAH	1	02		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 1	STRGHT										010,021	04
COUNTY					Tue 6P		MN 0			CN		TRF SIGNAL	N	DRY	TURN		PRVTE	N S									000	010,021	00
							13.22			03	0		N	DUSK	FAT		PSNGR CAR		01	DRVR	NONE	68	M	OR-Y		020	000		02
No	*45 39 5.99*				*-122 51 5.62*		009200100S00																	OR>25					
																02	NONE 0	TURN-L											
																	PRVTE	W N									000		00
																	PSNGR CAR		01	DRVR	KILL	62	M	OR-Y		000	000		00
																								OR>25					
																03	NONE 0	STOP											
																	PRVTE	N S									011	081	00
																	PSNGR CAR		01	DRVR	NONE	53	M	OR-Y		000	000	081	00
																								OR<25					
11523	Y	N	N		10/20/2012	MULTNOMAH	1	02		INTER	3-LEG	N	N	RAIN	OVERTURN	01	NONE 0	STRGHT										124	01
STATE					Sat 9P		MN 0		NW CORNELIUS PASS RD	CN		TRF SIGNAL	N	WET	NCOL		PRVTE	W E									000	124	00
							13.22		LOWER COL RIVER HY	03	0		N	DARK	INJ		MTRCYCLE		01	DRVR	INJC	66	M	OR-Y		047	000		01
No	*45 39 5.97*				*-122 51 5.62*		009200100S00		1															OR<25					
03854	N	N	N	N	04/17/2014	MULTNOMAH	1	02		INTER	3-LEG	N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT											07
STATE					Thu 6A		MN 0			CN		TRF SIGNAL	N	WET	REAR		PRVTE	W E									000		00
							13.22			03	0		N	DAWN	INJ		PSNGR CAR		01	DRVR	NONE	23	M	OR-Y		042,043	000		07
No	*45 39 5.97*				*-122 51 5.62*		009200100S00																	OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	W E									000		00
																	PSNGR CAR		01	DRVR	INJC	22	M	OR-Y		000	000		00
																								OR<25					
00949	N	N	N	N	01/28/2015	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLD	ANGL-OTH	01	NONE 0	TURN-R											02
STATE					Wed 11A		MN 0			CN		TRF SIGNAL	N	WET	TURN		PRVTE	W S									000		00
						PORTLAND UA	13.22			03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	57	F	OR-Y		028	000		02
No	*45 39 5.97*				*-122 51 5.62*		009200100S00																	OR<25					
																02	NONE 0	STRGHT											
																	PRVTE	N S									000		00
																	PSNGR CAR		01	DRVR	NONE	74	M	OR-Y		000	000		00
																								OR<25					

092 LOWER COLUMBIA RIVER — US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet
January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPEED	ALC	DRUG	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC	CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
13321	N	N	N			11/04/2016	MULTNOMAH	1	14		INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT										
NO RPT						Fri 5P		MN 0		NW CORNELIUS PASS RD	CN		TRF SIGNAL	N	DRY	TURN		N/A	N S								000	00
							PORTLAND UA	13.22		LOWER COL RIVER HY	04	0		N	DUSK	PDO		MTRCYCLE		01	DRVR	NONE	00	U	UNK		000	000	00
No	*45 39*		*5.97*	*-122 51*		*5.62*		009200100S00		1															UNK				
																	02	NONE 9	TURN-L										
																		N/A	W N									013	00
																		PSNGR CAR		01	DRVR	NONE	00	U	UNK		000	000	00
																									UNK				
13348	N	N	N			11/05/2016	MULTNOMAH	1	14		INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT										
COUNTY						Sat 10A		MN 0			CN		TRF SIGNAL	N	WET	TURN		PRVTE	W E								000	00
							PORTLAND UA	13.22			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	17	F	OR-Y		020	000	04
No	*45 39*		*5.97*	*-122 51*		*5.62*		009200100S00																	OR<25				
																	02	NONE 0	TURN-L										
																		PRVTE	S W									000	00
																		PSNGR CAR		01	DRVR	INJC	66	F	OR-Y		000	000	00
																									OR<25				
																				02	PSNG	INJC	67	M			000	000	00
01198	Y	N	N	N	N	02/03/2009	MULTNOMAH	1	02		STRGHT		N	N	CLR	S-STRGHT	01	NONE 0	STRGHT										
COUNTY						Tue 1P		MN 0			UN	(NONE)	NONE	N	DRY	REAR		PRVTE	SE NW								000	00
								13.23			03			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	29	M	OR-Y		042	000	01
No	*45 39*		*6.40*	*-122 51*		*6.22*		009200100S00				(02)													OR<25				
																				02	PSNG	INJC	00	F			000	000	00
																	02	NONE 0	STRGHT										
																		PRVTE	SE NW									000	00
																		PSNGR CAR		01	DRVR	NONE	44	M	OR-Y		000	000	00
																									OR<25				
80050	N	N	N	N	N	02/21/2012	MULTNOMAH	1	02		STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										
STATE						Tue 6P		MN 0			UN	(NONE)	L-TURN REF	N	DRY	REAR		PRVTE	E W								000	00
								13.23			05			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	66	F	OR-Y		043	000	07
No	*45 39*		*6.40*	*-122 51*		*6.22*		009200100S00				(05)													OR<25				
																	02	NONE 0	STOP										
																		PRVTE	E W									012	00
																		PSNGR CAR		01	DRVR	NONE	38	M	OR-Y		000	000	00
																									OR>25				
11971	N	N	N			10/30/2012	MULTNOMAH	1	02		STRGHT		Y	N	RAIN	S-1STOP	01	NONE 0	STRGHT										
NONE						Tue 7A		MN 0			UN	(NONE)	UNKNOWN	N	WET	REAR		UNKN	N S								000	00
								13.24			03	0		N	DAWN	INJ		PSNGR CAR		01	DRVR	NONE	00	M	UNK		026	000	07
No	*45 39*		*6.84*	*-122 51*		*6.82*		009200100S00				(04)													UNK				
																	02	NONE 0	STOP										
																		PRVTE	N S									011	00
																		PSNGR CAR		01	DRVR	INJB	47	M	OR-Y		000	000	00
																									OR<25				

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SER# / INVEST / UNLOC?	SPEED	ALCHL	DRUGS	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	COUNTY / CITY / URBAN AREA	RD# / CMPT/MLG / MILEPNT / LRS	FC / CONN # / FIRST STREET / SECOND STREET / INTERSECTION SEQ#	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
01857	Y	N	N	N	N	02/25/2013	MULTNOMAH	1 02		STRGHT		N	N	RAIN	S-STRGHT	01	NONE 0	STRGHT										01
COUNTY						Mon 9A		MN 0		UN	(NONE)	NONE	N	WET	REAR		PRVTE	W E									000	00
								13.24		04			N	DAY	PDO		SEMI TOW		01	DRVR	NONE	37	M	OR-Y		047,080	017	01
No	*45 39*	*6.84*	*-122 51*	*6.82*				009200100S00			(04)													OR<25				
																02	NONE 0	STRGHT										
																	PRVTE	W E									000	00
																	PSNGR CAR		01	DRVR	NONE	61	M	OR-Y		000	000	00
																								OR<25				
08340	Y	N	N			07/20/2007	MULTNOMAH	1 02		STRGHT		Y	N	RAIN	S-1STOP	01	NONE 0	STRGHT										01
NO RPT						Fri 4P		MN 0		UN	(NONE)	UNKNOWN	N	WET	REAR		PRVTE	N S									000	00
								13.24		05			N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	17	F	OR-Y		047,026	000	01
No	*45 39*	*6.85*	*-122 51*	*6.82*				009200100S00			(04)													OR<25				
																02	NONE 0	STOP										
																	PRVTE	N S									011	00
																	PSNGR CAR		01	DRVR	NONE	33	M	OR-Y		000	000	00
																								OR<25				
11591	N	N	N	N	N	10/28/2011	MULTNOMAH	1 02		STRGHT		Y	N	FOG	S-1STOP	01	NONE 0	STRGHT										07
STATE						Fri 7A		MN 0		UN	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	N S									000	00
								13.24		05	0		N	DAWN	PDO		PSNGR CAR		01	DRVR	NONE	20	M	NONE		026	000	07
No	*45 39*	*6.84*	*-122 51*	*6.82*				009200100S00			(04)													OR<25				
																02	NONE 0	STOP										
																	PRVTE	N S									011	00
																	PSNGR CAR		01	DRVR	NONE	29	F	OR-Y		000	000	00
																								OR<25				

MULTNOMAH COUNTY

US 30 Lower Columbia River Hwy (092) & NW Cornelius Pass Rd plus 200 feet

January 1, 2007 through December 31, 2016

SER# / INVEST / UNLOC?	SPE	ALC	DRG	SUS	WCH	ORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02511	N	N	N				3/15/2013		LOWER COL RIVER HY	INTER	3-LEG	N	N	CLR	S-1STOP	01	UNKN 0	STRGHT											07
NONE							Fri 1P	0	NW CORNELIUS PASS RD	S		TRF SIGNAL	N	DRY	REAR		UNKN	S N										000		00
No							*45 39 5.97 -122 51 5.62*	1	1	06	0		N	DAY	PDO		UNKNOWN		01	DRVR	NONE	00	F	UNK		026	000		07
																									UNK					
																02	NONE 0	STOP											
																	PRVTE	S N										011		00
																	PSNGR CAR		01	DRVR	NONE	30	M	OR-Y		000	000		00
																									OR<25					
01035	Y	N	N	N	N		1/26/2008		NW CORNELIUS PASS RD	CURVE		N	Y	SLT	FIX OBJ	01	NONE 0	STRGHT											124,079,010	01,10
COUNTY							Sat 9A	2	LOWER COL RIVER HY	S	(NONE)	NONE	N	ICE	FIX		PRVTE	N S										000	124,079,010	00
No							*45 37 26.04 -122 51 50.69*	1	1	01			N	DAY	INJ		PSNGR CAR		01	DRVR	INJA	56	F	OR-Y		047,083,081	017		01,10
											(02)														OR<25					
																			02	PSNG	INJC	36	M			000	000		00
05495	N	N	N				5/28/2010		NW CORNELIUS PASS RD	STRGHT		N	N	RAIN	S-1STOP	01	NONE 9	STRGHT											06
NONE							Fri 5P	2	LOWER COL RIVER HY	S	(NONE)	UNKNOWN	N	WET	REAR		PRVTE	S N										000		00
No							*45 39 5.16 -122 51 6.37*	1	1	03			N	DAY	PDO		SEMI TOW		01	DRVR	NONE	33	M	OR-Y		032,038,026	000		06
											(02)														OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N										011		00
																	PSNGR CAR		01	DRVR	NONE	63	F	OR-Y		000	000		00
																									OR<25					
03256	N	N	N	N	N		3/31/2012		NW CORNELIUS PASS RD	STRGHT		N	N	CLR	S-1STOP	01	UNKN 9	STRGHT											07
COUNTY							Sat 9P	2	LOWER COL RIVER HY	S	(NONE)	NONE	N	DRY	REAR		UNKN	S N										000		00
No							*45 39 5.19 -122 51 6.35*	1	1	03			N	DARK	PDO		UNKNOWN		01	DRVR	NONE	00	U	UNK		026	000		07
											(02)														UNK					
																02	NONE 0	STOP											
																	PRVTE	S N										011		00
																	PSNGR CAR		01	DRVR	NONE	49	M	OR-Y		000	000		00
																									OR<25					
03021	N	N	N	N	N		3/26/2012		NW CORNELIUS PASS RD	STRGHT		N	N	CLR	S-1STOP	01	NONE 0	STRGHT										013	07
NO RPT							Mon 11A	4	LOWER COL RIVER HY	S	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE	S N										000		00
No							*45 39 4.35 -122 51 7.14*	1	1	03			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	48	M	OR-Y		026	000		07
											(02)														OR<25					
																02	NONE 0	STOP											
																	PRVTE	S N										011	013	00
																	PSNGR CAR		01	DRVR	INJB	61	M	OR-Y		000	000		00
																									OR<25					
																03	NONE 0	STOP											
																	PRVTE	S N										022	013	00
																	PSNGR CAR		01	DRVR	NONE	25	F	OR-Y		000	000		00
																									OR>25					

MULTNOMAH COUNTY

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SER# / INVEST / UNLOC?	SPED	ALC	DRUG	SCHL	WORK	DATE / DAY/TIME / *LAT/LONG*	MILEPNT / DIST FROM / INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
															04	NONE 0	STOP											
																PRVTE	S N										011		00
																PSNGR CAR		01	DRVR	NONE	00	F	UNK		000	000		00
																							UNK					
02585	N	N	N	N	N	3/16/2013		NW CORNELIUS PASS RD	INTER	3-LEG	N	N	CLD	S-1STOP	01	NONE 1	STRGHT											07
STATE						Sat 11A	0	LOWER COL RIVER HY	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N										000		00
No						*45 39 5.97 -122 51 5.62*	1		06	0		N	DAY	PDO		SEMI TOW		01	DRVR	NONE	67	M	OR-Y		026	000		07
																							OR>25					
															02	NONE 0	STOP											
																PRVTE	S N										011		00
																PSNGR CAR		01	DRVR	NONE	49	M	OTH-Y		000	000		00
																							N-RES					
09866	N	N	N			9/23/2014		NW CORNELIUS PASS RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						Tue 1P	0	LOWER COL RIVER HY	S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N										000		00
No						*45 39 5.97 -122 51 5.62*	1		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	F	UNK		026	000		07
																							OR>25					
															02	NONE 0	STOP											
																PRVTE	S N										011		00
																PSNGR CAR		01	DRVR	NONE	52	M	OR-Y		000	000		00
																							OR<25					
15002	N	N	N	N	N	12/12/2016		NW CORNELIUS PASS RD	STRGHT		N	Y	CLD	OVERTURN	01	NONE 9	STRGHT											17
COUNTY						Mon 4P	2	LOWER COL RIVER HY	W	(NONE)	UNKNOWN	N	DRY	NCOL		N/A	W E										006		00
No						*45 39 4.93 -122 51 6.59*	1		01			N	DUSK	PDO		SEMI TOW		01	DRVR	NONE	00	U	UNK		000	000		00
										(03)													UNK					
01290	N	N	N	N	N	2/2/2007		NW CORNELIUS PASS RD	CURVE		N	N	CLR	O-STRGHT	01	NONE 0	STRGHT											16,10
COUNTY						Fri 8P	2	LOWER COL RIVER HY	W	(NONE)	NONE	N	DRY	HEAD		PRVTE	S N										000		00
No						*45 39 5.19 -122 51 6.36*	1		03			N	DARK	PDO		PSNGR CAR		01	DRVR	NONE	74	M	OR-Y		016,080	025		16,10
										(02)													OR<25					
															02	NONE 0	STRGHT											
																PRVTE	N S										000		00
																PSNGR CAR		01	DRVR	NONE	56	M	OR-Y		000	000		00
																							OR>25					
03285	N	N	N			4/2/2009		NW CORNELIUS PASS RD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE 0	STRGHT											07
NONE						Thu 12P	0	LOWER COL RIVER HY	W		TRF SIGNAL	N	DRY	REAR		PRVTE	W E										000		00
No						*45 39 5.99 -122 51 5.62*	1		06	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	43	M	OR-Y		026	000		07
																							OR>25					
															02	NONE 0	STOP											
																PRVTE	W E										011		00
																PSNGR CAR		01	DRVR	NONE	71	M	OR-Y		000	000		00
																							OR<25					

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
014	EMR V PKD	EMERGENCY VEHICLE LEGALLY PARKED IN THE ROADWAY
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED OR DISABLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING
055	SPRAY	BLINDED BY WATER SPRAY

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHIN
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER
51	FAIL LN	FAILED TO MAINTAIN LANE
52	OFF RD	RAN OFF ROAD

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1 L-TURN	FROM OPPOSITE DIRECTION-ONE LEFT TURN,ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED
4	EXP	EXPIRED
8	N-VAL	OTHER NON-VALID LICENSE
9	UNK	UNKNOWN IF DRIVER WAS LICENSED AT TIME OF CRASH

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TOO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WORK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAY ON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHIC
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY
134	TORRENTIAL	TORRENTIAL RAIN (EXCEPTIONALLY HEAVY RAIN)

