Attachment A

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Sisters Woodlands

Transportation Impact Study

Sisters, Oregon

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Executive Summary

1. The proposed Sisters Woodlands involves a change in zoning from Public Facility (PF), Urban Area Reserve (UAR), and Open Space (OS) to North Sisters Business Park (NSBP), Downtown Commercial (DC), Multi-Family Residential (MFR), and Open Space (OS) on a site located between Highway 20, W Barclay Drive, and N Pine Street in Sisters, Oregon.

2. Eventually, a land division is expected to be proposed to subdivide the northern portion of the lot into a mixed-use housing development, which is expected to contain a mix of light industrial, commercial, recreational, cottage housing, and multi-family housing land uses. The proposed Sisters Woodlands will include the construction of approximately 40,000 square feet of industrial buildings, approximately 24,000 square feet of commercial buildings, an approximately 20,000 square foot multi-use facility, and up to 346 units of multi-family housing (to include 2nd and 3rd-story flats above commercial buildings, duplex units, and cottage housing units).

3. The "worst-case scenario" trip generation calculations show that the proposed zoning is expected to generate a net increase of 44 trips during the evening peak hour when compared to the number of trips assigned to the existing land use. The *Sisters Transportation System Plan* (TSP) has assigned 312 trips to the existing property during the evening peak hour.

4. All intersections were calculated has having a crash rate below 1.00 CMEV. No significant trends or crash patterns were identified at any of the study intersections that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

5. The most recent site plan shows that proposed site access locations are in compliance with the access spacing standards shown in Development Code 3.1.300(I)(1) and the *1999 Oregon Highway Plan*. Actual site access locations will be determined at the time of a future land division application, following the zone change.

6. Due to insufficient traffic volumes, traffic signal warrants are not projected to be met at the unsignalized study intersections of W Barclay Drive at N Pine Street, W Hood Avenue at US Highway 20, and N Pine Street at US Highway 20 under any of the analysis scenarios. Left-turn lane warrants are projected to be met under the year 2040 planning horizon plus zone change scenario for the intersection of W Barclay Drive at N Pine Street, specifically for the westbound approach.

7. Two study intersections are either currently or projected to operate with v/c ratios in excess of the maximum allowable ODOT performance standards. These intersections are N Pine Street at US Highway 20 and N Locust Street at US Highway 20. Suggested mitigation may include the following:

    - N Pine Street at US Highway 20: During peak hours when delays are long, drivers will self-select how they enter US Highway 20 to avoid excessive delays. Local traffic may choose a number of other routes to avoid US Highway 20 and utilize the local street system. For this reason, no mitigation is recommended.

    - N Locust Street at US Highway 20: The applicant proposes mitigation in the form of a proportional share payment for improvements at the intersection of N Locust Street at US Highway 20.

8. The mitigation described above offsets the potential impacts from the project and avoids further degradation of key infrastructure in Sisters. Accordingly, the Transportation Planning Rule is satisfied.

Project Description

Introduction

The proposed Sisters Woodlands involves a change in zoning from Public Facility (PF), Urban Area Reserve (UAR), and Open Space (OS) to North Sisters Business Park (NSBP), Downtown Commercial (DC), Multi-Family Residential (MFR), and Open Space (OS) on a site located between Highway 20, W Barclay Drive, and N Pine Street in Sisters, Oregon. In addition, the proposed project involves a comprehensive plan amendment.

This report examines the impacts of the proposed change in land use on the transportation system in the vicinity of the project site. The purpose of this report is to analyze potential traffic impacts and recommend any required transportation mitigation measures to ensure safe and efficient performance of the transportation facilities that will be impacted by the proposed change in land use.

All supporting data and calculations are provided in the appendix to this report.

Location Description

The project site is located southeast of the intersection of W Barclay Drive at US Highway 20 in Sisters, Oregon, and consists of the northern portion of tax lot 102. The site currently has multiple buildings on it, which will be removed upon construction of Sisters Woodlands. The immediate proposal is for a change in zoning from Public Facility (PF), Urban Area Reserve (UAR), and Open Space (OS) to North Sisters Business Park (NSBP), Downtown Commercial (DC), Multi-Family Residential (MFR), and Open Space (OS). Eventually, a land division is expected to be proposed to subdivide the northern portion of the lot into a mixed-use housing development, which is expected to contain a mix of light industrial, commercial, recreational, cottage housing, and multi-family housing land uses.

The project site is shown in Figure 1.

Figure 1: Project Location (image from Google Earth)

Vicinity Roadways

The proposed project is expected to impact five roadways near the site. Table 1 provides a description of each of the vicinity roadways.

Table 1: Vicinity Roadway Descriptions

Street Name	Functional Classification	Cross-Section	Speed (MPH)	Curbs & Sidewalks	On-Street Parking	Bicycle Facilities
US Highway 20	State Highway/Arterial	2-3 Lanes	20-35 posted	Yes	Downtown Core	Partial
W Barclay Drive	Arterial	2 Lanes	30 posted	Partial	No	Partial
N Pine Street	Collector	2-3 Lanes	25 posted	Partial	Yes	No
N Locust Street	Arterial	2-3 Lanes	20-40 posted	Partial	Partial	Partial
W Hood Avenue (between US 20 and OR 242)	Arterial	3 Lanes	30 posted	Partial	No	Both Sides

Table Notes: Functional Classification provided by the City of Sisters Transportation System Plan (TSP) Refinement[1], Figure 7-1

Study Intersections

Based on the location of the subject property, preliminary calculations of trip generation, and coordination with the City of Sisters, the following intersections were identified for analysis:

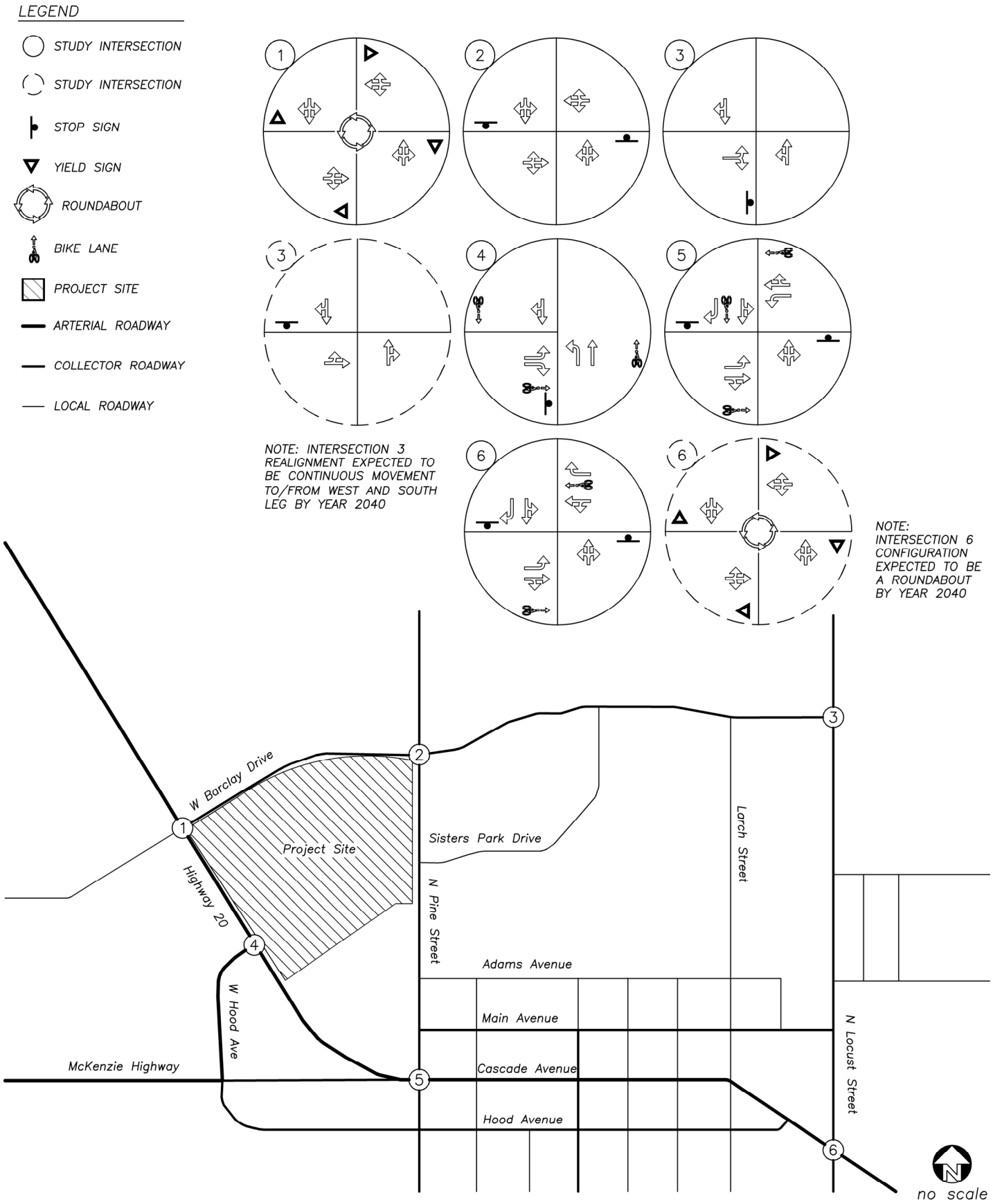
- US Highway 20 at W Barclay Drive;
- W Barclay Drive at N Pine Street;
- E Barclay Drive at N Locust Street;
- W Hood Avenue at US Highway 20;
- N Pine Street at US Highway 20; and
- N Locust Street at US Highway 20