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE
9	NONE	PARTICIPANT UNINJURED, OVER THE AGE OF 4

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY
9	PARKNG	PARKING MANEUVER

NON-MOTORIST LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYA
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OB
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING
095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
00	PDO	NOT COLLECTED FOR PDO CRASHES
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

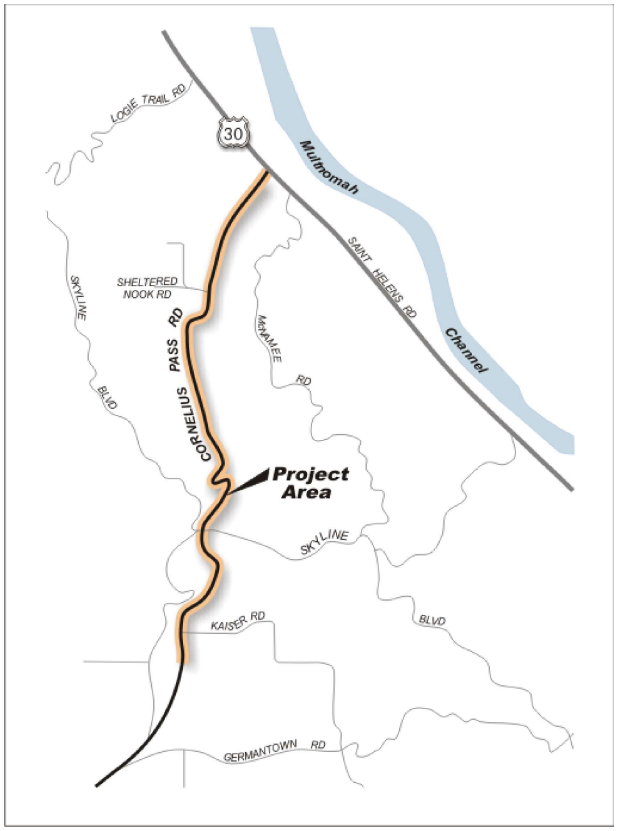
EXHIBIT I - Cornelius Pass Road Safety Improvement

-ODOT Transportation Volume Table (TVT)

Cornelius Pass Road Safety Evaluation JTA Final Report

BACKGROUND

The Jobs and Transportation Act, adopted by the 2009 Oregon Legislative Assembly, directs the Oregon Department of Transportation (ODOT), in consultation with local government, to develop design alternatives to improve safety for at least one county road that is used for hazardous materials routing in lieu of a state highway. ODOT identified Cornelius Pass Road, an arterial that runs between Washington County (City of Hillsboro) and Multnomah County (Lower Columbia River Highway [US 30]), as a road meeting these requirements. The project vicinity is shown to the right. This road safety evaluation focuses on a five-mile section of Cornelius Pass Road within Multnomah County.



Prior to the 2009 corridor safety directives, the Cornelius Pass Road Work Group was formed following the tragic fatality crash involving a local teenager. The work group focused on developing safety improvements and included representatives from Multnomah, Columbia and Washington counties, ODOT, the Taija Belwood Foundation, the Oregon Trucking Association, Multnomah County law enforcement and several Oregon legislators. Members of this work group contributed to the Federal Highway Administration (FHWA) Road Safety Audit (RSA). The RSA was completed in December of 2008 and covered Multnomah County's five-mile segment of Cornelius Pass Road between the Washington County border and US 30. The RSA identified 18 safety issues along the corridor and provided a set of recommended low-cost improvement options.

Since the completion of the RSA, Multnomah County utilized federal stimulus funds to implement many of the recommended low-cost options. Notable improvements included upgrading critical sections of guardrail, installing centerline and shoulder rumble strips, vehicle speed feedback signs, and a pair of flashing yellow beacons with warning signs. Additionally, ODOT is designing a project to improve the safety and operation of the intersection of US 30 and Cornelius Pass Road.

SouthFlashing Yellow

Speed Feedback Sign

A project team that included staff from Multnomah County, ODOT, consulting firms, and Portland State University (PSU) was assembled to define the scope of additional potential safety improvements along Cornelius Pass Road. The goal was to propose a range of improvement alternatives and associated costs to improve the safety of Cornelius Pass Road for motor vehicles, freight and hazardous material transport. The consultant design team was co-led by DKS Associates (DKS) and Kittelson & Associates, Inc. (KAI). Additional members of the consultant design team included 3J Consulting, Convergent Pacific, and Howell Consulting. See Appendix "A" (Project Team) for team individuals.

The project team collaborated further to gather information and ideas with representatives from ODOT, PSU, Multnomah County, Washington County, and Portland Public Schools to provide a range of innovative improvement alternatives that include both engineering and non-engineering solutions. This collaborative approach provided several opportunities, as summarized below, to brainstorm ideas and exhaust a range of concepts to address the safety concerns.

- Field Visit: Observed geometric, land use and environmental conditions as well as driver behavior at identified areas of safety concerns.
- Design Workshop #1: Brainstormed ideas for key corridor locations based on collision and crash data.
- Design Workshop #2: Presented, evaluated and screened initial concepts to select and refine alternatives.
- Design Workshop #3: Presented select alternatives determined as part of the refined analysis.

EXISTING CONDITIONS ASSESSMENT

Cornelius Pass Road connects the important transportation corridors of Tualatin Valley Highway (OR 8), Sunset Highway (US 26), and US 30. The Multnomah County segment of Cornelius Pass Road has two-lanes, substandard shoulder widths and no turn lanes (with the exception of the Skyline Boulevard intersection). Within Multnomah County, the average daily traffic (ADT) and truck percentages range between 10,500 vehicles with 12.7% trucks near the Skyline Boulevard intersection and 11,500 with 13.4% trucks near the Sheltered Nook Road intersection.

Collision Data Collection and Analysis

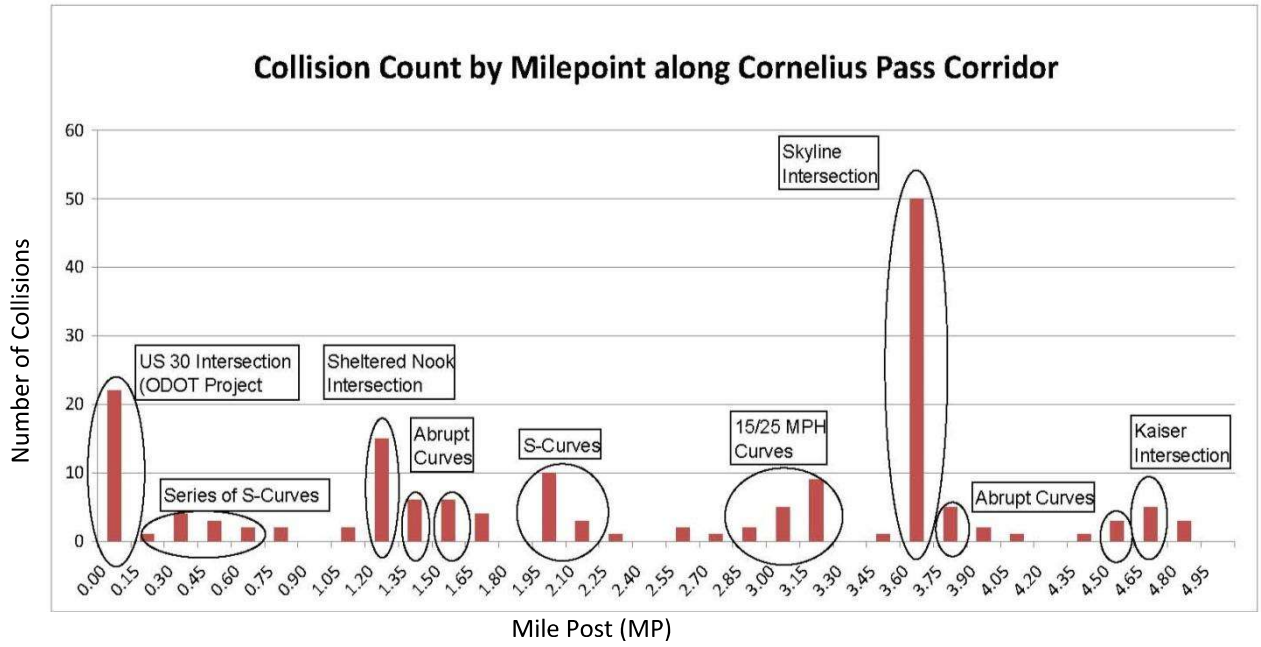
In order to develop a thorough understanding of safety concerns along Cornelius Pass Road, collision data was collected and analyzed from three sources.

- The Multnomah County Sheriff's Office traffic crash reports, which included collision data from 2003-2007.
- The Oregon Department of Transportation's Crash Analysis and Reporting Unit collision data from 2007-2009.
- The Oregon Traffic Safety Data Archive (OrTSDA), provided by PSU, which included collision records from 2003-2009.

The collision records from all three sources were combined and duplicate records were identified and consolidated. Then the crash records were analyzed for trends, such as collision severity, collision type, environmental conditions, and time of day. Collision diagrams were created for each record to create a visual tool along the corridor that showed the location, type, and severity of each collision. Collision diagrams are attached in Appendix "B" (Design Workshop #2) that illustrates each project area. Other information such as peak hour traffic volumes, vehicle speeds, and vehicle classifications collected by Multnomah County were also used to enhance the understanding of the safety concerns along Cornelius Pass Road. Traffic data trends were evaluated at three locations along the corridor to identify vehicle class, speed, volume and peak travel times.

Collision Analysis

Along the five-mile corridor of Cornelius Pass Road from the Multnomah County line to Highway 30, 171 collisions records between the years 2003 through 2009 were evaluated. The chart below illustrates the key locations along the corridor where clusters of collisions were identified.



Eleven key locations, as shown in the circled areas above, were identified as areas with safety concerns due to the number of collisions. ODOT already has a project underway to address operational and safety deficiencies at the US 30/Cornelius Pass Road intersection, which is one of the eleven key locations. A detailed review of the corridor wide crash data is included in the attached Appendix "B" (Design Workshop #2). Of all crashes recorded, the majority (nearly 60%) of the collisions occurred under dry, daylight conditions. This implies that roadway conditions are likely contributing to the collisions along the corridor. Ten of the 171 total recorded collisions involved trucks (approximately 6%) while trucks consisted of 12-13% of the total traffic volumes. Based on these records, truck collisions do not appear to be the primary safety concern along the corridor.

Speed studies indicated that travel speeds were not significantly higher than the posted speed limit of 45 mph along the corridor (e.g., the 85th percentile of speed was approximately 45-50 mph in the vicinity of the Sheltered Nook Road intersection). However, collision reports indicated that approximately one-third of the collisions note that the driver was traveling too fast for the conditions. With these types of collisions, the contributing factors are often a combination of driver behavior, environmental conditions, and roadway geometry.

CONCEPTUAL IMPROVEMENT PROJECT LIST

The project team identified 27 potential safety projects by conducting a field visit of the corridor and holding Design Workshop #1. These 27 projects can be divided into three categories:

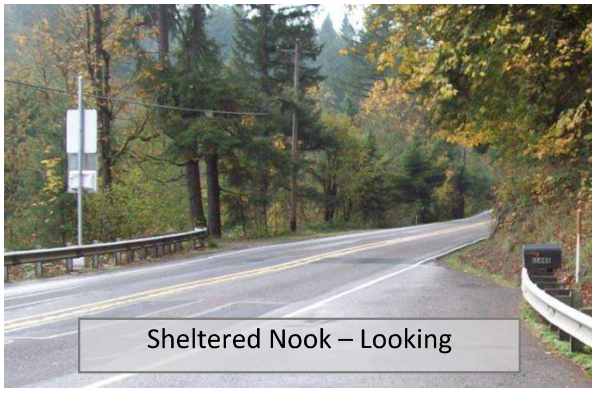
- Location specific improvements (e.g., intersection geometric improvements)
- Corridor wide improvements (e.g., corridor lighting)
- Policy considerations (e.g., corridor design guide)

The improvement project location map (on page 6) shows the high-collision locations that were identified within the study area. The project concepts that were originally considered for improving the safety of the Cornelius Pass Road corridor included 23 different improvement projects at 10 locations along the corridor, two corridor wide projects and two policy consideration packets.

Location Specific Improvements

Of the 10 locations with proposed improvements, seven include areas with either a horizontal or vertical curve or a series of s-curves, and the remaining three locations are intersections. Two or more project alternatives (roadway realignment or sight distance improvements) have been developed for the sections of road with existing curves and collisions. The preliminary projects included a corridor long project that would realign all curves with a less than 45 mile per hour design speed. This would improve driver expectations through the entire Cornelius Pass Road corridor and reduce the likelihood of drivers losing control of their vehicles, which was a contributing factor in a significant number of past collisions. The other improvement alternative considered for these curved sections would be to remove roadside obstacles restricting the drivers' sightline through a curve. This would allow drivers more time to react to changing conditions (such as other vehicles slowing down to make a turn or obstacles on the road). Additionally, both of these project alternatives for the curves could be augmented with a widening of roadway shoulders to allow for increased recovery areas and reduce the likelihood of collisions causing traffic interruptions.

The recommended intersection projects include improving intersection geometrics and sight distance. Geometric improvements include the construction of turn pockets to separate slow moving vehicles from the main traffic stream, thereby reducing the likelihood of rear-end collisions. Improving sight distance along the corridor provides drivers with additional time to react to on-coming vehicles and roadway conditions. As an example, Skyline Boulevard, which had the highest occurrence of collisions, includes a variety of proposals to increase the available sight distance, improve existing turn lanes, and modify the existing traffic control from the existing two-way stop control to a roundabout.



Sheltered Nook – Looking

Skyline – Looking South

Corridor Wide Improvements and Policy Considerations

Proposed improvements along the entire corridor included roadway lighting, roadside treatment (e.g., guardrail), a design guide and potential corridor policy recommendations. The installation of roadway lighting along the corridor could reduce collisions that occur at night. Additional roadside treatments would help reduce the severity of collisions that occur when drivers lose control of their vehicles. A proposed design guide for the corridor and a variety of policies could provide a more consistent roadway and utilize signs to reduce unexpected changes in the road conditions and increase driver awareness.

Larger, more costly improvements, such as additional travel lanes or the general roadway straightening projects were beyond the scope of this evaluation and were not considered because the associated environmental, land-use and capital costs would outweigh the safety benefits gained. Furthermore, based on

the projected volumes for 2030, the capacity of the current two lanes would be sufficient for future traffic needs. The 2030 forecasted traffic will be operating at 87% of the available capacity.

Some of the project concepts may be installed in phases. For instance, roadway lighting could initially be installed where there have been high numbers of collisions at night, while lighting for the entire corridor could be installed at a later date. Appendix "B" (Design Workshop #2) has narrative and exhibits as part of each project area package illustrating more details associated with the proposed improvements.

EVALUATION CRITERIA AND INITIAL CONCEPT SCREENING

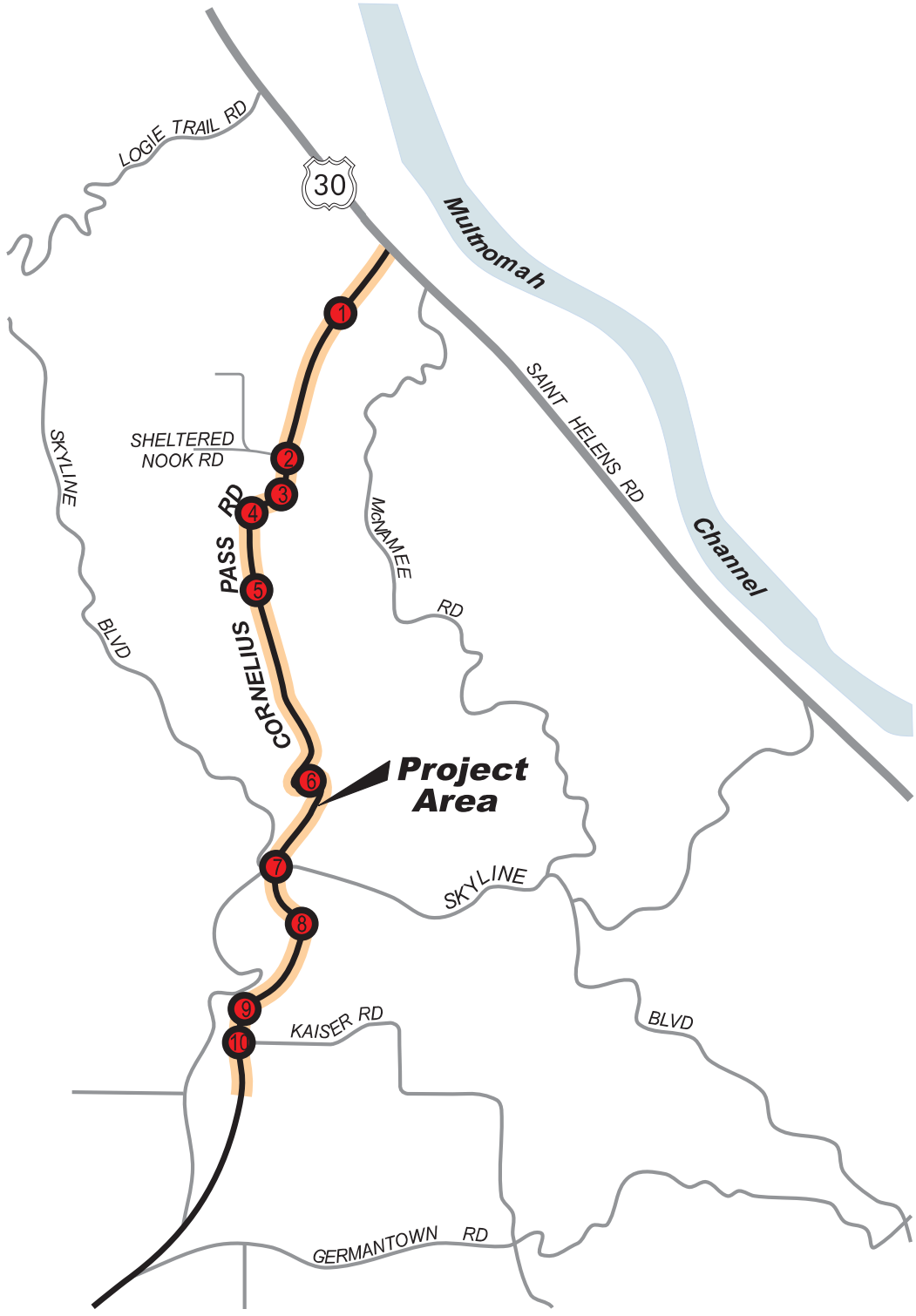
As part of Design Workshop #2, the participants collaboratively agreed on nine evaluation criteria to screen the 27 project alternatives and to select the most promising projects for further analyses. The evaluation criteria include:

- Safety Benefit-cost analysis
- Collision frequency and trends
- Economic impact (e.g., temporary closure due to incident)
- Right-of-way/environmental impacts
- Maintenance
- Future capacity
- Constructability
- Funding sources
- Future compatibility and consistency with the Region's vision.

The initial screening evaluation was conducted within the workshop setting using a qualitative approach. Each project was assigned a qualitative rating (good, fair, or poor), relative to each of the evaluation criteria. Appendix "C" (Concept Evaluation) provides an overview of the evaluation criteria, evaluation matrix of 27 projects, and benefit-cost analysis methodology.

Based on the results of the evaluation, 13 projects were identified for further refinement. The number for each of the following projects corresponds to the project location on the map found on the following page. Projects 11 through 13 are not identified on the map, since these are corridor long improvements.

1. Series of S-Curves at MP 0.15-0.60: Provide end treatments at all retaining wall ends, provide guardrails (or roadside protection) along steep drop-offs, and provide stopping sight distance (SSD) along the S-curves via tree and vegetation removal.
2. Sheltered Nook Road Intersection: Add a 100-foot long northbound left turn pocket and flatten the existing vertical crest curve on the northern leg of the Cornelius Pass Road/Shelter Nook Road intersection.
3. S-Curves and 8th Avenue Intersection at MP 1.5: Provide SSD along the S-curves, as well as intersection sight distance (ISD) at the 8th Avenue intersection via tree and vegetation removal.
4. S-Curves and Columbia Street Intersection at MP 1.8-2.1: Provide SSD along the S-curves, as well as ISD at the Columbia Street intersection via tree and vegetation removal.
5. Tight 15/25-mph Curves at MP 2.8-3.3 (Minor Widening): Widen the shoulders for both directions of traffic through the area of the 15-mph and 25-mph curves to provide additional recovery area for vehicles.
6. Tight 15/25-mph Curves at MP 2.8-3.3 (Realignment to the West): Replace the 15-mph and 25-mph curves with a new alignment to the west by providing horizontal curves designed for 45-mph.
7. Skyline Boulevard Intersection (Roundabout): Construct a single-lane roundabout with a 160-foot inscribed diameter and provide appropriate left-turn lanes at the Plainview Road intersection and one consolidated grocery store access.



Project Location Map

LEGEND

1 - Project Location — - Project Area

8. Skyline Boulevard Intersection (Realignment and Access Management): Improve horizontal alignment, provide ISD and SSD, and provide appropriate left-turn lanes at Skyline Boulevard and Plainview Road intersections.
9. Curve at MP 4.5: Improves SSD around the curve by creating a clear zone of vegetation and hillside.
10. Kaiser Road Intersection: Create a northbound paved right-turn pocket and improve ISD.
11. Corridor Roadway Lighting: Provide corridor wide optimal lighting levels along the 5-mile segment of Cornelius Pass Road in Multnomah County using 200 Watt, flat lens (dark sky compliant), cobra head luminaires, mounted at a height of 35 feet and spaced at approximately 165 feet.
12. Improve Cornelius Pass Road Corridor to a 45-mph Facility: Provide curve improvements for a 45-mph design speed along the entire corridor, as well as the improvements at the Sheltered Nook Road, Skyline Boulevard, and Kaiser Road intersections. This corridor project also provides roadway lighting along the entire corridor. This project excludes realignment improvements at the tight 15/25-mph Curves at (MP 2.8-3.3) due to the significant potential environmental and capital costs.
13. Corridor Design Guide and Policies: Develop a design guide and associated policies that provide consistency for the design elements and characteristics for future improvement projects.

For each of these projects, Appendix "D" (Design Workshop #3) provides documentation of the safety concern, a narrative summarizing the proposed improvements with exhibits, a summary of a preliminary cost estimate, and an explanation of how the safety concern is being addressed.

CONCEPTUAL IMPROVEMENT SAFETY BENEFIT/COST ANALYSIS

A safety benefit-cost (B/C) analysis was conducted for each of the 13 selected projects. Projects resulting in B/C ratios greater than 1.00 indicate the project is economically valid from a safety perspective because the estimated benefits exceed the estimated cost. The table below summarizes the results of the B/C analysis (based strictly on predicted safety benefits) over a service life of 20 years. The individual projects contain the conceptual cost estimate and B/C analysis worksheets for each project in Appendix "D".

Map ID	Projects	Benefit Estimate	Cost Estimate	B/C Ratio
1	Series of S-Curves at MP 0.15-0.60	$773,000	$1.38 Million	0.56
2	Sheltered Nook Road Intersection	$3.89 Million	$1.82 Million	2.14
3	S-Curves and 8th Avenue Intersection at MP 1.5	$636,000	$191,000	3.33
4	S-Curves and Columbia Street Intersection at MP 1.8-2.1	$100,000	$914,000	0.11
5	Tight 15/25-mph Curves at MP 2.8-3.3 (Minor Widening)	$75,000	$260,000	0.29
6	Tight 15/25-mph Curves at MP 2.8-3.3 (Realignment to the West)	$675,000	$13.50 Million	0.05
7	Skyline Boulevard Intersection (Roundabout)	$9.79 Million	$3.75 Million	2.61
8	Skyline Boulevard Intersection (Realignment and Access Management)	$6.58 Million	$5.30 Million	1.24
9	Curve at MP 4.5	$1.70 Million	$1.3 Million	1.31
10	Kaiser Road Intersection	$960,000	$200,000	4.80
**	Corridor Roadway Lighting	$2.82 Million	$1.00 Million	2.82
**	Improve Cornelius Pass Road Corridor to 45-mph Facility	$29.1 Million	$26.8 Million	1.08
**	Corridor Design Guide and Policies*	-	-	-

*The Cornelius Pass Road Design Guide and Policies do not have collision benefit estimates or a B/C ratio because it is not feasible to reasonably estimate the potential monetary safety benefit of these projects.
**Corridor long projects are not shown on the map

The conceptual cost estimates assume a reduced cross section with paved shoulders of two (2) to four (4) feet due to topographical constraints to match the existing approaching roadway. However, Multnomah County's transportation system plan (TSP) identifies the Cornelius Pass Road corridor as a bike route. Therefore, Multnomah County should explore a separated multi-use path along this corridor to accommodate non-motorized travel modes.

Design Considerations

Special care should be taken during the design phase of isolated projects to provide appropriate transition segments, especially at intersections.

The evaluated corridor is heavily vegetated with a number of stream crossings and parallel streams. Environmental features observed during the initial field visit were taken into consideration as alternatives were developed. However, before any of the proposed projects are moved forward, a more detailed inventory of environmental features, including wetlands and potential Threatened and Endangered species, should be undertaken. There are a number of old stone walls along the project corridor that should be examined by a historian to determine if they are eligible for the historic register before any modifications are made to them. An archeological survey of the project improvement areas should also be undertaken. Lastly, storm water runoff, treatment and detention will need to be analyzed for each project as it moves forward.

Replacing several consecutive s-curves with a single large-radii curve and improving curve radii at isolated locations to comply with a consistent design speed of 45 mph would meet driver expectancy along the entire corridor. However, the corridor improvements identified do not address the tight 15/25-mph curves due to topographical and environmental constraints. These locations can be improved by providing appropriate approaching speed reduction treatments and warning signage.

There are additional curves with limited or no collisions history, which were excluded from this evaluation. Despite their exclusion, these additional curves should be investigated as part of the next phase of this potential corridor project. It is important that the entire corridor provides a consistent driver expectation and not potentially shift the existing safety problem from one set of curves to the next.

CONCLUSIONS

Multnomah County has made strides in improving the safety of Cornelius Pass Road since the Road Safety Audit was completed. The work through this JTA study identifies additional safety projects the county could consider should funds become available. Since the project team's focus was specifically towards safety improvements, Multnomah County in collaboration with regional transportation partners and stakeholders may want to consider a broader planning effort that addresses the regional significance of this corridor and its future.

The safety evaluation and design alternatives analysis of the Cornelius Pass Road corridor resulted in 27 initial project alternatives that focused on key locations with collision clusters. The evaluation of these project concepts highlighted 13 projects that were studied in more detail to develop B/C ratios. The study, data and supporting documentation has been prepared and submitted to Multnomah County. The project concepts and information contained are sufficient to enable to the county to pursue funding should opportunities arise. Based on the safety B/C ratios, Multnomah County may want to consider the following projects for preliminary design and construction:

Map ID	Project Name	Description	Cost Estimate
2	Sheltered Nook Road Intersection	Add a northbound left turn pocket and flatten the vertical crest curve to the north of the intersection	$1.82 Million
3	S-Curves and 8th Avenue Intersection at MP 1.5	Provide stopping sight distance (SSD) along the S-curves, as well as intersection sight distance (ISD) at the 8th Avenue intersection via tree and vegetation removal.	$191,000
7	Skyline Boulevard Intersection (Roundabout)	Construct a single-lane roundabout and provide appropriate left-turn lanes at the Plainview Road intersection and one consolidated grocery access.	$3.75 Million
9	Curve at MP 4.5	Improves stopping sight distance (SSD) around the curve.	$1.3 Million
10	Kaiser Road Intersection	Create a northbound right-turn lane and improve intersection sight distance (ISD).	$200,000
**	Corridor Roadway Lighting	Provide corridor wide optimal lighting levels along the 5-mile segment of Cornelius Pass Road.	$1.00 Million
**	Improve Cornelius Pass Road Corridor to 45-mph Facility	Provide a horizontal alignment that complies with a 45-mph design speed along the entire corridor with the exception of the tight 15/25-mph curves, as well as intersection improvements at Sheltered Nook Road, Skyline Boulevard, and Kaiser Road. The project also includes corridor roadway lighting.	$26.8 Million

Milepoint	2016 AADT All Vehicles	ATR AVC	Location Description
			PACIFIC HIGHWAY WEST NO. 91 (Continued)
126.07	*18300*		0.30 mile northwest of Pacific Highway (I-5)
			LOWER COLUMBIA RIVER HIGHWAY NO. 92
			Milepoint indicates distance from Stadium Freeway (I-405), at West Fremont Bridge Interchange in Portland
1.45	*81200*		West end of ramp structure
			On N.W. Yeon Street
1.87	*38800*		0.10 mile south of N.W. Nicolai Street
2.38	*34200*		0.05 mile southeast of N.W. 26th Avenue
2.63	*34100*		0.05 mile southeast of N.W. 29th Avenue
3.07	*32000*		0.05 mile southeast of N.W. 35th Avenue
3.76	*26300*		0.05 mile southeast of N.W. 44th Avenue
3.97	*32400*		0.05 mile northwest of Kittridge Avenue
			Equation: MP 4.13 BK = MP 4.52 AH
6.31	*29000*		0.10 mile southeast of south approach to St. Johns Bridge, Northeast Portland Highway (US30 Bypass)
7.42	*27900*		0.10 mile northwest of north approach to St. Johns Bridge, Northeast Portland Highway (US30 Bypass)
			West city limits of Portland
10.75	*21900*		0.08 mile south of Sauvie Island Road
10.95	*17700*		0.12 mile north of Sauvie Island Road
13.12	*17800*		0.10 mile south of Cornelius Pass Road
17.34	*26300*		0.05 mile south of Rocky Point Road
			Columbia - Multnomah County Line, MP 18.37
19.35	*24200*		0.30 mile north of Johnsons Landing Road
20.58	*30600*		0.05 mile north of S.W. Em Watts Road
21.24	*32000*		0.03 mile south of Scappoose-Vernonia Road
21.32	*24200*		0.05 mile north of Scappoose-Vernonia Road
23.30	*24800*		0.05 mile south of Fullerton Road
23.40	*24000*		0.05 mile north of Fullerton Road
24.86	*23700*		0.05 mile south of Berg Road
25.53	*23500*		0.05 mile north of Church Road
27.01	*21100*		0.05 mile north of Millard Road
27.54	*23800*		0.05 mile south of Firlock Park Boulevard
27.64	*22800*		0.05 mile south of Gable Road
27.74	*24000*		0.05 mile north of Gable Road
28.58	*20700*		0.02 mile north of Columbia Boulevard
			North city limits of St. Helens
29.47	*14300*		0.05 mile north of Deer Island Road
30.46	*14400*		0.07 mile south of "L" Street
30.58	*13600*		0.05 mile north of "L" Street
30.97	*13600*		0.05 mile south of "E" Street
32.00	*10600*		0.39 mile north of Pacific Street
33.77	*10700*		0.20 mile south of Deer Island Frontage Road
36.58	*8700*		0.05 mile north of Tide Creek Road (Shiloh Basin)
40.56	*8300*		0.09 mile north of Nicolai Road (Moorage Road)
43.07	*8700*		0.05 mile south of Graham Road
45.88	*7700*		0.49 mile north of Spring Lane