[1] Kittelson & Associates, *Sisters Transportation System Plan Refinement*, June 2018

A summarized description of the study intersections is provided in Table 2. A vicinity map showing the project site, vicinity streets, and study intersection configurations is shown in Figure 2.

Table 2: Study Intersection Descriptions

Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	US Highway 20 at W Barclay Drive	Roundabout	Yield-Controlled	NB/SB/EB/WB Yield-Controlled
2	W Barclay Drive at N Pine Street	Four-Legged	Stop-Controlled	NB/SB Stop-Controlled
3	E Barclay Drive at N Locust Street	Three-Legged	Stop-Controlled	EB Stop-Controlled
4	W Hood Avenue at US Highway 20	Three-Legged	Stop-Controlled	NEB Stop-Controlled
5	N Pine Street at US Highway 20	Four-Legged	Stop-Controlled	NB/SB Stop-Controlled
6	N Locust Street at US Highway 20	Four-Legged	Stop-Controlled	NB/SB Stop-Controlled



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VICINITY MAP

Figure 2

Sisters Woodlands

5/15/2020

Site Trips

Trip Generation

The proposed Sisters Woodlands involves a change in zoning from Public Facility (PF), Urban Area Reserve (UAR), and Open Space (OS) to North Sisters Business Park (NSBP), Downtown Commercial (DC), Multi-Family Residential (MFR), and Open Space (OS). Following this proposed change in zoning, a land division is expected to be proposed to subdivide the northern portion of the lot into a mixed-use housing development, which is expected to contain a mix of light industrial, commercial, recreational, cottage housing, and multi-family housing land uses.

In order to determine a reasonable "worst-case" scenario for trip generation of the site with the proposed zoning, the most recent concept site plan was used which shows a range of square footages and a range of multi-family housing units throughout the site. The upper range of multi-family housing units was used in order to determine a reasonable "worst-case" scenario for trip generation. The proposed Sisters Woodlands reasonable "worst case" scenario will include the construction of approximately 40,000 square feet of industrial buildings, approximately 24,000 square feet of commercial buildings, an approximately 20,000 square foot multi-use facility, and up to 346 units of multi-family housing (to include 2nd and 3rd-story flats above commercial buildings, duplex units, and cottage housing units).

The number of trips assigned to the existing site according to the *Sisters Transportation Plan*[2] (TSP) was also examined. In a memorandum[3] prepared by DKS Associates, the total trips assigned to the existing zoning was shown. The number of trips assumed in the TSP represents the existing zoning scenario and should be compared to trips generated in proposed rezone scenarios. The referenced memorandum is provided in the appendix.

To estimate the number of trips that will be generated by the proposed zoning, trip rates from the *Trip Generation Manual* [4] were used. Data for the following land use codes were used: 110 (*General Light Industrial*), 220 (*Multifamily Housing Low-Rise*), 495 (*Recreational Community Center*), and 820 (*Shopping Center*). Land use codes 110, 495, and 820 were used to estimate the proposed trip generation based on the gross square footage of the buildings. Land use code 220 was used to estimate the proposed trip generation based on the number of units.

The "worst-case scenario" trip generation calculations show that the proposed zoning is expected to generate a net increase of 44 trips during the evening peak hour. The trip generation calculations are summarized in Table 3 and detailed calculation worksheets are provided in the appendix.

[2] City of Sisters, *Sisters Transportation Plan*, January 2010.
[3] Chris Maciejewski, PE (DKS Associates), "City of Sisters USFS Property Redevelopment – Revised Draft Redevelopment Plan Traffic Impact Analysis", January 27, 2011 (Table 6).
[4] Institute of Transportation Engineers, *Trip Generation Manual*, 10th Edition, 2017.

Table 3: Zone Change Reasonable Worst-Case Trip Generation Summary

Zoning	Acres	Land Use	ITE Code	Evening Peak Hour In	Out	Total
Existing Zoning[1]						
Public Facility (PF) Urban Area Reserve (UAR) Open Space (OS)		Assumed in the TSP: 60 Retail Employees, 25 Service Employees, 5 Other Employees	-	145	167	312
Proposed Zoning						
North Sisters Business Park (NSBP)	4.93	40,000 Square Foot Light Industrial	110	3	22	25
Multi-Family Residential (MFR)	25.00	346 Dwelling Units Multi-Family	220	122	72	194
Open Space (OS)	4.26	20,000 Square Foot Multi-Use Facility	495	22	24	46
Downtown Commercial (DC)	1.96	24,000 Square Foot Shopping Center	820	44	47	91
		Total Trips, Proposed Zoning		*191*	*165*	*356*
Net Increase in Trips				46	-2	44

1=The Sisters Transportation System Plan (TSP) allocates trips to this site as part of the TSP. Therefore, for the purpose of the zone change, trip generation for development under the existing zoning was shown as "Existing Zoning".

To prepare a worst-case analysis, it is assumed that there will be no pass-by trips, site internalization, or trip sharing reductions in trip generation for this site.

It should be noted that the proposed development plan for the site includes a trip generation estimate that is more in line with the assumptions made to the existing zoning in the TSP. To estimate the number of trips that will be generated by the proposed development plan, trip rates from the *Trip Generation Manual* were used. Data for the following land use codes were used: 110 (*General Light Industrial*), 220 (*Multifamily Housing Low-Rise*), 221 (*Multifamily Housing Mid-Rise*), 495 (*Recreational Community Center*), and 820 (*Shopping Center*). Land use codes 110, 495, and 820 were used to estimate the proposed development's trip generation based on the gross square footage of the buildings. Land use codes 220 and 221 were used to estimate the proposed development's trip generation based on the number of units.

The trip generation calculations show that the proposed development plan is expected to generate a net decrease of 11 trips during the evening peak hour. Again, to prepare a worst-case trip generation for the proposed development plan, it is assumed that there will be no pass-by trips, site internalization, or trip sharing reductions in trip generation for this site.

The trip generation calculations are summarized in Table 4 and detailed calculation worksheets are provided in the appendix.