EXHIBIT J

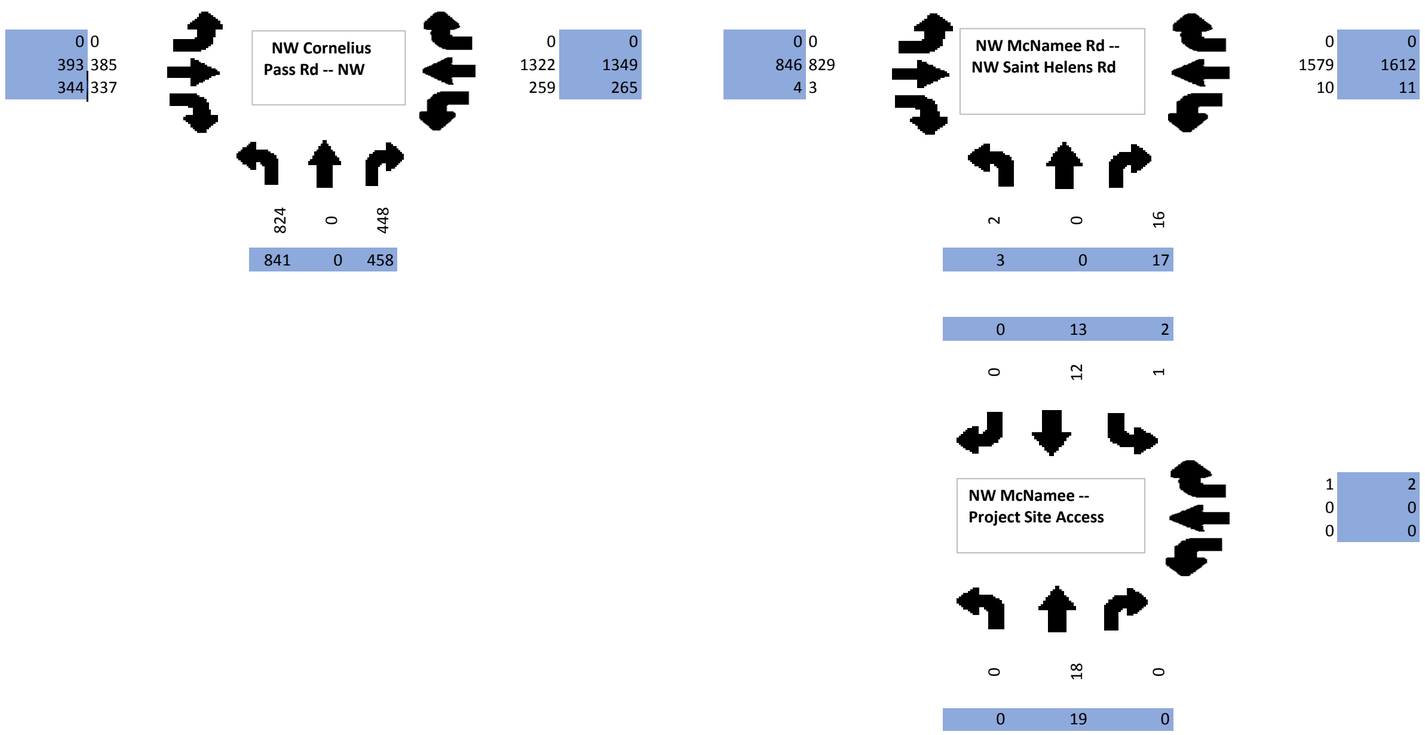
Year 2019/Year 2033 Background Traffic Calculation

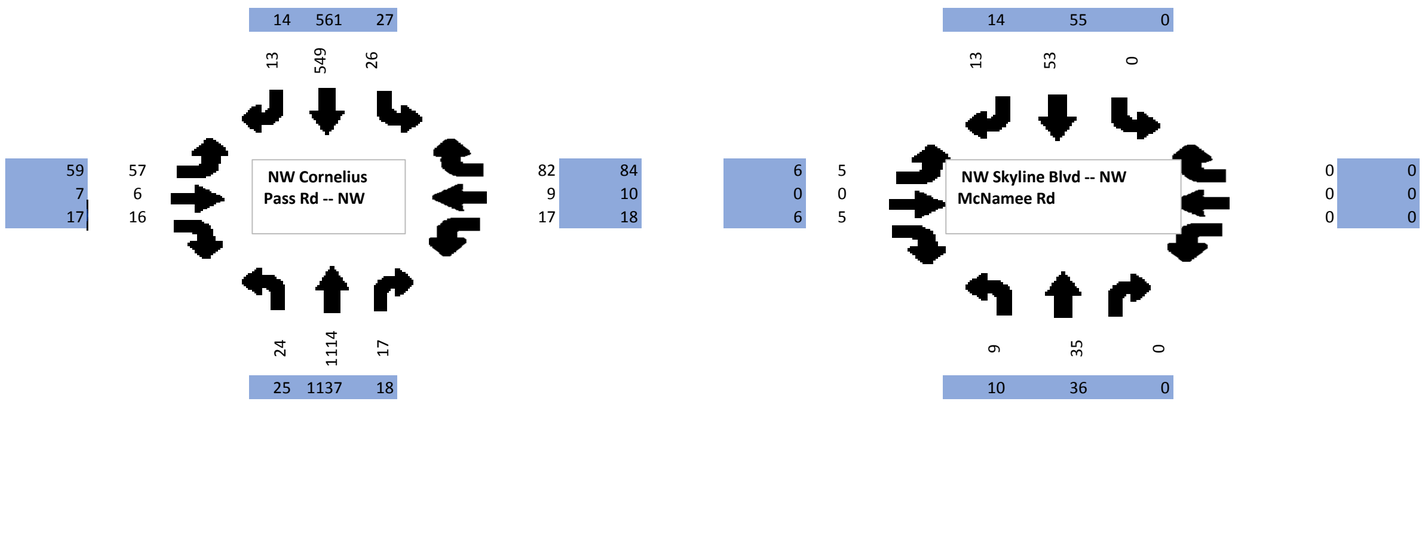
PEAK-HOUR VOLUMES

		NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEnterin	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
4:15 PM -- 5:15 PM	**14735217 - NW McNamee -- Project Site Access**	0	18	0	1	12	0	0	0	0	0	0	1	18	13	0	1	18	13	1	0
4:15 PM -- 5:15 PM	**14735218 - NW Skyline Blvd -- NW McNamee Rd**	9	35	0	0	53	13	5	0	5	0	0	0	44	66	10	0	40	58	0	22
4:15 PM -- 5:15 PM	**14735219 - NW McNamee Rd -- NW Saint Helens Rd**	2	0	19	0	0	0	0	832	3	12	1582	0	21	0	835	1594	0	15	851	1584
4:15 PM -- 5:15 PM	**14735222 - NW Cornelius Pass Rd -- NW Saint Helens Rd**	824	0	448	0	0	0	0	384	337	259	1322	0	1272	0	721	1581	0	596	832	2146
4:15 PM -- 5:15 PM	**14735225 - NW Cornelius Pass Rd -- NW Skyline Blvd**	24	1114	17	26	549	13	57	6	16	17	9	82	1155	588	79	108	1147	688	49	46

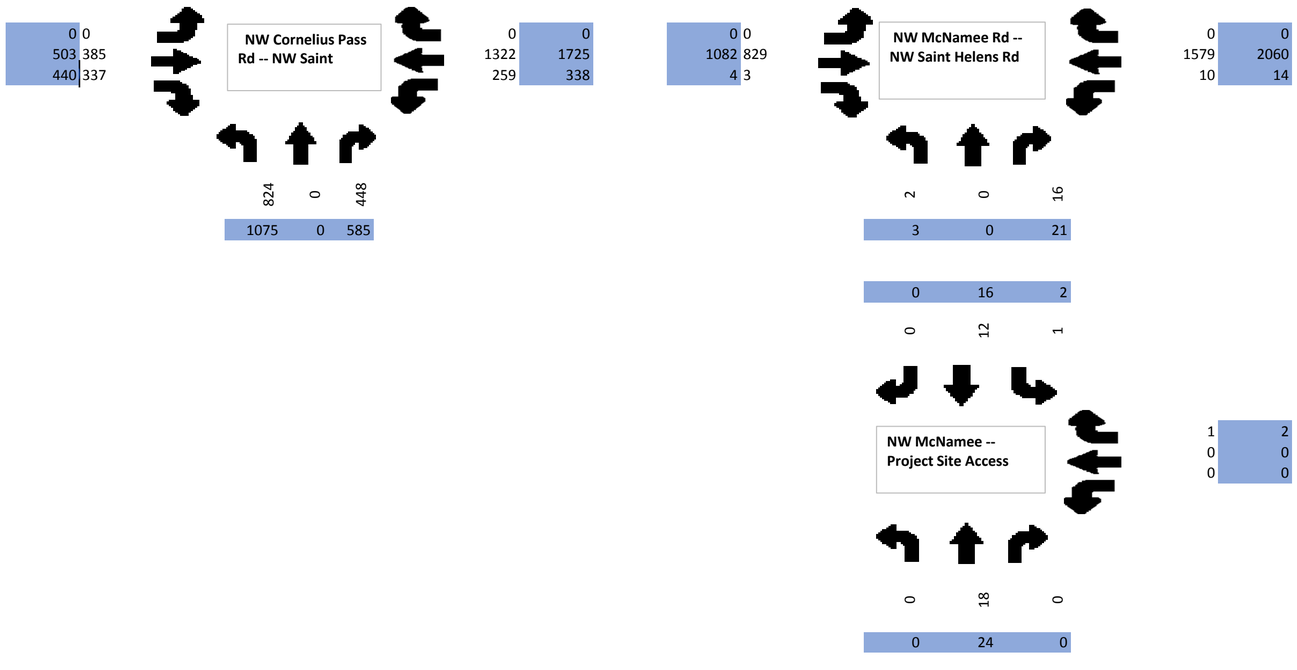
Thursday System peak hour : 4:15-5:15

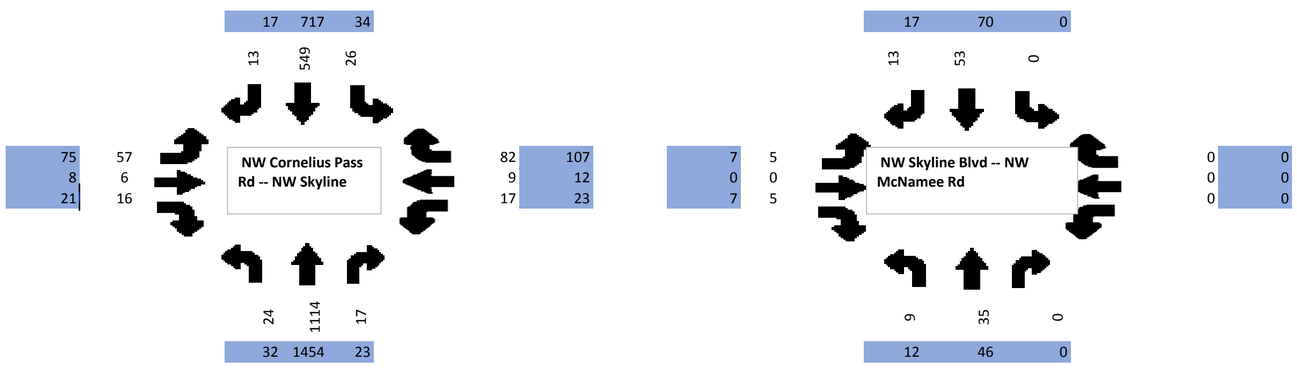
YEAR 2019 BACKGROUND TRAFFIC





Year 2033 Background Traffic





Trip balancing
Intersection with close proximity to each other and with minimal number of driveway were balance

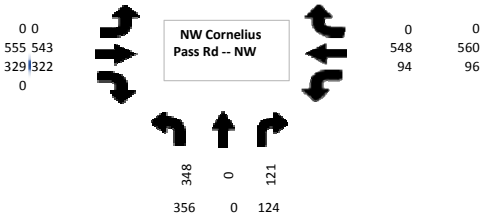
The figure presented here is not to scale and

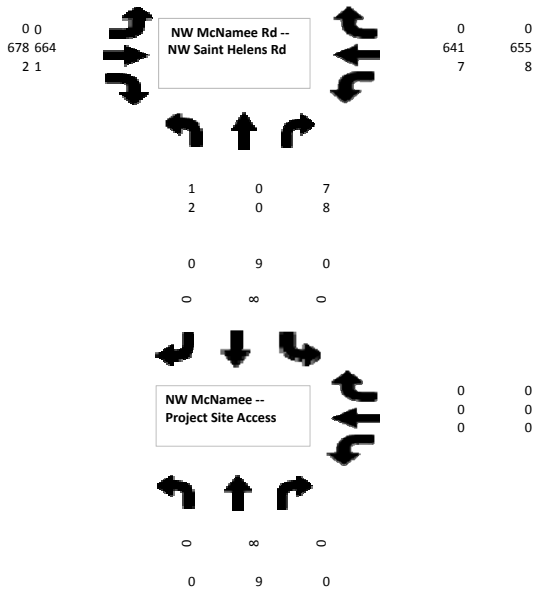
PEAK-HOUR VOLUMES

		NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEnterin	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
1:20 PM -- 2:20 PM	**14735210 - NW McNamee -- Project Site Access**	0	5	0	0	8	0	0	0	0	0	0	0	5	8	0	0	5	8	0	0
1:20 PM -- 2:20 PM	**14735211 - NW Skyline Blvd -- NW McNamee Rd**	3	29	0	0	39	4	5	0	4	0	0	0	32	43	9	0	33	44	0	7
1:20 PM -- 2:20 PM	**14735220 - NW McNamee Rd -- NW Saint Helens Rd**	1	0	7	0	0	0	0	609	1	7	638	0	8	0	610	645	8	0	616	639
1:20 PM -- 2:20 PM	**14735223 - NW Cornelius Pass Rd -- NW Saint Helens Rd**	348	0	121	0	0	0	0	543	322	94	548	0	469	0	865	642	416	0	664	896
1:20 PM -- 2:20 PM	**14735226 - NW Cornelius Pass Rd -- NW Skyline Blvd**	30	431	16	13	408	11	19	13	14	19	10	22	477	432	46	51	472	441	42	51

Saturday System peak hour : 1:20-2:20

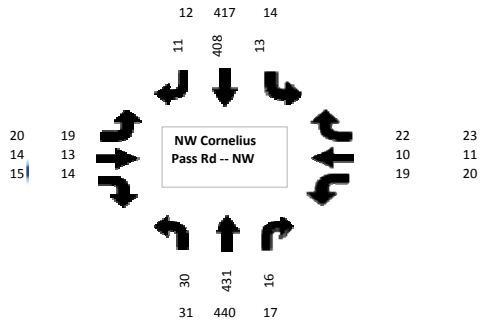
Year 2019 Balanced Volumes

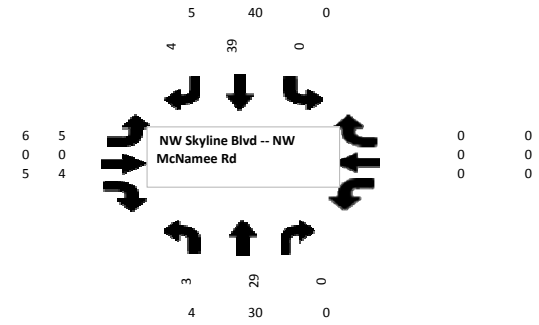




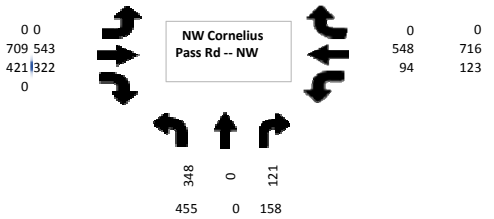
Trip balancing
Intersection with close proximity to each other and with minimal number of driveway were balance

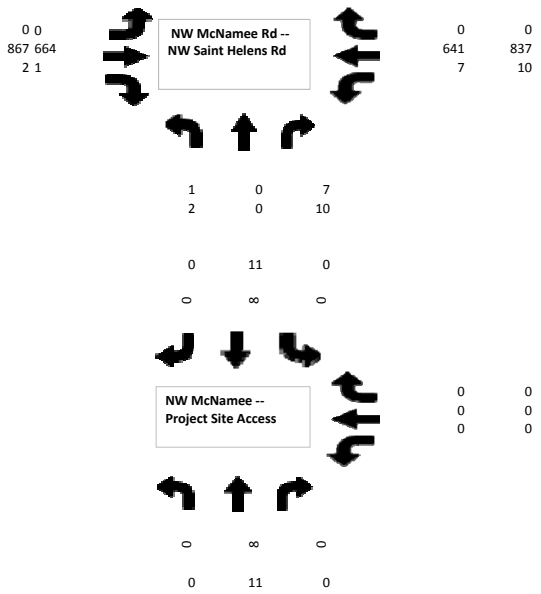
The figure presented here is not to scale and