Table 4: Proposed Development Plan Trip Generation Summary

Zoning	Acres	Land Use	ITE Code	Evening Peak Hour In	Out	Total
Existing Zoning[1]						
Public Facility (PF) Urban Area Reserve (UAR) Open Space (OS)		Assumed in the TSP: 60 Retail Employees, 25 Service Employees, 5 Other Employees	-	145	167	312
Proposed Zoning						
North Sisters Business Park (NSBP)	4.93	40,000 Square Foot Light Industrial	110	3	22	25
Multi-Family Residential (MFR)	25.00	186 Dwelling Units Low-Rise Multi-Family	220	66	38	104
		79 Dwelling Units Mid-Rise Multi-Family	221	21	14	35
Open Space (OS)	4.26	20,000 Square Foot Multi-Use Facility	495	22	24	46
Downtown Commercial (DC)	1.96	24,000 Square Foot Shopping Center	820	44	47	91
		Total Trips, Proposed Zoning		*156*	*145*	*301*
Net Increase in Trips				11	-22	-11

Although the proposed development plan generates fewer trips and is more consistent with Sisters TSP assumptions for the existing zoning, the "worst-case" trip generation shown in Table 3 was used for the analysis scenarios shown in this report.

Trip Distribution

The directional distribution of site trips to and from the proposed site was estimated based on locations of likely trip origins and destinations, was well as locations of major transportation facilities in the site vicinity. The following trip distribution was estimated and used for analysis:

- Approximately 30 percent of site trips will travel to/from the southeast along US Highway 20;
- Approximately 15 percent of site trips will travel to/from the south along S Pine Street;
- Approximately 10 percent of site trips will travel to/from local destinations south of the project site along N Pine Street;
- Approximately 10 percent of site trips will travel to/from the northwest along US Highway 20;
- Approximately 10 percent of site trips will travel to/from the west along McKinney Butte Road;
- Approximately 10 percent of site trips will travel to/from local destinations along N Locust Street;
- Approximately 5 percent of site trips will travel to/from the north along Camp Polk Road;

- Approximately 5 percent of site trips will travel to/from the east along Sisters Park Drive; and
- Approximately 5 percent of site trips will travel to/from the north along N Pine Street.

The following assumptions were used for trip distribution:

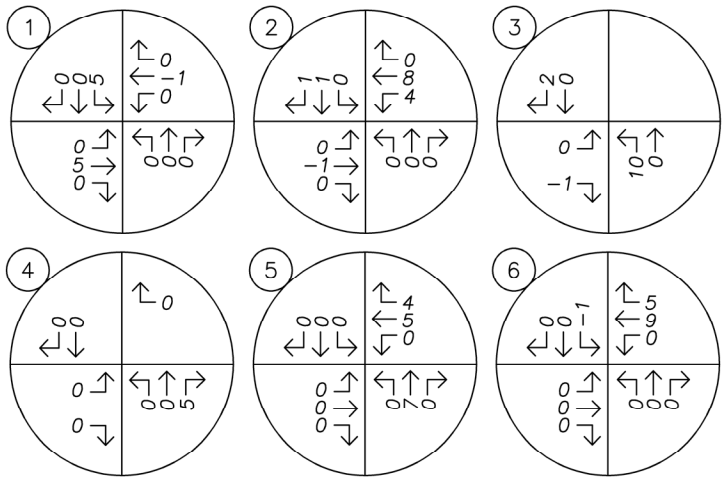
- For trips traveling to the southeast along US Highway 20: It was assumed that trips exit the site via the proposed site accesses along W Barclay Drive and N Pine Street, and then access US Highway 20 from N Locust Street in order to avoid delays making a left-turn from N Pine Street onto US Highway 20. For the 2040 planning horizon plus zone change scenario, it was assumed that the roundabout at the intersection of N Locust Street at US Highway 20 is installed and operational.
- For trips traveling from the southeast along US Highway 20: It was assumed that trips to the site would be split between all three site accesses. Approximately one-third of site trips would use the W Barclay Drive access (via N Locust Street and W Barclay Drive), approximately one-third of site trips would use the N Pine Street access (via US Highway 20 and N Pine Street), and approximately one-third of site trips would use the site access directly off US Highway 20.
- For trips traveling to/from local destinations south of the project site along N Pine Street: It was assumed that all of these trips would use the proposed site access on N Pine Street.
- For trips traveling to/from the northwest along US Highway 20: It was assumed that all trips into the site would use the proposed site access on W Barclay Drive. For trips exiting the site, it was assumed that half of the trips would use the proposed site access on W Barclay Drive and the other half would exit the site via the proposed site access on US Highway 20.
- For trips traveling to/from local destinations along N Locust Street: It was assumed that half of the trips would use the proposed site access on N Pine Street, and half would use the proposed site access on W Barclay Drive.
- For trips traveling to/from the north along Camp Polk Road: It was assumed that half of the trips would use the proposed site access on N Pine Street, and half would use the proposed site access on W Barclay Drive.
- For trips traveling to/from the north along N Pine Street: It was assumed that half of the trips would use the proposed site access on N Pine Street, and half would use the proposed site access on W Barclay Drive.

Figure 3 shows the net trip distribution and assignment for the proposed zone change.

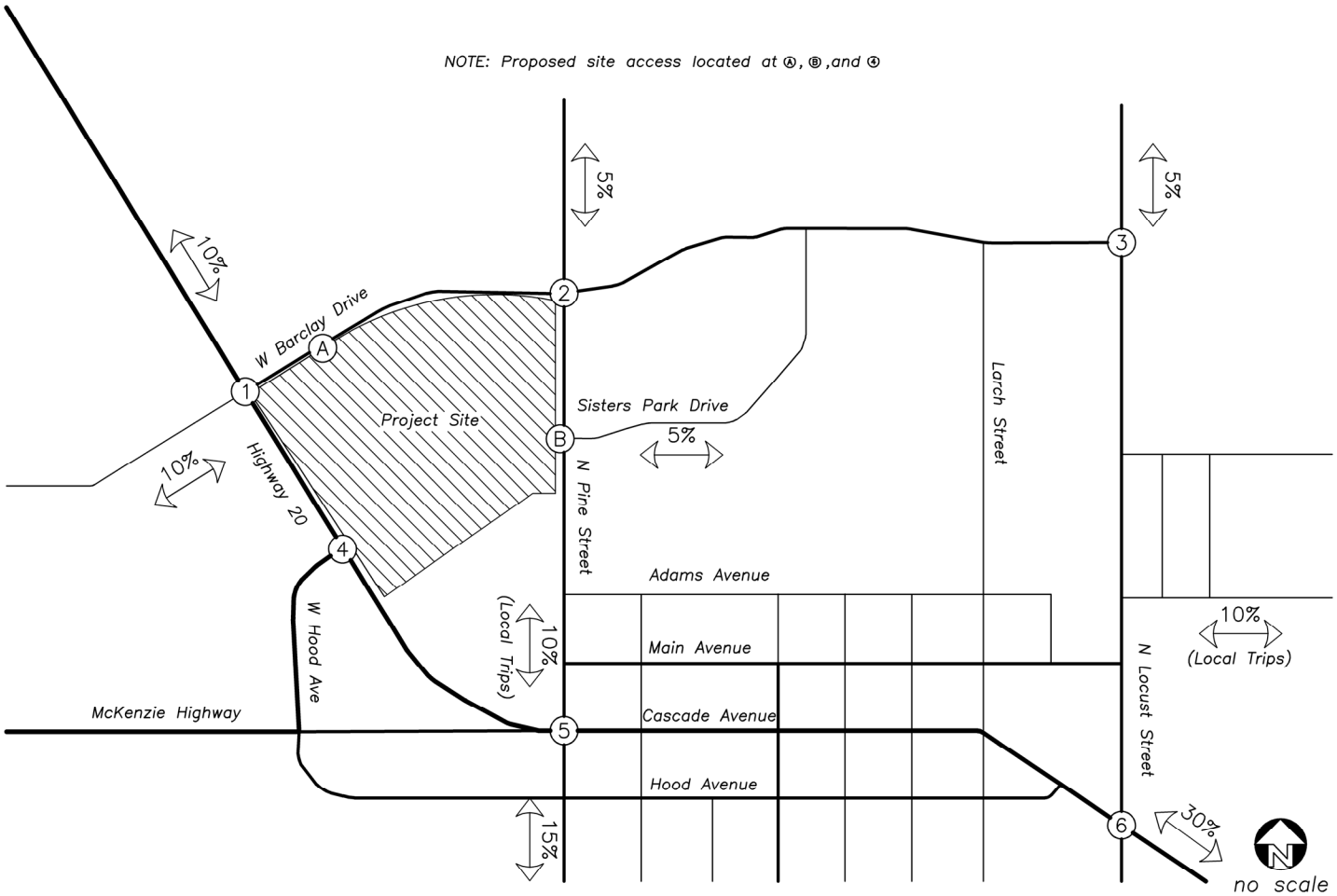
LEGEND

XX% PERCENT OF PRIMARY TRIPS

NET TRIP GENERATION			
	IN	OUT	TOTAL
PM	46	−2	44



NOTE: Proposed site access located at Ⓐ, Ⓑ, and ④



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SITE TRIP DISTRIBUTION & ASSIGNMENT