Year 2033 Background Traffic

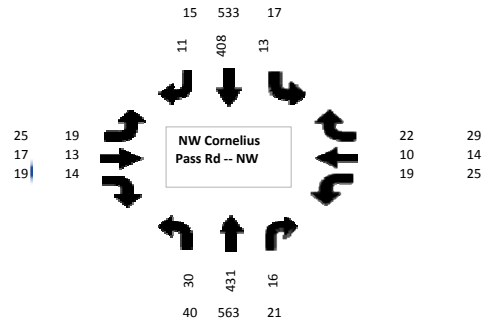


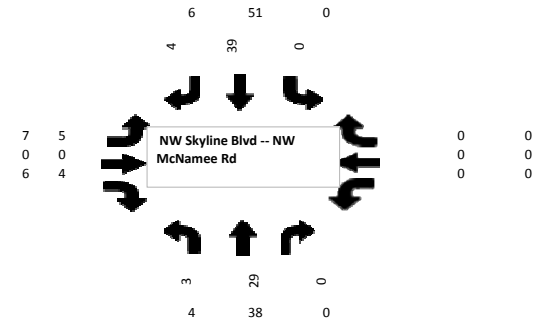


Trip balancing

Intersection with close proximity to each other and with minimal number of driveway were balance

The figure presented here is not to scale and





Ajacent Street Peak Traffic Hour Directional Distribution

County Park ITE (412)				Regional (417)				**Burlington Park**			
Weekday		*Weekend Day		Weekday		*Weekend Day		**Weekday**		***Weekend Day**	
In	Out	In	Out	In	Out	In	Out	**In**	**Out**	**In**	**Out**
61	39	57	43	44	56	48	52	**53**	**47**	**53**	**47**

* Peak hour of genarator. Peak hour of adjacent street is not provided

EXHIBIT K

Year 2019 Background Weekday/Weekend Day Synchro Worksheets

Year 2019 Total Weekday/Weekend Day Synchro Worksheets

HCM Signalized Intersection Capacity Analysis
6: NW Cornelius Pass Rd & US 30

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	395	345	265	1355	845	460
Future Volume (vph)	395	345	265	1355	845	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	375	288	1473	918	500
RTOR Reduction (vph)	0	299	0	0	0	218
Lane Group Flow (vph)	429	76	288	1473	918	282
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	5	
Permitted Phases		4				5
Actuated Green, G (s)	15.9	15.9	17.3	39.2	27.6	27.6
Effective Green, g (s)	15.9	15.9	17.3	39.2	27.6	27.6
Actuated g/C Ratio	0.20	0.20	0.22	0.50	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	718	321	391	1771	1210	557
v/s Ratio Prot	0.12		0.16	c0.42	c0.27	
v/s Ratio Perm		0.05				0.18
v/c Ratio	0.60	0.24	0.74	0.83	0.76	0.51
Uniform Delay, d1	28.3	26.1	28.4	16.7	22.4	20.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.4	7.1	3.5	2.8	0.7
Delay (s)	29.6	26.5	35.4	20.2	25.2	20.7
Level of Service	C	C	D	C	C	C
Approach Delay (s)	28.2			22.7	23.6	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	78.3	Sum of lost time (s)	17.5
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	845	5	10	1615	0	5	0	20	0	0	0
Future Vol, veh/h	0	845	5	10	1615	0	5	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	918	5	11	1755	0	5	0	22	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1755	0	0	923	0	0	1821	2698	462	2236	2700	878
Stage 1	-	-	-	-	-	-	921	921	-	1777	1777	-
Stage 2	-	-	-	-	-	-	900	1777	-	459	923	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	353	-	-	736	-	0	48	21	547	23	21	291
Stage 1	-	-	-	-	-	0	291	347	-	85	134	-
Stage 2	-	-	-	-	-	0	300	134	-	551	347	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	353	-	-	736	-	-	47	21	547	22	21	291
Mov Cap-2 Maneuver	-	-	-	-	-	-	47	21	-	22	21	-
Stage 1	-	-	-	-	-	-	291	347	-	85	132	-
Stage 2	-	-	-	-	-	-	296	132	-	529	347	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.9	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	547	353	-	-	736	-	-
HCM Lane V/C Ratio	0.04	-	-	-	0.015	-	-
HCM Control Delay (s)	11.9	0	-	-	10	-	0
HCM Lane LOS	B	A	-	-	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	5	0	20	0	0	15	0
Future Vol, veh/h	0	0	0	0	0	5	0	20	0	0	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	22	0	0	16	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	41	38	16	38	38	22	16	0	0	22	0	0
Stage 1	16	16	-	22	22	-	-	-	-	-	-	-
Stage 2	25	22	-	16	16	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	963	854	1063	967	854	1055	1602	-	-	1593	-	-
Stage 1	1004	882	-	996	877	-	-	-	-	-	-	-
Stage 2	993	877	-	1004	882	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	958	854	1063	967	854	1055	1602	-	-	1593	-	-
Mov Cap-2 Maneuver	958	854	-	967	854	-	-	-	-	-	-	-
Stage 1	1004	882	-	996	877	-	-	-	-	-	-	-
Stage 2	988	877	-	1004	882	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.4	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	-	1055	1593	-	-
HCM Lane V/C Ratio	-	-	-	-	0.005	-	-	-
HCM Control Delay (s)	0	-	-	0	8.4	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	35	55	15	5	5
Future Vol, veh/h	10	35	55	15	5	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	38	60	16	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	76	0	-	0	128	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	60	-
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	1523	-	-	-	866	995
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	963	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1523	-	-	-	860	995
Mov Cap-2 Maneuver	-	-	-	-	860	-
Stage 1	-	-	-	-	948	-
Stage 2	-	-	-	-	963	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1523	-	-	-	923
HCM Lane V/C Ratio	0.007	-	-	-	0.012
HCM Control Delay (s)	7.4	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	82.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	20	20	10	85	25	1140	20	30	560	15
Future Vol, veh/h	60	10	20	20	10	85	25	1140	20	30	560	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	22	22	11	92	27	1239	22	33	609	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2039	1998	617	2004	1995	1250	625	0	0	1261	0	0
Stage 1	683	683	-	1304	1304	-	-	-	-	-	-	-
Stage 2	1356	1315	-	700	691	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 42	60	490	44	60	211	956	-	-	551	-	-
Stage 1	439	449	-	197	230	-	-	-	-	-	-	-
Stage 2	184	228	-	430	446	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	55	490	33	55	211	956	-	-	551	-	-
Mov Cap-2 Maneuver	~ 19	55	-	33	55	-	-	-	-	-	-	-
Stage 1	427	422	-	191	224	-	-	-	-	-	-	-
Stage 2	96	222	-	376	419	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	1480.7	267.5	0.2	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	956	-	-	27	97	551	-	-
HCM Lane V/C Ratio	0.028	-	-	3.623	1.289	0.059	-	-
HCM Control Delay (s)	8.9	-	-	$ 1480.7	267.5	11.9	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	11.9	8.8	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	555	330	95	560	365	125
Future Volume (veh/h)	555	330	95	560	365	125
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	603	359	103	609	397	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1305	582	163	2098	506	
Arrive On Green	0.37	0.37	0.09	0.59	0.15	0.00
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	603	359	103	609	397	0
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	4.4	6.3	1.9	2.9	3.8	0.0
Cycle Q Clear(g_c), s	4.4	6.3	1.9	2.9	3.8	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1305	582	163	2098	506	
V/C Ratio(X)	0.46	0.62	0.63	0.29	0.79	
Avail Cap(c_a), veh/h	2361	1053	1371	5564	506	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.2	8.8	15.0	3.5	14.1	0.0
Incr Delay (d2), s/veh	0.3	1.1	4.0	0.1	8.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.2	0.7	0.1	1.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.5	9.9	19.0	3.5	22.0	0.0
LnGrp LOS	A	A	B	A	C	
Approach Vol, veh/h	962			712	397	A
Approach Delay, s/veh	9.0			5.8	22.0	
Approach LOS	A			A	C	

Timer - Assigned Phs	2	3	4		8
Phs Duration (G+Y+Rc), s	9.5	7.6	17.1		24.7
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.0	26.3	22.7		53.5
Max Q Clear Time (g_c+I1), s	5.8	3.9	8.3		4.9
Green Ext Time (p_c), s	0.0	0.2	4.2		4.0

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	680	0	10	655	0	0	0	10	0	0	0
Future Vol, veh/h	0	680	0	10	655	0	0	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	739	0	11	712	0	0	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	712	0	0	739	0	0	1117	1473	370	1104	1473	356
Stage 1	-	-	-	-	-	-	739	739	-	734	734	-
Stage 2	-	-	-	-	-	-	378	734	-	370	739	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	884	-	-	863	-	-	162	126	627	166	126	640
Stage 1	-	-	-	-	-	-	375	422	-	378	424	-
Stage 2	-	-	-	-	-	-	616	424	-	622	422	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	884	-	-	863	-	-	160	124	627	162	124	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	160	124	-	162	124	-
Stage 1	-	-	-	-	-	-	375	422	-	378	418	-
Stage 2	-	-	-	-	-	-	608	418	-	611	422	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	10.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	627	884	-	-	863	-	-	-
HCM Lane V/C Ratio	0.017	-	-	-	0.013	-	-	-
HCM Control Delay (s)	10.8	0	-	-	9.2	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	0	0	0	0	0	10	0	0	10	0
Future Vol, veh/h	0	0	0	0	0	0	0	10	0	0	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	11	0	0	11	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	22	22	11	22	22	11	11	0	0	11	0	0
Stage 1	11	11	-	11	11	-	-	-	-	-	-	-
Stage 2	11	11	-	11	11	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	990	872	1070	990	872	1070	1608	-	-	1608	-	-
Stage 1	1010	886	-	1010	886	-	-	-	-	-	-	-
Stage 2	1010	886	-	1010	886	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	990	872	1070	990	872	1070	1608	-	-	1608	-	-
Mov Cap-2 Maneuver	990	872	-	990	872	-	-	-	-	-	-	-
Stage 1	1010	886	-	1010	886	-	-	-	-	-	-	-
Stage 2	1010	886	-	1010	886	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1608	-	-	-	-	1608	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	30	40	5	5	5
Future Vol, veh/h	5	30	40	5	5	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	33	43	5	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	48	0	-	0	89	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	43	-
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	1559	-	-	-	912	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1559	-	-	-	909	1023
Mov Cap-2 Maneuver	-	-	-	-	909	-
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	979	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1559	-	-	-	963
HCM Lane V/C Ratio	0.003	-	-	-	0.011
HCM Control Delay (s)	7.3	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↱		↰	↱	
Traffic Vol, veh/h	20	15	15	20	10	25	30	440	20	15	420	15
Future Vol, veh/h	20	15	15	20	10	25	30	440	20	15	420	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	16	16	22	11	27	33	478	22	16	457	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1071	1063	465	1068	1060	489	473	0	0	500	0	0
Stage 1	497	497	-	555	555	-	-	-	-	-	-	-
Stage 2	574	566	-	513	505	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	198	223	597	199	224	579	1089	-	-	1064	-	-
Stage 1	555	545	-	516	513	-	-	-	-	-	-	-
Stage 2	504	507	-	544	540	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	175	213	597	176	214	579	1089	-	-	1064	-	-
Mov Cap-2 Maneuver	175	213	-	176	214	-	-	-	-	-	-	-
Stage 1	538	537	-	501	498	-	-	-	-	-	-	-
Stage 2	456	492	-	505	532	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	22.1	0.5	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1089	-	-	238	270	1064	-	-
HCM Lane V/C Ratio	0.03	-	-	0.228	0.221	0.015	-	-
HCM Control Delay (s)	8.4	-	-	24.5	22.1	8.4	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.8	0	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	395	345	265	1355	845	460
Future Volume (vph)	395	345	265	1355	845	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	375	288	1473	918	500
RTOR Reduction (vph)	0	299	0	0	0	218
Lane Group Flow (vph)	429	76	288	1473	918	282
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	5	
Permitted Phases		4				5
Actuated Green, G (s)	15.9	15.9	17.3	39.2	27.6	27.6
Effective Green, g (s)	15.9	15.9	17.3	39.2	27.6	27.6
Actuated g/C Ratio	0.20	0.20	0.22	0.50	0.35	0.35
Clearance Time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	718	321	391	1771	1210	557
v/s Ratio Prot	0.12		0.16	c0.42	c0.27	
v/s Ratio Perm		0.05				0.18
v/c Ratio	0.60	0.24	0.74	0.83	0.76	0.51
Uniform Delay, d1	28.3	26.1	28.4	16.7	22.4	20.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.4	7.1	3.5	2.8	0.7
Delay (s)	29.6	26.5	35.4	20.2	25.2	20.7
Level of Service	C	C	D	C	C	C
Approach Delay (s)	28.2			22.7	23.6	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	78.3	Sum of lost time (s)	17.5
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 2010 TWSC
3: NW McNamee Rd & US 30

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	845	5	15	1615	0	5	0	25	0	0	0
Future Vol, veh/h	0	845	5	15	1615	0	5	0	25	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	918	5	16	1755	0	5	0	27	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1755	0	0	923	0	0	1831	2708	462	2246	2710	878
Stage 1	-	-	-	-	-	-	921	921	-	1787	1787	-
Stage 2	-	-	-	-	-	-	910	1787	-	459	923	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	353	-	-	736	-	0	47	21	547	23	21	291
Stage 1	-	-	-	-	-	0	291	347	-	84	132	-
Stage 2	-	-	-	-	-	0	296	132	-	551	347	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	353	-	-	736	-	-	46	21	547	22	21	291
Mov Cap-2 Maneuver	-	-	-	-	-	-	46	21	-	22	21	-
Stage 1	-	-	-	-	-	-	291	347	-	84	129	-
Stage 2	-	-	-	-	-	-	290	129	-	524	347	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.9	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	547	353	-	-	736	-	-
HCM Lane V/C Ratio	0.05	-	-	-	0.022	-	-
HCM Control Delay (s)	11.9	0	-	-	10	-	0
HCM Lane LOS	B	A	-	-	B	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-

HCM 2010 TWSC
8: NW McNamee Rd & Maintenance/Project Access

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	0	10	0	20	5	5	15	0
Future Vol, veh/h	0	0	0	5	0	10	0	20	5	5	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	0	11	0	22	5	5	16	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	56	53	16	51	51	25	16	0	0	27	0	0
Stage 1	26	26	-	25	25	-	-	-	-	-	-	-
Stage 2	30	27	-	26	26	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	941	838	1063	948	840	1051	1602	-	-	1587	-	-
Stage 1	992	874	-	993	874	-	-	-	-	-	-	-
Stage 2	987	873	-	992	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	929	835	1063	946	837	1051	1602	-	-	1587	-	-
Mov Cap-2 Maneuver	929	835	-	946	837	-	-	-	-	-	-	-
Stage 1	992	871	-	993	874	-	-	-	-	-	-	-
Stage 2	977	873	-	989	871	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.6	0	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	-	1014	1587	-	-
HCM Lane V/C Ratio	-	-	-	-	0.016	0.003	-	-
HCM Control Delay (s)	0	-	-	0	8.6	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

HCM 2010 TWSC
5: NW Skyline Blvd & NW McNamee Rd

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	35	55	20	5	10
Future Vol, veh/h	10	35	55	20	5	10
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	38	60	22	5	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	82	0	-	0	131	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	60	-
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	1515	-	-	-	863	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	963	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1515	-	-	-	857	991
Mov Cap-2 Maneuver	-	-	-	-	857	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	963	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1515	-	-	-	942
HCM Lane V/C Ratio	0.007	-	-	-	0.017
HCM Control Delay (s)	7.4	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 2010 TWSC
10: NW Cornelius Pass Rd & NW Skyline Blvd