"Worst-Case" Scenario - Net Change in Site Trips

PM Peak Hour

Figure 3

Sisters Woodlands

5/15/2020

Traffic Volumes

Existing Conditions

With the exception of the intersection of W Hood Avenue at US Highway 20, traffic counts were conducted at the study intersections on October 15, 2019, from 4:00 PM to 6:00 PM. Traffic counts for the intersection of W Hood Avenue at US Highway 20 were conducted on December 12, 2018, from 2:00 PM to 6:00 PM. Turning movement volumes corresponding to the system peak hour were used for analysis.

City staff were concerned that the counts were taken in December 2018 and indicated that updated counts from May/June 2020 would be required. As a response to the COVID-19 pandemic, Oregon Governor Kate Brown issued a "Stay Home Stay Safe" order on March 23rd, 2020. This statewide order requires residents to stay home except for essential needs. Schools and most retail establishments have been closed. The goal of collecting new traffic counts in late May or early June would be to capture both school trips as well as early summer tourism traffic. As schools are presently closed and tourism is low due to the "Stay Home Stay Safe" order, neither of these volumes would be reflected in any counts taken in May/June 2020. As a result, any traffic counts collected in May or June would most likely not reflect typical conditions. In lieu of collecting new data, recently collected traffic counts were used for existing volumes and to build planning horizon volumes for the Sisters Woodlands transportation impact study.

Since US Highway 20 is under the juristiction of the Oregon Department of Transportation (ODOT), procedures described in ODOT's *Analysis Procedures Manual* were used to seasonally adjust existing traffic volumes to reflect the 30th-highest hour in a typical year. Using a map of seasonal trends, this portion of US Highway 20 was determined to show a summer trend, and a seasonal adjustment factor (SAF) of 1.18349 was applied to through volumes along US Highway 20.

The existing seasonally-adjusted traffic volumes at the study intersections are shown in Figure 4 .

Year 2040 Planning Horizon Conditions

To provide analysis of the impact of the proposed zone change, an estimate of future traffic volumes is required. A growth rate must be applied to recorded traffic volumes in order to calculate planning horizon volumes.

Growth rates for through traffic on US Highway 20 were derived using ODOT's 2038 Future Volume Table. Corresponding data was used for each of the four intersections along US Highway 20:

- Data corresponding to Milepost 100.05 (ODOT Highway 16) was used for the intersection of US Highway 20 at W Barclay Drive;
- Data corresponding to Milepost 92.07 (ODOT Highway 15) was used for the intersection of W Hood Avenue at US Highway 20;
- Data corresponding to Milepost 92.52 (ODOT Highway 15) was used for the interesction of N Pine Street at US Highway 20; and

- Data corresponding to Milepost 92.85 (ODOT Highway 15) was used for the intersection of N Locust Street at US Highway 20.

The following growth rates were applied to US Highway 20 through volumes over a 21-year period to determine year 2040 planning horizon volumes. For through volumes along US Highway 20 at the intersection of W Hood Avenue, a growth rate was applied over a 22-year period since existing traffic counts were taken in 2018 as opposed to 2019:

- US Highway 20 at W Barclay Drive – 1.02386
- W Hood Avenue at US Highway 20 – 1.07207
- N Pine Street at US Highway 20 – 1.16458
- N Locust Street at US Highway 20 – 1.30706

For non-ODOT facilities, a compounded growth rate of two percent per year was applied to the existing traffic volumes over a 21-year period to determine year 2040 planning horizon volumes. At the intersection of W Hood Avenue at US Highway 20, a compounded growth rate of two percent per year was applied to the existing traffic volumes over a 22-year period to determine year 2040 planning horizon volumes.

In addition to the expected planning horizon growth in the site vicinity, the nearby McKenzie Meadows subdivision will impact future volumes at the study intersections. This development is proposed for the site west of McKinney Ranch Road and east of Sisters High School, on the north side of W McKinney Butte Road, and will include 150 single-family homes and 55 units of low-rise multi-family housing. Since this development will likely be contributing trips to the transportation system by 2040, the site trips it is projected to generate were included in the 2040 planning horizon volumes. A figure showing the in-process site trips generated by this development that are expected to impact the study intersections is provided in the appendix.

The Threewind Master Plan is also expected to impact future volumes at the study intersections. This development is proposed for the site southeast of W McKinney Butte Road and west of W Hood Avenue, and will include 50 units of multi-family housing and 28,000 square feet of commercial space. Since this development will likely be contributing trips to the transportation system by 2040, the site trips it is projected to generate were included in the 2040 planning horizon volumes. A figure showing the in-process site trips generated by this development that are expected to impact the study intersections is provided in the appendix.

The Dollar General is also expected to impact future volumes at the study intersections. This development is proposed for the site southeast of McKinney Butte Road, east of N Wheeler Loop, and northwest of the existing Bi-Mart store, and includes construction of a 9,100 square foot building. Since this development will likely be contributing trips to the transportation system by 2040, the site trips it is projected to generate were included in the 2040 planning horizon volumes. A figure showing the in-process site trips generated by this development that are expected to impact the study intersections is provided in the appendix.

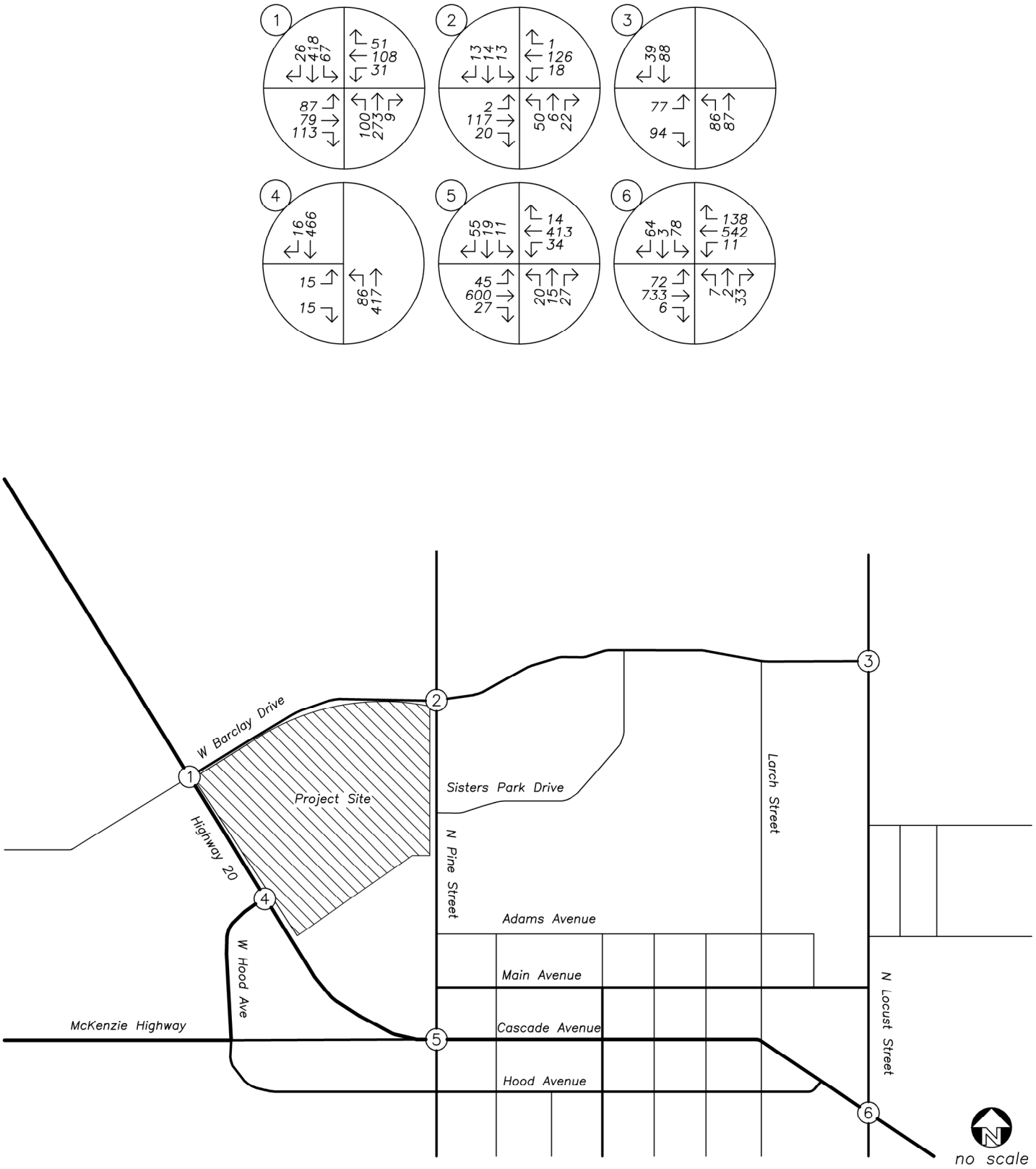
Finally, the area north of W Barclay Drive and west of N Pine Street is also expected to impact future volumes at the study intersections. A proposed zone change application for this site indicates a variety of future estimated land uses. Since this development will likely be contributing trips to the transportation system by 2040, the site trips it is projected to generate (based on the zone change traffic analyses) were included in the 2040 planning

horizon volumes. A figure showing the in-process site trips generated by this development that are expected to impact the study intersections is provided in the appendix.

Figure 5 shows the projected year 2040 planning horizon traffic volumes during the evening peak hour.

Year 2040 Planning Horizon with Zone Change Conditions

Figure 6 shows year 2040 planning horizon plus zone change traffic volumes, which include site trips generated by the proposed zone change.



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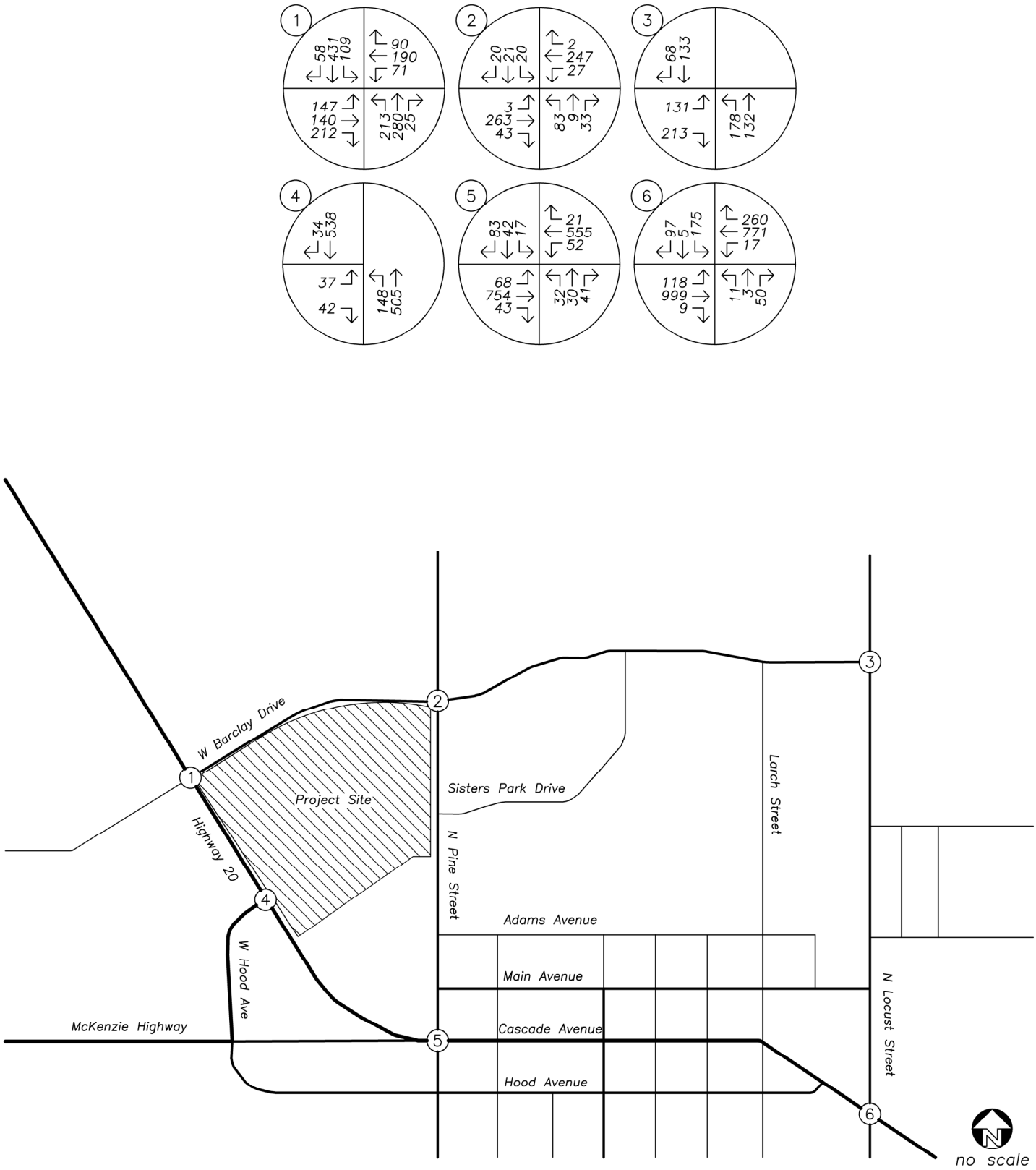
TRAFFIC VOLUMES
Existing Conditions
PM Peak Hour