Intersection	
Int Delay, s/veh	82.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	10	20	20	10	85	25	1140	20	30	560	15
Future Vol, veh/h	60	10	20	20	10	85	25	1140	20	30	560	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	11	22	22	11	92	27	1239	22	33	609	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2039	1998	617	2004	1995	1250	625	0	0	1261	0	0
Stage 1	683	683	-	1304	1304	-	-	-	-	-	-	-
Stage 2	1356	1315	-	700	691	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 42	60	490	44	60	211	956	-	-	551	-	-
Stage 1	439	449	-	197	230	-	-	-	-	-	-	-
Stage 2	184	228	-	430	446	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	55	490	33	55	211	956	-	-	551	-	-
Mov Cap-2 Maneuver	~ 19	55	-	33	55	-	-	-	-	-	-	-
Stage 1	427	422	-	191	224	-	-	-	-	-	-	-
Stage 2	96	222	-	376	419	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, $	1480.7	267.5	0.2	0.6
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	956	-	-	27	97	551	-	-
HCM Lane V/C Ratio	0.028	-	-	3.623	1.289	0.059	-	-
HCM Control Delay (s)	8.9	-	-	$ 1480.7	267.5	11.9	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	11.9	8.8	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	560	330	95	565	365	125
Future Volume (veh/h)	560	330	95	565	365	125
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	609	359	103	614	397	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1229	548	144	1997	618	
Arrive On Green	0.35	0.35	0.08	0.56	0.18	0.00
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	609	359	103	614	397	0
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	6.0	8.5	2.5	4.1	4.7	0.0
Cycle Q Clear(g_c), s	6.0	8.5	2.5	4.1	4.7	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1229	548	144	1997	618	
V/C Ratio(X)	0.50	0.65	0.71	0.31	0.64	
Avail Cap(c_a), veh/h	2482	1107	642	4243	1985	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.5	12.3	19.9	5.1	16.9	0.0
Incr Delay (d2), s/veh	0.3	1.3	6.4	0.1	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.2	1.1	0.6	1.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.8	13.6	26.3	5.2	18.0	0.0
LnGrp LOS	B	B	C	A	B	
Approach Vol, veh/h	968			717	397	A
Approach Delay, s/veh	12.5			8.3	18.0	
Approach LOS	B			A	B	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.4	9.6	21.4		30.9
Change Period (Y+Rc), s		5.5	6.0	6.0		6.0
Max Green Setting (Gmax), s		25.5	16.0	31.0		53.0
Max Q Clear Time (g_c+I1), s		6.7	4.5	10.5		6.1
Green Ext Time (p_c), s		1.3	0.2	4.9		4.1

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	680	5	20	655	0	5	0	15	0	0	0
Future Vol, veh/h	0	680	5	20	655	0	5	0	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	739	5	22	712	0	5	0	16	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	712	0	0	744	0	0	1142	1498	372	1126	1500	356
Stage 1	-	-	-	-	-	-	742	742	-	756	756	-
Stage 2	-	-	-	-	-	-	400	756	-	370	744	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	884	-	-	859	-	-	155	121	625	160	121	640
Stage 1	-	-	-	-	-	-	374	420	-	366	414	-
Stage 2	-	-	-	-	-	-	597	414	-	622	420	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	884	-	-	859	-	-	152	118	625	153	118	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	118	-	153	118	-
Stage 1	-	-	-	-	-	-	374	420	-	366	403	-
Stage 2	-	-	-	-	-	-	582	403	-	606	420	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	15.9	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	352	884	-	-	859	-	-	-
HCM Lane V/C Ratio	0.062	-	-	-	0.025	-	-	-
HCM Control Delay (s)	15.9	0	-	-	9.3	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	0	5	0	5	0	10	5	5	15	0
Future Vol, veh/h	0	0	0	5	0	5	0	10	5	5	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	0	5	0	11	5	5	16	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	42	42	16	40	40	14	16	0	0	16	0	0
Stage 1	26	26	-	14	14	-	-	-	-	-	-	-
Stage 2	16	16	-	26	26	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	961	850	1063	964	852	1066	1602	-	-	1602	-	-
Stage 1	992	874	-	1006	884	-	-	-	-	-	-	-
Stage 2	1004	882	-	992	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	954	847	1063	962	849	1066	1602	-	-	1602	-	-
Mov Cap-2 Maneuver	954	847	-	962	849	-	-	-	-	-	-	-
Stage 1	992	871	-	1006	884	-	-	-	-	-	-	-
Stage 2	999	882	-	989	871	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.6	0	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	-	1011	1602	-	-
HCM Lane V/C Ratio	-	-	-	-	0.011	0.003	-	-
HCM Control Delay (s)	0	-	-	0	8.6	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	30	40	10	10	5
Future Vol, veh/h	5	30	40	10	10	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	33	43	11	11	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	54	0	-	0	92	49
Stage 1	-	-	-	-	49	-
Stage 2	-	-	-	-	43	-
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	1551	-	-	-	908	1020
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1551	-	-	-	905	1020
Mov Cap-2 Maneuver	-	-	-	-	905	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	979	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1551	-	-	-	940
HCM Lane V/C Ratio	0.004	-	-	-	0.017
HCM Control Delay (s)	7.3	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↑		↰	↑	
Traffic Vol, veh/h	20	15	15	20	10	25	30	440	20	15	420	15
Future Vol, veh/h	20	15	15	20	10	25	30	440	20	15	420	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	16	16	22	11	27	33	478	22	16	457	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1071	1063	465	1068	1060	489	473	0	0	500	0	0
Stage 1	497	497	-	555	555	-	-	-	-	-	-	-
Stage 2	574	566	-	513	505	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	198	223	597	199	224	579	1089	-	-	1064	-	-
Stage 1	555	545	-	516	513	-	-	-	-	-	-	-
Stage 2	504	507	-	544	540	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	175	213	597	176	214	579	1089	-	-	1064	-	-
Mov Cap-2 Maneuver	175	213	-	176	214	-	-	-	-	-	-	-
Stage 1	538	537	-	501	498	-	-	-	-	-	-	-
Stage 2	456	492	-	505	532	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	22.1	0.5	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1089	-	-	238	270	1064	-	-
HCM Lane V/C Ratio	0.03	-	-	0.228	0.221	0.015	-	-
HCM Control Delay (s)	8.4	-	-	24.5	22.1	8.4	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.8	0	-	-

EXHIBIT L - Synchro worksheets

-Year 2033 Weekday/Weekend Day Background Traffic

- Year 2033 Weekday/Weekend Day Total Traffic

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	505	445	340	1730	1075	585
Future Volume (vph)	505	445	340	1730	1075	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	484	370	1880	1168	636
RTOR Reduction (vph)	0	348	0	0	0	127
Lane Group Flow (vph)	549	136	370	1880	1168	509
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	5	
Permitted Phases		4				5
Actuated Green, G (s)	40.9	40.9	33.9	80.8	53.5	53.5
Effective Green, g (s)	40.9	40.9	33.9	80.8	53.5	53.5
Actuated g/C Ratio	0.28	0.28	0.23	0.55	0.37	0.37
Clearance Time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	992	444	411	1961	1259	580
v/s Ratio Prot	0.16		0.21	c0.53	c0.34	
v/s Ratio Perm		0.09				0.32
v/c Ratio	0.55	0.31	0.90	0.96	0.93	0.88
Uniform Delay, d1	44.7	41.3	54.3	30.9	44.3	43.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4	22.2	11.9	11.8	14.0
Delay (s)	45.3	41.7	76.5	42.8	56.0	57.1
Level of Service	D	D	E	D	E	E
Approach Delay (s)	43.6			48.4	56.4	
Approach LOS	D			D	E	

Intersection Summary			
HCM 2000 Control Delay	50.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	145.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1085	5	15	2065	0	5	0	25	0	0	0
Future Vol, veh/h	0	1085	5	15	2065	0	5	0	25	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1179	5	16	2245	0	5	0	27	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2245	0	0	1184	0	0	2337	3459	592	2867	3461	1123
Stage 1	-	-	-	-	-	-	1182	1182	-	2277	2277	-
Stage 2	-	-	-	-	-	-	1155	2277	-	590	1184	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	227	-	-	586	-	-	19	7	449	8	7	200
Stage 1	-	-	-	-	-	-	201	262	-	41	74	-
Stage 2	-	-	-	-	-	-	209	74	-	461	261	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	227	-	-	586	-	-	19	7	449	7	7	200
Mov Cap-2 Maneuver	-	-	-	-	-	-	19	7	-	7	7	-
Stage 1	-	-	-	-	-	-	201	262	-	41	72	-
Stage 2	-	-	-	-	-	-	203	72	-	433	261	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	62.4	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	94	227	-	-	586	-	-	-
HCM Lane V/C Ratio	0.347	-	-	-	0.028	-	-	-
HCM Control Delay (s)	62.4	0	-	-	11.3	-	-	0
HCM Lane LOS	F	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	1.4	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	0	0	0	5	0	25	0	5	15	0
Future Vol, veh/h	0	0	0	0	0	5	0	25	0	5	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	5	0	27	0	5	16	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	56	53	16	53	53	27	16	0	0	27	0	0
Stage 1	26	26	-	27	27	-	-	-	-	-	-	-
Stage 2	30	27	-	26	26	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	941	838	1063	946	838	1048	1602	-	-	1587	-	-
Stage 1	992	874	-	990	873	-	-	-	-	-	-	-
Stage 2	987	873	-	992	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	934	835	1063	944	835	1048	1602	-	-	1587	-	-
Mov Cap-2 Maneuver	934	835	-	944	835	-	-	-	-	-	-	-
Stage 1	992	871	-	990	873	-	-	-	-	-	-	-
Stage 2	982	873	-	989	871	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.5	0	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	-	1048	1587	-	-
HCM Lane V/C Ratio	-	-	-	-	0.005	0.003	-	-
HCM Control Delay (s)	0	-	-	0	8.5	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	50	70	20	5	5
Future Vol, veh/h	15	50	70	20	5	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	54	76	22	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	98	0	-	0	173	87
Stage 1	-	-	-	-	87	-
Stage 2	-	-	-	-	86	-
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	1495	-	-	-	817	971
Stage 1	-	-	-	-	936	-
Stage 2	-	-	-	-	937	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1495	-	-	-	808	971
Mov Cap-2 Maneuver	-	-	-	-	808	-
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	937	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1495	-	-	-	882
HCM Lane V/C Ratio	0.011	-	-	-	0.012
HCM Control Delay (s)	7.4	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2484.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	5	25	25	15	105	30	1455	25	35	720	20
Future Vol, veh/h	75	5	25	25	15	105	30	1455	25	35	720	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	82	5	27	27	16	114	33	1582	27	38	783	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2597	2545	794	2548	2543	1596	805	0	0	1609	0	0
Stage 1	870	870	-	1662	1662	-	-	-	-	-	-	-
Stage 2	1727	1675	-	886	881	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 17	27	388	~ 18	27	131	819	-	-	406	-	-
Stage 1	346	369	-	123	154	-	-	-	-	-	-	-
Stage 2	112	152	-	339	365	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 1	23	388	~ 12	23	131	819	-	-	406	-	-
Mov Cap-2 Maneuver	~ 1	23	-	~ 12	23	-	-	-	-	-	-	-
Stage 1	332	334	-	118	148	-	-	-	-	-	-	-
Stage 2	~ 12	146	-	281	331	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay	$ 57917.9	$ 1482	0.2	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	819	-	-	1	41	406	-	-
HCM Lane V/C Ratio	0.04	-	-	114.13	3.844	0.094	-	-
HCM Control Delay (s)	9.6	-	-	$ 57917.9	$ 1482	14.8	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	16.7	17.9	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	710	420	125	715	455	160
Future Volume (veh/h)	710	420	125	715	455	160
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	772	457	136	777	495	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1436	641	180	2157	684	
Arrive On Green	0.40	0.40	0.10	0.61	0.20	0.00
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	772	457	136	777	495	0
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	9.8	14.2	4.4	6.5	7.9	0.0
Cycle Q Clear(g_c), s	9.8	14.2	4.4	6.5	7.9	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1436	641	180	2157	684	
V/C Ratio(X)	0.54	0.71	0.75	0.36	0.72	
Avail Cap(c_a), veh/h	3615	1612	846	5663	2607	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.4	14.7	25.8	5.8	22.1	0.0
Incr Delay (d2), s/veh	0.3	1.5	6.3	0.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	4.1	1.9	1.3	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	16.2	32.1	5.9	23.6	0.0
LnGrp LOS	B	B	C	A	C	
Approach Vol, veh/h	1229			913	495	A
Approach Delay, s/veh	14.6			9.8	23.6	
Approach LOS	B			A	C	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		17.2	12.0	29.8		41.8
Change Period (Y+Rc), s		5.5	6.0	6.0		6.0
Max Green Setting (Gmax), s		44.5	28.0	60.0		94.0
Max Q Clear Time (g_c+I1), s		9.9	6.4	16.2		8.5
Green Ext Time (p_c), s		1.8	0.3	7.6		5.5

Intersection Summary	
HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	870	0	10	840	0	0	0	10	0	0	0
Future Vol, veh/h	0	870	0	10	840	0	0	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	946	0	11	913	0	0	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	913	0	0	946	0	0	1425	1881	473	1408	1881	457
Stage 1	-	-	-	-	-	-	946	946	-	935	935	-
Stage 2	-	-	-	-	-	-	479	935	-	473	946	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	742	-	-	721	-	-	96	70	538	99	70	551
Stage 1	-	-	-	-	-	-	281	338	-	285	342	-
Stage 2	-	-	-	-	-	-	537	342	-	541	338	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	742	-	-	721	-	-	95	69	538	96	69	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	95	69	-	96	69	-
Stage 1	-	-	-	-	-	-	281	338	-	285	337	-
Stage 2	-	-	-	-	-	-	529	337	-	530	338	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	538	742	-	-	721	-	-	-
HCM Lane V/C Ratio	0.02	-	-	-	0.015	-	-	-
HCM Control Delay (s)	11.8	0	-	-	10.1	-	-	0
HCM Lane LOS	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	0	0	10	0	0	10	0
Future Vol, veh/h	0	0	0	0	0	0	0	10	0	0	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	11	0	0	11	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	22	22	11	22	22	11	11	0	0	11	0	0
Stage 1	11	11	-	11	11	-	-	-	-	-	-	-
Stage 2	11	11	-	11	11	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	990	872	1070	990	872	1070	1608	-	-	1608	-	-
Stage 1	1010	886	-	1010	886	-	-	-	-	-	-	-
Stage 2	1010	886	-	1010	886	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	990	872	1070	990	872	1070	1608	-	-	1608	-	-
Mov Cap-2 Maneuver	990	872	-	990	872	-	-	-	-	-	-	-
Stage 1	1010	886	-	1010	886	-	-	-	-	-	-	-
Stage 2	1010	886	-	1010	886	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1608	-	-	-	-	1608	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	40	50	5	5	5
Future Vol, veh/h	5	40	50	5	5	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	43	54	5	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	59	0	-	0	110	57
Stage 1	-	-	-	-	57	-
Stage 2	-	-	-	-	53	-
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	1545	-	-	-	887	1009
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	970	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1545	-	-	-	884	1009
Mov Cap-2 Maneuver	-	-	-	-	884	-
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	970	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1545	-	-	-	942
HCM Lane V/C Ratio	0.004	-	-	-	0.012
HCM Control Delay (s)	7.3	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↰	↑		↰	↑	
Traffic Vol, veh/h	20	25	20	25	15	30	40	565	25	20	535	15
Future Vol, veh/h	20	25	20	25	15	30	40	565	25	20	535	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	27	22	27	16	33	43	614	27	22	582	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1372	1361	590	1373	1356	628	598	0	0	641	0	0
Stage 1	634	634	-	714	714	-	-	-	-	-	-	-
Stage 2	738	727	-	659	642	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	123	148	508	123	149	483	979	-	-	943	-	-
Stage 1	467	473	-	422	435	-	-	-	-	-	-	-
Stage 2	410	429	-	453	469	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	99	138	508	95	139	483	979	-	-	943	-	-
Mov Cap-2 Maneuver	99	138	-	95	139	-	-	-	-	-	-	-
Stage 1	446	462	-	403	416	-	-	-	-	-	-	-
Stage 2	351	410	-	399	458	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	46.8	45.5	0.6	0.3
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	979	-	-	154	162	943	-	-
HCM Lane V/C Ratio	0.044	-	-	0.459	0.47	0.023	-	-
HCM Control Delay (s)	8.8	-	-	46.8	45.5	8.9	-	-
HCM Lane LOS	A	-	-	E	E	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.1	2.2	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	505	445	340	1730	1075	585
Future Volume (vph)	505	445	340	1730	1075	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	3433	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	549	484	370	1880	1168	636
RTOR Reduction (vph)	0	348	0	0	0	254
Lane Group Flow (vph)	549	136	370	1880	1168	382
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	5	
Permitted Phases		4				5
Actuated Green, G (s)	40.9	40.9	33.9	80.8	53.5	53.5
Effective Green, g (s)	40.9	40.9	33.9	80.8	53.5	53.5
Actuated g/C Ratio	0.28	0.28	0.23	0.55	0.37	0.37
Clearance Time (s)	6.0	6.0	6.0	6.0	5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	992	444	411	1961	1259	580
v/s Ratio Prot	0.16		0.21	c0.53	c0.34	
v/s Ratio Perm		0.09				0.24
v/c Ratio	0.55	0.31	0.90	0.96	0.93	0.66
Uniform Delay, d1	44.7	41.3	54.3	30.9	44.3	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4	22.2	11.9	11.8	2.7
Delay (s)	45.3	41.7	76.5	42.8	56.0	41.2
Level of Service	D	D	E	D	E	D
Approach Delay (s)	43.6			48.4	50.8	
Approach LOS	D			D	D	