Figure 4
Sisters Woodlands
5/15/2020



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TRAFFIC VOLUMES

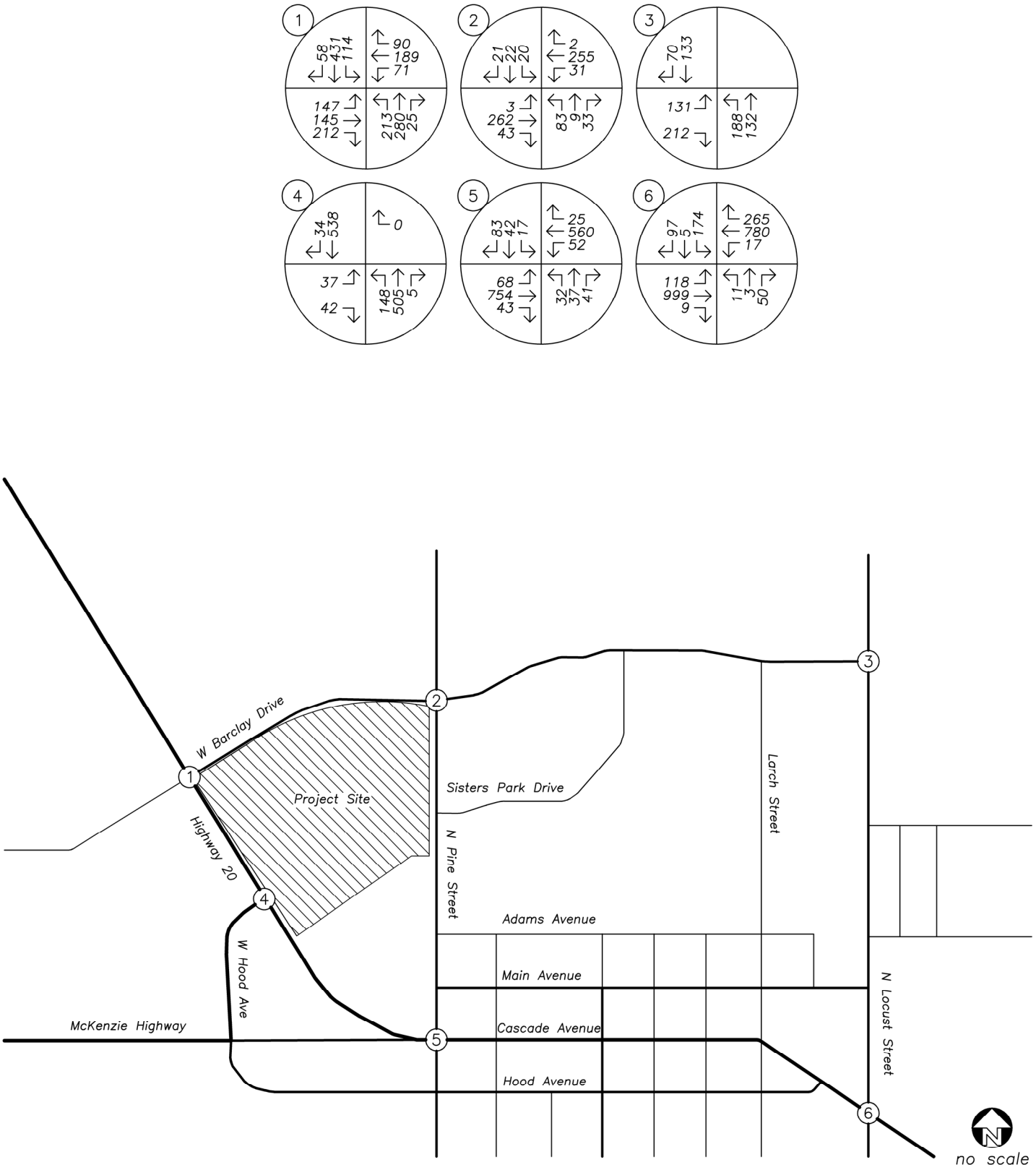
Year 2040 Planning Horizon

PM Peak Hour

Figure 5

Sisters Woodlands

5/15/2020



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TRAFFIC VOLUMES

Year 2020 Planning Horizon with Zone Change

PM Peak Hour

Figure 6

Sisters Woodlands

5/15/2020

Safety Analysis

Crash History Review

Using data obtained from ODOT's Crash Data System, a review of approximately five years of the most recent available crash history (January 2013 through December 2017) was performed at the study intersections. The crash data was evaluated based on the number of crashes, the type of collisions, and the severity of the collisions. Crash severity is based on injuries sustained by people involved in the crash, and includes five categories:

- PDO – property damage only;
- Injury C – possible injury or complaint of pain;
- Injury B – non-incapacitating injury;
- Injury A – incapacitating injury (i.e. bleeding or broken bones); and
- Fatality

Crash rates provide the ability to compare safety risks at different intersection by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.0 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

Table 5 provides a summary of crash types while Table 6 summarizes crash severities and rates for each of the study intersections. Detailed crash data is provided in the appendix to this report.

Table 5: Crash Type Summary

Intersection		Crash Type								Total Crashes
		Turn	Rear End	Angle	Fixed Object	Side swipe	Ped	Backing	Other	
1	US Highway 20 at W Barclay Drive	0	0	5	1	0	0	0	0	6
2	W Barclay Drive at N Pine Street	0	0	3	0	0	0	0	0	3
3	E Barclay Drive at N Locust Street	1	0	0	0	0	0	0	0	1
4	W Hood Avenue at US Highway 20	1	0	0	0	0	0	0	0	1
5	N Pine Street at US Highway 20	1	3	0	0	0	1	0	0	5
6	N Locust Street at US Highway 20	2	3	1	0	0	0	0	0	6

Table 6: Crash Severity and Rate Summary

Intersection		SEVERITY					Total Crashes	Peak Hour Volume	Crash Rate
		PDO	C	B	A	Fatality			
1	US Highway 20 at W Barclay Drive	3	0	1	2	0	6	12,560	0.26
2	W Barclay Drive at N Pine Street	0	0	3	0	0	3	4,020	0.41
3	E Barclay Drive at N Locust Street	0	1	0	0	0	1	4,710	0.12
4	W Hood Avenue at US Highway 20	1	0	0	0	0	1	8,790	0.06
5	N Pine Street at US Highway 20	2	3	0	0	0	5	11,230	0.24
6	N Locust Street at US Highway 20	1	5	0	0	0	6	14,910	0.22

BOLDED *text indicates a crash rate in excess of 1.00 CMEV.*

Based on a review of the crash data, there were several crashes which involved either a pedestrian or were classified as "Incapacitating Injury – Bleeding, Broken Bones" (*Injury A*) or "Non-Incapaciting Injury" (*Injury B*). An in-depth analysis of these crashes is detailed in the following sections to determine any potential crash patterns indicative of safety issues.

US Highway 20 at W Barclay Drive

The intersection of US Highway 20 at W Barclay Drive had two crashes resulting in injuries consistant with *Injury A* classification. The first crash occurred when the driver of a westbound vehicle struck a southbound-traveling motorcycle. Both the motorcyclist and passenger sustained injuries consistant with *Injury A* classification. The second crash occurred when the driver of a northbound vehicle failed to yield right-of-way to an westbound-traveling vehicle and struck the westbound vehicle. All three occupants of the westbound vehicle sustained injuries consistent with *Injury A* classification.

The intersection also had one crash resulting in injuries consistent with *Injury B* classification. The crash occurred when the driver of a westbound vehicle failed to yield right-of-way to a southbound-traveling vehicle and struck the southbound vehicle. The driver of the southbound vehicle and three passengers sustained injuries consistent with *Injury B* classification.

It should be noted that all of the crashes in the analysis period occurred in 2013, which was before construction of the existing roundabout at the intersection of US Highway 20 at W Barclay Drive.

W Barclay Drive at N Pine Street

The intersection of W Barclay Drive at N Pine Street had three crashes resulting in injuries consistent with *Injury B* classification. The first crash occurred when the driver of a southbound-traveling vehicle ran a stop sign and collided with an eastbound-traveling vehicle. The crash reported noted that "inattention" was a factor in the collision. The southbound-traveling vehicle overturned after the collision, and the driver sustained injuries

consistent with *Injury B* classification, while the driver and passenger of the eastbound-traveling vehicle sustained injuries consistent with *Injury C* classification.

The second crash occurred when the driver of a northbound-traveling vehicle ran a stop sign and collided with a westbound-traveling vehicle. The northbound-traveling vehicle overturned after the collision, and the driver and passenger both sustained injuries consistent with *Injury B* classification. The driver of the westbound-traveling vehicle did not report any injuries.

The third crash occurred when the driver of a southbound-traveling vehicle ran a stop sign and collided with a westbound-traveling vehicle. The driver of the southbound-traveling vehicle sustained injuries consistent with *Injury B* classification, while the passenger sustained injuries consistent with *Injury C* classification. Both the driver of the westbound-traveling vehicle and the passenger sustained injuries consistent with *Injury B* classification.

Based on a review of the crash data at the intersection of W Barclay Drive at N Pine Street, it was noted that all three collisions occurred in 2017 and were the result of either a northbound or southbound-traveling vehicle failing to stop at the stop signs located along N Pine Street. Upon review of the study intersection, it was noted that the northbound approach of N Pine Street has a "Stop Ahead" warning sign as well as a flashing stop sign. The southbound approach of N Pine Street also has a flashing stop sign. Both of the flashing stop signs were in place by May of 2018 and appear to have been installed following the three crashes in 2017. The preliminary crash data from January 2018 to December 2018 shows that there were no reported crashes at the intersection during this analysis period.

N Pine Street at US Highway 20

The intersection of N Pine Street at US Highway 20 had one crash which involved a pedestrian and was classified as "Possible Injury or Complaint of Pain" (*Injury C*). The crash occurred when the driver of a westbound vehicle failed to yield right-of-way to a southbound pedestrian crossing in a marked crosswalk. The pedestrian sustained injuries consistent with *Injury C* classification.

Based on an analysis of the available crash data, all intersections were calculated has having a crash rate below 1.00 CMEV. No significant trends or crash patterns were identified at any of the study intersections that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Sight Distance Evaluation

Actual site access locations will be determined at the time of a future land division application, following the zone change. The most recent site plan shows three site access locations. One site access is along W Barclay Drive, approximately 750 feet from the intersection of W Barclay Drive at N Pine Street. The second site access is located along N Pine Street across from Sisters Park Drive, approximately 700 feet from the intersection of W Barclay Drive at N Pine Street. Finally, the third site access is located along US Highway 20 across from W Hood Avenue, approximately 860 feet from the intersection of US Highway 20 at W Barclay Drive.

The City of Sisters Development Code 3.1.300(I)(1) identifies access spacing standards for various roadway classifications. W Barclay Drive and N Pine Street are classified by the City of Sisters as collector roadways, and the minimum driveway-to-driveway spacing along a collector roadway is 100 feet. In addition, the minimum roadway-to-driveway spacing along a collector roadway is also 330 feet. US Highway 20 is classified by ODOT

as a statewide highway. The *Oregon Highway Plan*[5] requires an access management spacing standard of 770 feet for statewide highways in rural areas with a 35 mph posted speed.

The most recent site plan shows that proposed site access locations are in compliance with the access spacing standards shown in Development Code 3.1.300(I)(1) as well as the *Oregon Highway Plan*. At the time of the land division application, it should be verified that actual site access locations meet City of Sisters and ODOT access spacing standards.

Warrant Analysis

Left-turn lane warrants and preliminary traffic signal warrants were examined for the study intersections where such treatments would be applicable.

Left-Turn Lane Warrants

Left-turn lane warrants were examined for the study intersections where such treatments would be applicable.

A left-turn refuge lane is primarily a safety consideration for the major street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants were examined using methodologies provided in the ODOT's *Analysis Procedures Manual* (APM). Left-turn lane warrants were evaluated based on the number of advancing and opposing vehicles, number of turning vehicles, travel speed, and the number of through lanes.

Left-turn lane warrants were not examined for the intersection of E Barclay Drive at N Locust Street. This intersection is identified in the City's TSP Refinement and a future project includes the realignment of the intersection to make a continuous movement to/from the west and south legs.

Left-turn lane warrants were also not examined for the intersection of N Locust Street at US Highway 20. This intersection is identified in the City's TSP Refinement, and a future project includes the construction of a roundabout.

Left-turn lane warrants are projected to be met under the year 2040 planning horizon scenario for the intersection of W Barclay Drive at N Pine Street, specifically for the westbound approach.

Preliminary Traffic Signal Warrants

Preliminary traffic signal warrants were examined for the following unsignalized study intersections to determine whether the installation of a new traffic signal will be warranted at the intersection upon completion of the proposed development:

- W Barclay Drive at N Pine Street;
- W Hood Avenue at US Highway 20; and
- N Pine Street at US Highway 20.

Due to insufficient traffic volumes, traffic signal warrants are not projected to be met at the unsignalized study intersections under any of the analysis scenarios. Traffic signal warrants were not examined for the intersection of N Locust Street at US Highway 20 due to the intersection being listed in the City's TSP Refinement as a candidate for a future roundabout. It was assumed in this study that the roundabout would be in place by the year 2040. In addition, traffic signal warrants were not examined for the intersection of E Barclay Drive at N

[5] Oregon Department of Transportation, *1999 Oregon Highway Plan: Including amendments November 1999 through May 2015*, 1999.

Locust Street due to the intersection being listed in the City's TSP Refinement as a candidate for a future intersection realignment. It was assumed in this study that the realignment would be in place by the year 2040.

Operational Analysis

A capacity and delay analysis were conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* (HCM)[6]. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

The study intersections of US Highway 20 at W Barclay Drive, N Pine Street at US Highway 20, W Hood Avenue at US Highway 20, and N Locust Street at US Highway 20 are under the jurisdiction of ODOT. The applicable minimum operation standard for this facility is established under the *Oregon Highway Plan*[7] and is based on the v/c ratio of the intersection. According to the *Oregon Highway Plan*, US Highway 20 is a freight route on a statewide highway, and has a maximum allowable v/c ratio of 0.85. The above mentioned intersections along US Highway 20 were analyzed according to this standard.

The study intersections of W Barclay Drive at N Pine Street and E Barclay Drive at N Locust Street, both two-way stop-controlled intersections, are under the jurisdiction of the City of Sisters. The City's TSP Refinement states that two-way stop-controlled intersections should have a v/c ratio no greater than 0.90.

Delay & Capacity Analysis

The LOS, delay, and v/c results of the capacity analysis are shown in Table 7 for the evening peak hour. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

[6] Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.
[7] Oregon Department of Transportation, *1999 Oregon Highway Plan: Including amendments November 1999 through May 2015*, 1999

Table 7: Capacity Analysis Summary

Intersection	Existing			2040 Planning Horizon			2040 Planning Horizon Plus Zone Change		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
1. US Highway 20 at W Barclay Drive	A	9	0.53	C	19	0.79	C	20	0.80
2. W Barclay Drive at N Pine Street	B	12	0.11	C	24	0.33	C	25	0.34
3. E Barclay Drive at N Locust Street	B	13	0.15	C	22	0.37	C	22	0.38
4. W Hood Avenue at US Highway 20	D	26	0.09	F	58	0.39	F	85	0.50
5. N Pine Street at US Highway 20	F	57	0.23	F	>200	**1.63**	F	>200	**1.68**
6. N Locust Street at US Highway 20	F	>200	**1.10**	F	59	**1.12**	F	60	**1.12**

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection. ***BOLDED*** *results indicate operation above acceptable jurisdictional standards*

Based on the results of the operational analysis, there are two intersections that are either currently or projected to operate with v/c rations in excess of minimum ODOT performance standards:

- N Pine Street at US Highway 20
- N Locust Street at US Highway 20

Further inspection and potential mitigations at the intersections listed above are discussed within the following *Mitigation Analysis* section.

All other study intersections are currenlty operating acceptably per City of Sisters and ODOT standards and are projected to continue operating acceptably though the 2040 planning horizon, regardless of the potential increase in site trip generation upon rezoning the site. No operational mitigation is necessary or recommended at these intersections.

Mitigation Analysis

As determined within the *Operational Analysis* section, there are two study intersections that are projected to exceed acceptable levels of operation per ODOT performance standards. The following narrative discusses potential mitigative measures which may improve operation of study intersections to acceptable levels. The City of Sisters TSP Refinement, Deschutes County TSP, and ODOT's Statewide Transportation Improvement Plan (STIP) were reviewed to determine any planned projects at these intersections.

N Pine Street at US Highway 20

The intersection of N Pine Street at US Highway 20 is projected to exceed ODOT's maximum v/c ratio of 0.85 under year 2040 planning horizon conditions. This is due primarily to a relatively high northbound left-turn volume from N Pine Street onto US Highway 20. The intersection operates acceptably for existing conditions, but delays increase in future years, regardless of the zoning change of the project site. No mitigations to improve capacity are recommended at this intersection for the following reason:

- During peak hours when delays are long, drivers will self-select how they enter US Highway 20 to avoid excessive delays. Local traffic may choose a number of other routes to avoid US Highway 20 and utilize the local street system.