Intersection Summary			
HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	145.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1085	5	20	2060	0	5	0	30	0	0	0
Future Vol, veh/h	0	1085	5	20	2060	0	5	0	30	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1179	5	22	2239	0	5	0	33	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2239	0	0	1184	0	0	2346	3465	592	2873	3467	1120
Stage 1	-	-	-	-	-	-	1182	1182	-	2283	2283	-
Stage 2	-	-	-	-	-	-	1164	2283	-	590	1184	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	228	-	-	586	-	-	19	7	449	7	7	201
Stage 1	-	-	-	-	-	-	201	262	-	40	74	-
Stage 2	-	-	-	-	-	-	207	74	-	461	261	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	228	-	-	586	-	-	18	7	449	6	7	201
Mov Cap-2 Maneuver	-	-	-	-	-	-	18	7	-	6	7	-
Stage 1	-	-	-	-	-	-	201	262	-	40	71	-
Stage 2	-	-	-	-	-	-	199	71	-	428	261	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	59.9	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	102	228	-	-	586	-	-	-
HCM Lane V/C Ratio	0.373	-	-	-	0.037	-	-	-
HCM Control Delay (s)	59.9	0	-	-	11.4	-	-	0
HCM Lane LOS	F	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	1.5	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	5	0	10	0	25	5	10	15	0
Future Vol, veh/h	0	0	0	5	0	10	0	25	5	10	15	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	5	0	11	0	27	5	11	16	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	73	70	16	68	68	30	16	0	0	32	0	0
Stage 1	38	38	-	30	30	-	-	-	-	-	-	-
Stage 2	35	32	-	38	38	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	918	821	1063	925	823	1044	1602	-	-	1580	-	-
Stage 1	977	863	-	987	870	-	-	-	-	-	-	-
Stage 2	981	868	-	977	863	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	903	815	1063	920	817	1044	1602	-	-	1580	-	-
Mov Cap-2 Maneuver	903	815	-	920	817	-	-	-	-	-	-	-
Stage 1	977	857	-	987	870	-	-	-	-	-	-	-
Stage 2	971	868	-	970	857	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.7	0	2.9
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1602	-	-	-	999	1580	-	-
HCM Lane V/C Ratio	-	-	-	-	0.016	0.007	-	-
HCM Control Delay (s)	0	-	-	0	8.7	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	50	70	25	15	5
Future Vol, veh/h	10	50	70	25	15	5
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	54	76	27	16	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	103	0	-	0	166	90
Stage 1	-	-	-	-	90	-
Stage 2	-	-	-	-	76	-
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	1489	-	-	-	824	968
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	947	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1489	-	-	-	817	968
Mov Cap-2 Maneuver	-	-	-	-	817	-
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	947	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1489	-	-	-	850
HCM Lane V/C Ratio	0.007	-	-	-	0.026
HCM Control Delay (s)	7.4	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	2484.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	5	25	25	15	105	30	1455	25	35	720	20
Future Vol, veh/h	75	5	25	25	15	105	30	1455	25	35	720	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	82	5	27	27	16	114	33	1582	27	38	783	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2597	2545	794	2548	2543	1596	805	0	0	1609	0	0
Stage 1	870	870	-	1662	1662	-	-	-	-	-	-	-
Stage 2	1727	1675	-	886	881	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 17	27	388	~ 18	27	131	819	-	-	406	-	-
Stage 1	346	369	-	123	154	-	-	-	-	-	-	-
Stage 2	112	152	-	339	365	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 1	23	388	~ 12	23	131	819	-	-	406	-	-
Mov Cap-2 Maneuver	~ 1	23	-	~ 12	23	-	-	-	-	-	-	-
Stage 1	332	334	-	118	148	-	-	-	-	-	-	-
Stage 2	~ 12	146	-	281	331	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay	$ 57917.9	$ 1482	0.2	0.7
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	819	-	-	1	41	406	-	-
HCM Lane V/C Ratio	0.04	-	-	114.13	3.844	0.094	-	-
HCM Control Delay (s)	9.6	-	-	$ 57917.9	$ 1482	14.8	-	-
HCM Lane LOS	A	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	16.7	17.9	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	715	420	125	720	455	160
Future Volume (veh/h)	715	420	125	720	455	160
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	777	457	136	783	495	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1438	641	180	2159	684	
Arrive On Green	0.40	0.40	0.10	0.61	0.20	0.00
Sat Flow, veh/h	3647	1585	1781	3647	3456	1585
Grp Volume(v), veh/h	777	457	136	783	495	0
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1728	1585
Q Serve(g_s), s	9.8	14.2	4.4	6.6	7.9	0.0
Cycle Q Clear(g_c), s	9.8	14.2	4.4	6.6	7.9	0.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1438	641	180	2159	684	
V/C Ratio(X)	0.54	0.71	0.75	0.36	0.72	
Avail Cap(c_a), veh/h	3610	1610	844	5656	2604	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.4	14.7	25.8	5.8	22.2	0.0
Incr Delay (d2), s/veh	0.3	1.5	6.3	0.1	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	4.1	1.9	1.4	2.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	16.2	32.1	5.9	23.7	0.0
LnGrp LOS	B	B	C	A	C	
Approach Vol, veh/h	1234			919	495	A
Approach Delay, s/veh	14.6			9.8	23.7	
Approach LOS	B			A	C	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		17.2	12.0	29.9		41.9
Change Period (Y+Rc), s		5.5	6.0	6.0		6.0
Max Green Setting (Gmax), s		44.5	28.0	60.0		94.0
Max Q Clear Time (g_c+I1), s		9.9	6.4	16.2		8.6
Green Ext Time (p_c), s		1.8	0.3	7.7		5.6

Intersection Summary	
HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	870	5	15	840	0	5	0	15	0	0	0
Future Vol, veh/h	0	870	5	15	840	0	5	0	15	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	150	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	946	5	16	913	0	5	0	16	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	913	0	0	951	0	0	1438	1894	476	1418	1896	457
Stage 1	-	-	-	-	-	-	949	949	-	945	945	-
Stage 2	-	-	-	-	-	-	489	945	-	473	951	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	742	-	-	718	-	-	94	69	535	97	69	551
Stage 1	-	-	-	-	-	-	280	337	-	282	339	-
Stage 2	-	-	-	-	-	-	529	339	-	541	336	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	742	-	-	718	-	-	92	67	535	92	67	551
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	67	-	92	67	-
Stage 1	-	-	-	-	-	-	280	337	-	282	332	-
Stage 2	-	-	-	-	-	-	517	332	-	525	336	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	21.3	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	243	742	-	-	718	-	-	-
HCM Lane V/C Ratio	0.089	-	-	-	0.023	-	-	-
HCM Control Delay (s)	21.3	0	-	-	10.1	-	-	0
HCM Lane LOS	C	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	40	50	10	10	10
Future Vol, veh/h	5	40	50	10	10	10
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	43	54	11	11	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	65	0	-	0	113	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	53	-
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	1537	-	-	-	884	1005
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	970	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1537	-	-	-	881	1005
Mov Cap-2 Maneuver	-	-	-	-	881	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	970	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1537	-	-	-	939
HCM Lane V/C Ratio	0.004	-	-	-	0.023
HCM Control Delay (s)	7.4	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	10	5	5	15
Future Vol, veh/h	5	5	10	5	5	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	-	-	-	-	-
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	5	5	11	5	5	16

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	40	14	0	0	16	0
Stage 1	14	-	-	-	-	-
Stage 2	26	-	-	-	-	-
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	972	1066	-	-	1602	-
Stage 1	1009	-	-	-	-	-
Stage 2	997	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	969	1066	-	-	1602	-
Mov Cap-2 Maneuver	969	-	-	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	997	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.6	0	1.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1015	1602	-
HCM Lane V/C Ratio	-	-	0.011	0.003	-
HCM Control Delay (s)	-	-	8.6	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	20	20	25	15	30	40	565	20	20	535	15
Future Vol, veh/h	20	20	20	25	15	30	40	565	20	20	535	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	400	-	-	300	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	22	22	27	16	33	43	614	22	22	582	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1370	1356	590	1367	1353	625	598	0	0	636	0	0
Stage 1	634	634	-	711	711	-	-	-	-	-	-	-
Stage 2	736	722	-	656	642	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	124	149	508	124	150	485	979	-	-	947	-	-
Stage 1	467	473	-	424	436	-	-	-	-	-	-	-
Stage 2	411	431	-	454	469	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	100	139	508	99	140	485	979	-	-	947	-	-
Mov Cap-2 Maneuver	100	139	-	99	140	-	-	-	-	-	-	-
Stage 1	446	462	-	405	417	-	-	-	-	-	-	-
Stage 2	352	412	-	405	458	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	43.3	43.8	0.6	0.3
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	979	-	-	157	166	947	-	-
HCM Lane V/C Ratio	0.044	-	-	0.415	0.458	0.023	-	-
HCM Control Delay (s)	8.8	-	-	43.3	43.8	8.9	-	-
HCM Lane LOS	A	-	-	E	E	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	1.8	2.1	0.1	-	-

EXHIBIT M – SimTraffic Queue Analysis Worksheets

- Year 2033 Weekday Peak Hour Traffic
- Year 2033 Weekend Day Peak Hour Traffic

Intersection: 3: NW McNamee Rd & US 30

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	28
Average Queue (ft)	16
95th Queue (ft)	38
Link Distance (ft)	1000
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: NW Skyline Blvd & NW McNamee Rd

Movement	EB
Directions Served	LT
Maximum Queue (ft)	25
Average Queue (ft)	5
95th Queue (ft)	22
Link Distance (ft)	3532
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: NW Cornelius Pass Rd & US 30

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	R
Maximum Queue (ft)	138	50	158	136	79	114	250	4438	125
Average Queue (ft)	87	32	108	110	62	64	246	2210	125
95th Queue (ft)	144	62	154	150	92	112	254	4662	125
Link Distance (ft)	1197	1197			1359	1359		7455	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			625	300			225		100
Storage Blk Time (%)							25	83	0
Queuing Penalty (veh)							284	932	4

Intersection: 8: NW McNamee Rd & Maintenance/Project Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 10: NW Skyline Blvd & NW Cornelius Pass Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	552	476	27	28
Average Queue (ft)	331	295	11	19
95th Queue (ft)	570	482	33	37
Link Distance (ft)	1419	3532		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			400	300
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1219

Intersection: 3: NW McNamee Rd & US 30

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	27	29
Average Queue (ft)	9	27
95th Queue (ft)	28	29
Link Distance (ft)		998
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: NW Skyline Blvd & NW McNamee Rd

Movement	SB
Directions Served	LR
Maximum Queue (ft)	27
Average Queue (ft)	15
95th Queue (ft)	35
Link Distance (ft)	6873
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: NW Cornelius Pass Rd & US 30

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	R
Maximum Queue (ft)	122	53	144	162	101	92	250	3942	125
Average Queue (ft)	65	37	97	122	57	65	249	2232	125
95th Queue (ft)	121	70	152	165	96	101	250	4345	125
Link Distance (ft)	1197	1197			1359	1359		7455	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			625	300			225		100
Storage Blk Time (%)							17	79	1
Queuing Penalty (veh)							186	886	10

Intersection: 8: NW McNamee Rd & Maintenance/Project Access

Movement	WB
Directions Served	LTR
Maximum Queue (ft)	19
Average Queue (ft)	9
95th Queue (ft)	23
Link Distance (ft)	432
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: NW Cornelius Pass Rd & NW Skyline Blvd

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	440	373	30	22	67
Average Queue (ft)	282	291	6	4	38
95th Queue (ft)	502	389	26	19	69
Link Distance (ft)	1419	3532		2050	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			400		300
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 1081

Intersection: 3: NW McNamee Rd & US 30

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	28
Average Queue (ft)	16
95th Queue (ft)	37
Link Distance (ft)	996
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: NW Skyline Blvd & NW McNamee Rd

Movement									
Directions Served									
Maximum Queue (ft)									
Average Queue (ft)									
95th Queue (ft)									
Link Distance (ft)									
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 6: NW Cornelius Pass Rd & US 30

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	R	L	T	T	L	L	R
Maximum Queue (ft)	105	52	74	96	49	31	88	108	101
Average Queue (ft)	70	35	52	64	32	28	57	81	20
95th Queue (ft)	102	51	82	101	46	32	84	108	87
Link Distance (ft)	1197	1197			1359	1359		7455	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			625	300			225		100
Storage Blk Time (%)								1	0
Queuing Penalty (veh)								4	0

Intersection: 8: NW McNamee Rd & Maintenance/Project Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 10: NW Cornelius Pass Rd & NW Skyline Blvd

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	76	73	27	21	27
Average Queue (ft)	40	35	10	4	5
95th Queue (ft)	70	76	32	18	23
Link Distance (ft)	1419	3532		2050	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			400		300
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 4

Intersection: 3: NW McNamee Rd & US 30

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	22	27
Average Queue (ft)	9	16
95th Queue (ft)	26	37
Link Distance (ft)		998
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: NW Skyline Blvd & NW McNamee Rd

Movement	SB
Directions Served	LR
Maximum Queue (ft)	27
Average Queue (ft)	15
95th Queue (ft)	36
Link Distance (ft)	6873
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: NW Cornelius Pass Rd & US 30

Movement	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	T	T	L	L
Maximum Queue (ft)	111	125	101	95	30	53	134	148
Average Queue (ft)	72	53	67	65	26	21	104	111
95th Queue (ft)	107	114	100	101	31	53	132	144
Link Distance (ft)	1197	1197			1359	1359		7455
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			625	300			225	
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 8: NW McNamee Rd & Maintenance/Project Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 10: NW Cornelius Pass Rd & NW Skyline Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	78	44	24	27
Average Queue (ft)	45	30	5	11
95th Queue (ft)	77	42	21	33
Link Distance (ft)	1419	3532		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			400	300
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

EXHIBIT N

County Planned Projects List

Synchro Worksheet - NW Cornelius Pass Rd/NW Skyline Blvd

Mitigated

Table 14 Planned Projects

Document	Project Number	Project Name	Project Description
Sauvie Island/Multnomah Channel			
Westside Rural TSP	1	Sauvie Island Road	Safety improvement – Add to shoulders (4 ft) and add guardrail from Gillihan Road to Reeder Road. Replace culverts. $3,675,000
	2	US 30	Commuter rail study – Conduct study to determine feasibility of commuter rail from Portland to Astoria. $100,000
	3	Gillihan Road	Safety improvement – Add to shoulders (4 ft). $2,055,000
	4	Reeder Road	Safety improvement – Add to shoulders (4 ft). $5,925,000
	5	US 30	Ride share parking – Provide parking for 100 spaces next to truck scale near county line. $325,000
	6	US 30	Speed zone study – Conduct speed zone study to determine safe speed zone from Linnton north. $5,000
	7	US 30/Cornelius Pass Road	Public transportation – Provide commuter transit service from Columbia County over Cornelius Pass Road to Washington County. $78,000/year
	8	Reeder Road	Improve parking and intersection safety with Sauvie Island Road. $250,000
	9	US 30	RAZ service expansion – Expand assuming 20 hours of additional service per work day for one bus. $78,000/year
	10	Sauvie Island Wildlife Refuge	Recreational bike path – Conduct study to determine feasibility of a bike path north of Reeder Road for recreational purposes only, followed by implementation of the findings. $1,060,000
	11	Sauvie Island Road	Improve park and ride – Delineate parking and traffic circulation. $300,000
	12	US 30	Exclusive car pool lane study – Conduct study to determine feasibility and cost of adding a reversible exclusive car pool lane on US 30. $100,000
	13	US 30	Harborton sign installation – Provide signing for Harborton. $ 1,000
	14	US 30	Scenic viewing opportunities – Access provided across railroad tracks adjacent to Burlington Bottoms using existing road approaches (per location). Exact locations to be determined. Providing pull outs of widening along US 30 will not be acceptable on the basis of safety. $350,000
Multnomah County CIPP	15	Sauvie Island Road: Bridge to Reeder Road (PN 159)	Reconstruct road to rural collector standards with 2 travel lanes. Requires working on dike. $8,275,636
	16	Sauvie Island Road: Gillihan Road to Reeder Road	Bike path. $2,114,214
	17	Sauvie Island: Reeder to Ferry Road	Shoulder bikeway. $535,851
Sauvie Island/Multnomah Channel Rural Area Plan	18	Multnomah Channel/U.S. 30	*Ride share parking* – Provide parking for 100 spaces next to truck scale near county line. Project to be coordinated with ODOT, Multnomah, and Columbia Counties.
	19	U.S. 30/Cornelius Pass Road	*Public transportation* – Provide commuter van pool or transit service from Columbia County over Cornelius Pass

			Road to Washington County.
	21	U.S. 30	*Scenic viewing opportunities* – Access provided across railroad tracks adjacent to Burlington Bottoms using existing road approaches (per location).Exact locations to be determined. Providing linear pull outs or widening adjacent to U.S. 30 will not be acceptable on the basis of safety and access management standards.
	21	Cornelius Pass Road	*U.S. 30 intersection improvements* – Include a northbound turn lane and shared northbound left-turn/right-turn lane.
	22	Gillihan Loop Road	*Safety improvement* – Add to 6. 13 miles of shoulders (4 ft).
	23	Reeder Road	*Safety improvement* – Add to 4.33 miles of shoulders (4 ft).
	24	Reeder Road	*Safety improvements* – Improve intersection sight distance with Sauvie Island Road.
	25	Sauvie Island Road	*Safety improvement* – Add to 2.15 miles of shoulders (4 ft) and add guardrail from Gillihan Road to Reeder Road. Replace culverts.
	26	Sauvie Island Road	*Create park and ride* – Delineate parking and traffic circulation. (**Completed since 1998 TSP)**
West Hills			
Westside Rural TSP	27	Cornelius Pass Road	Safety improvement – Find ways to enforce posted speed limits and safe travel speeds. Install photo radar. $20,000
	28	Cornelius Pass Road	Safety improvement – Install reflectors, delineators, and traffic striping. $200,000
	29	Newberry Road	Safety spot improvement – Install guardrail ¼ mile south of US 30 and install speed hump 1.2 miles from US 30. $450,000
	30	Cornelius Pass Road	Speed Zone Study – Conduct speed zone study to determine average running speed, safe operating speed, and needs for enforcement. $5,000
	31	Germantown Road	Safety improvement – Add to 2.22 miles of shoulders (4 ft). $6,744,000
	32	Skyline Boulevard	Safety improvement – Add to shoulders from UGB to Cornelius Pass Road (1.49 miles). $ 2,039,000
	33	Skyline Boulevard	Safety improvement – Add to shoulders from Cornelius Pass Road to Rocky Point Road (4 ft). $ 11,153,000
	34	Skyline Boulevard	Cornelius Pass Road intersection improvements – install signal, provide westbound left-turn lane and through/right lane on Skyline Boulevard. $695,000
	35	Cornelius Pass Road	Safety and capacity needs – Study to look at climbing lanes, guardrail, drainage, addition of shoulders, and alternate routes. $180,000
	36	Germantown Road	Safety spot improvements – Widen lanes on curves only, install center skip like reflective markers, and install mirror at intersection with Old Germantown Road. $750,000
	37	Cornelius Pass Road	Safety Improvement – contract with the City of Portland for speed enforcement. Assume 0.25 staff per year including equipment and overhead. $50,000/year

	38	Skyline Boulevard	Speed zone study – Conduct speed study to determine appropriate speed limit for Skyline Boulevard from Cornelius Pass Road east to city limits of Portland. $5,000
	39	Springville Road	Safety improvement – Add to shoulders (4 ft). $3,160,000
	40	Laidlaw Road	Safety improvement – Add to shoulders (4 ft). $643,000
	41	Thompson Road	Safety improvement – Add to shoulders (4 ft). $100,000
	42	Cornelius Pass Road	Realignment – Recuce curvature and eliminate switchback while minimizing grade increase of 1,500-foor section (assume average cut of 60 feet). $2,020,000
	43	Skyline Boulevard	Safety improvement – Install traffic calming devices such as speed humps to reduce speeds from UGB to Cornelius Pass Road. $485,000
	44	Skyline Boulevard	Scenic viewing opportunities – Acquire property through fee or donation for development of parking area adjacent to roadway. $350,000
	45	Cornelius Pass Road	Safety improvement – Construct pullouts at a number of locations for the purposes of speed enforcement. $750,000
	46	Germantown Road	Safety improvement – Install traffic calming devices such as speed humps to reduce speeds. $887,000
Multnomah County CIPP	47	Cornelius Pass Road: MP 3.0 to MP 3.5 (PN 103a)	Realign and widen Cornelius Pass Road to provide southbound passing lane. $35,135,976
	48	Cornelius Pass Road: MUS 30 to MP 2 (PN 389)	Reconstruct Cornelius Pass Road including passing lane, safety, shoulder and drainage improvements. $54,159,714
	49	Cornelius Pass Road: MP 2 to MP 3 (PN 103)	Widen Cornelius Pass Road, including new box culvert and passing lane. $21,893,536
	50	Germantown Road/Old Germantown Road (PN 726)	Widen Germantown Road to create left turn pocket and improve sight distance. $780,835
	51	Skyline Boulevard: McNamee to Cornelius Pass	Shoulder bikeway. $2,629,164
	52	Skyline Boulevard: Cornelius Pass to Rocky Point	Shoulder bikeway. $15,153,851
	53	Springville Road: Skyline Boulevard to County Line	Shoulder bikeway. $4,254,950
	54	Cornelius Pass Road: (old) St. Helens Road to MP 2	Shoulder bikeway. $3,684,602
East of Sandy River			
Multnomah County CIPP	55	Ogden Road: Mershon to Woodard	Shoulder bikeway. $463,789
	56	Larch Mt. Road: HCRH to End of Road	Shoulder bikeway. $26,341,706
	57	Knieriem Road: Littlepage Road to HCRH	Shoulder bikeway. $3,122,720
	58	Hurlburt Road: HCRH to Littlepage Road	Shoulder bikeway. $4,344,240
	59	Evan Road: Hurlburt Road to HCRH	Shoulder bikeway. $4,463,908
	60	Woodard Road: HCRH to Ogden Road	Shoulder bikeway. $2,338,065

	61	Mershon Road: Ogden to HCRH	Shoulder bikeway. $4,009,646
East of Sandy River Rural Area Plan			
No major capital improvement improvements are proposed within the study area			
West of Sandy River			
West of Sandy River Rural Area Plan	62	Orient Road/Dodge Park Boulevard Realignment	Realign the intersection to create a more perpendicular angle. Driveway modifications would be required to serve the autobody shop in the northwest quadrant of the intersection.
	63	Division Drive/Troutdale Road Realignment	Eliminate the northeast leg of the intersection between SE Division Drive and SE Troutdale Road to create one intersection. Realign each end of the segment proposed for closure. While projected 2020 PM peak hour traffic volumes satisfy signal warrants, signalization is not recommended until additional warrants are satisfied. All-way stop control would provide LOS D with projected 2020 PM peak hour traffic volumes, while adding an eastbound right turn lane would provide LOS C.
	64	302nd Avenue/Orient Drive/Bluff Road Realignment	Potential options include realigning SE Orient Drive to intersect SE Bluff at a more perpendicular angle or creating a left turn lane for eastbound traffic on SE Orient Drive. Either option may require realignment of SE Teton Drive. Further engineering analysis will be necessary to determine a preferred alignment. Signalize realigned intersection when warranted.
	65	Oxbow Drive/327th Avenue Realignment	Channelizing the broad paved area on SE 327th Avenue at the approach to SE Oxbow Drive to create a more perpendicular intersection is recommended to improve sight distance and reduce the potential for conflict between westbound left turns and northbound left turns.
	66	Lusted Road/302nd Avenue/Pipeline Road Realignment/Intersection Consolidation	Further engineering analysis is recommended to determine if intersection consolidation is feasible fiven the surrounding vertical grades and the location of a sewage holding tank in the center of the intersection. Recent parking restrictions enacted by the County may be adequate for the near term.
	67	Lusted Road/Powell Valley Road/282nd Avenue Consolidation	Realignment to connect SE Lusted Road directly with SE Powell Valley Road is included in the County's Capital Improvement Plan and Program. The project would require further engineering analysis and coordination with the City of Gresham to develop a recommend alignment. A traffic signal is warranted based on projected 2020 PM peak hour volumes, and would provide LOS B operations.
	68	282nd Avenue/Stone Road Turn Lanes	The addition of turn lanes in the northbound and southbound direction on 282nd would reduce the high incidence of rear end crashes at this location. Some roadway widening would be necessary.
	69	Shoulder Widening to Meet Updated Standards	Prioritization for shoulder improvements within the West of Sandy River rural area should be given to roadways connecting to school sites, especially Barlow High School. Proposed shoulder widening should be evaluated based on potential impacts on drainage and adjacent productive lands. For shoulders wider than 1.8 meters, the adopted County standards require paved width of 1.5 meters. The remaining 0.3 meters may be unpaved. Shoulder widening should be incorporated into routine roadway maintenance wherever possible.
Multnomah County CIPP	70	Cochran Drive: Troutdale Road to westerly 2175' (PN 145)	Reconstruct to major collector standards: 2 travel lanes, center lane/median, sidewalks, bike lanes, and culvert replacement. $7,442,765

	71	Troutdale Road: Stark St to Division Drive (PN TBD)	Reconstruct with 2 travel lanes; construct center turn lane/median, sidewalks, bicycle lanes between Stark and Strebin. Reconstruct Troutdale Road/Division Drive intersection including new fish culverts. $8,297,000
	72	Sweetbriar Road: Troutdale Road to E City Limit (PN 149)	Widen to neighborhood collector standards with 2 travel lanes, sidewalk and bike lanes. $2,740,748
	73	Orient Drive/Bluff Road (PN 706)	Widen Orient Drive to create eastbound left turn lane to Bluff Road, realign Bluff and Teton to create perpendicular intersection. $685,247
	74	Orient Drive/Dodge Park Boulevard (PN 703)	Widen Orient Drive to create eastbound left turn lane. $373,616
	75	Oxbow Drive/Altman Road (PN 707)	Widen Oxbow Drive to create westbound left turn lane to Altman Road, realign intersection to a 5 perpendicular intersection. $ 790,693
	76	302nd Avenue/Lusted Road (PN 704)	Realign Lusted Road and Pipeline Road to create perpendicular intersection at 302nd, add left turn lane to each leg of intersection. $5,613,717
	77	Division Drive/Troutdale Road (Included in Collector project above) (PN 186)	Realign intersection, eliminating NE leg, producing a 4-way intersection. Replace 3 existing culverts identified as fish barriers. $ -
	78	Dodge Park Boulevard: 302nd to County Line	Shoulder bikeway. $7,592,686
	79	302nd Avenue: Division to Bluff	Shoulder bikeway. $3,878,852
	80	Orient Drive: Welch Road to Dodge Park Boulevard	Shoulder bikeway. $1,523,441
	81	Oxbow Park Road: Oxbow Drive to Road End	Shoulder bikeway. $1,834,695
	82	Oxbow Drive: Division Drive to Hosner Road	Shoulder bikeway. $5,393,681
	83	Oxbow Drive: Hosner Terrace to Oxbow Park Road SE	Shoulder bikeway. $1,259,838
	84	SE Division Drive: UGB to Troutdale Road	Bike lanes. $945,518
	85	Troutdale Road: Strebin Road to 282 Avenue	Bike lanes. $3,292,979
	86	SE Division Drive: Troutdale to Oxbow Parkway	Bike lanes. $3,371,407
Pedestrian Master Plan	87	Stark St: Eavans Ave to 35th St	Add sidewalk to south side
Columbia River Gorge National Scenic Area			
Multnomah County CIPP	88	Historic Columbia River Highway RR Overcrossing: Half miles east of 244th Avenue (PN 199)	Reconstruct railroad bridge to accommodate wider travel lanes, sidewalks, and bike lanes. $9,314,500
	89	Corbett Hill Road/Historic Columbia River Highway (PN 147)	Improve intersection alignment by making stops at right angle. $3,770,920
Other Plans and Projects			

East Metro Connections Plan	90	Sandy River to Springwater multi-modal connection	Projects to provide mutli-modal connections from Downtown Troutdale to Mt. Hood Community College and the Springwater Corridor Trail. CATALYST PROJECTS: Master plan for new multi-modal corridor.
	91	Pleasant Valley	Projects develop the necessary public infrastructure for development of Pleasant Valley Community Plan. CATALYST PROJECTS: Improvements to 174th and Foster.
	92	Catalyst for Springwater District	Projects help develop the necessary public infrastructure for private investment and jobs in this regionally significant employment area. Projects include a new interchange on US 26 and an extension of Rugg Road to connect US 26 and Hogan, as well as collector street improvements to provide needed access for future jobs and employment. CATALYST PROJECTS: New interchange on US 26 and arterial connections.
Pedestrian Master Plan	93	Interlachen Lane: Marine Dr to Blue Lake Rd	Add sidewalks to both sides

FUTURE CONDITIONS SUMMARY

The following highlights key information that can be used as part of future alternatives analyses tasks.

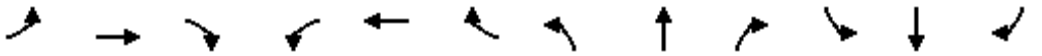
- Population and employment in the rural areas is expected to grow at approximately 3 – 3.5 percent per year. Although not projected to result in traffic congestion in the rural areas, this growth will continue to have impacts on safety and conflicts between different modes.
- Multnomah County has several different plans that identify transportation improvements in the County's rural unincorporated areas. These projects will be evaluated in the Alternatives Analysis phase of this project to determine if they are still warranted, how they should be prioritized, and if there are additional needs that require additional projects, programs, or policies to address them.

NEXT STEPS

The information in this memorandum will be reviewed by County staff and shared with the Transportation Subcommittee of the County's Comprehensive Plan Update Project Advisory Committee. Input will be requested on the existing and future conditions and currently planned project list to provide direction for the alternatives analysis.

REFERENCES

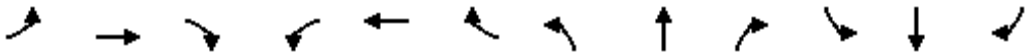
1. ODOT Analysis Procedures Manual
2. Highway Safety Manual
3. NCHRP Report 641 *Guidance for the Design and Application of Shoulder and Centerline Rumble Strips*



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	10	25	25	15	110	30	1450	25	35	720	20
Future Volume (vph)	75	10	25	25	15	110	30	1450	25	35	720	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5		5.5	5.5		5.5	5.5		5.5	5.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	1.00	
Frt		0.97		1.00	0.87		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1746		1770	1616		1770	3530		1770	1855	
Flt Permitted		0.71		0.82	1.00		0.24	1.00		0.14	1.00	
Satd. Flow (perm)		1288		1524	1616		448	3530		257	1855	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	11	27	27	16	120	33	1576	27	38	783	22
RTOR Reduction (vph)	0	23	0	0	5	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	97	0	27	131	0	33	1602	0	38	804	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.8		7.8	7.8		29.0	29.0		29.0	29.0	
Effective Green, g (s)		7.8		7.8	7.8		29.0	29.0		29.0	29.0	
Actuated g/C Ratio		0.16		0.16	0.16		0.61	0.61		0.61	0.61	
Clearance Time (s)		5.5		5.5	5.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		210		248	263		271	2141		155	1125	
v/s Ratio Prot					c0.08			c0.45			0.43	
v/s Ratio Perm		0.08		0.02			0.07			0.15		
v/c Ratio		0.46		0.11	0.50		0.12	0.75		0.25	0.71	
Uniform Delay, d1		18.1		17.0	18.2		4.0	6.8		4.3	6.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.6		0.2	1.5		0.2	1.5		0.8	2.2	
Delay (s)		19.7		17.2	19.7		4.2	8.2		5.2	8.7	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		19.7			19.3			8.2			8.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



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Level of Service		B		B	B		A	A		A	A	
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