In addition, the Motor Vehicle Master Plan Projects table (Table 7-5) in the City's TSP Refinement lists a possible mitigation of restricting northbound and southbound approaches at the intersection to right-turns only. The intersection should be monitored to determine whether these movement restrictions become necessary in the future.

N Locust Street at US Highway 20

The intersection of N Locust Street at US Highway 20 is also projected to operate above acceptable ODOT standards; however, this issue is projected to occur regardless of whether the proposed zoning change is approved. The City of Sisters is aware that the intersection fails to meet operational standards, and recently conducted a roundabout feasibility study at the intersection.

According to the City's TSP Refinement, near-term mitigation at the intersection includes the installation of a mini-roundabout with the intent of addressing near-term capacity and safety deficiencies. It is our understanding that following preliminary investigation into the feasibility of a mini-roundabout, the City and ODOT have decided not to further pursue this interim option. In addition, a long-term mitigation improvement includes the installation of a full-size roundabout at the intersection. Initial traffic forecasts and analysis performed for the City's TSP Refinement indicate that a single-land roundabout would operate acceptably through 2030 but not for the entire planning horizon.

Based on the operational analysis results either with or without the proposed zone change, it is recommended that design options to add capacity be explored, such as the addition of a westbound right-turn slip lane. However, capacity enhancements such as additional lanes can affect safety at the intersection, particularly for vulnerable roadway users. The City of Sisters and ODOT will need to balance safety and capacity when deciding the configuration of this intersection improvement. For the purpose of this 2040 planning horizon analysis, it was assumed that a standard, single-lane roundabout would be constructed.

<u>Proposed Mitigation:</u> The applicant proposes mitigation in the form of a proportional share payment for the intersection of N Locust Street at US Highway 20. Improvement of this intersection is the largest planned intersection improvement in Sisters, and the project cost and implementation would far exceed the rough proportionality of the impacts of this site development. Therefore, a proportional share fee is proposed and explained further in the *Proportional Share Mitigation Assessment* section.

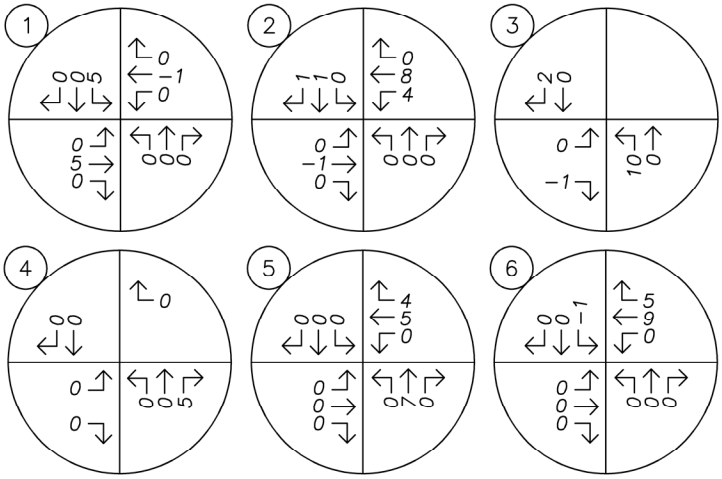
Proportional Share Mitigation Assessment

Proportional share fees were evaluated for the intersection of N Locust Street at US Highway 20. As discussed, the proposed development plan shown in Table 4 generates slightly fewer trips than the Sisters TSP assumed for the property (a net decrease of 11 trips), but the "worst-case" analysis scenario results in a trip generation that is slightly higher (a net increase of 44 trips). For the purpose of determining a proportional share cost payment, trip generation estimates were based upon the "worst-case" analysis scenario shown in Table 3 in the *Trip Generation* section of this report.

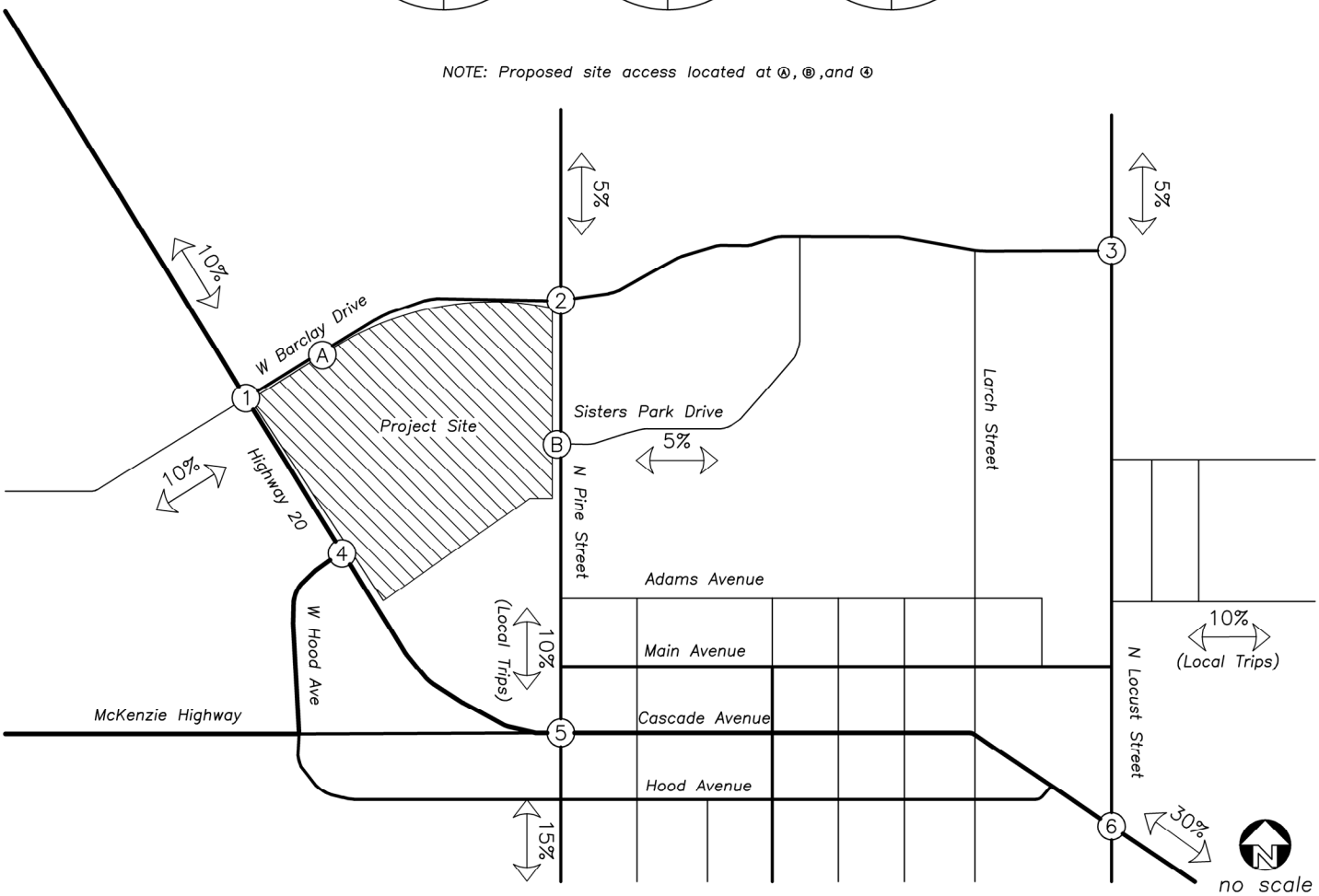
For the Sisters Woodlands zone change, the proposed development plan is a reduction in trips, while the "worst-case" scenario shown for the proposed zone change is only a slight increase in trips compared to the number of trips assigned to the existing site according to the Sisters TSP. It is proposed that the proportional share mitigation be based on the potential net increase of site trips added to the intersection due to the proposed zone change, as shown in Table 3. The same trip distribution listed in the *Trip Distribution* section was used for this analysis. Specifically, the net increase in site trips at the intersection of N Locust Street at US Highway 20 were used to calculate proportional share fees. Figure 7 shows the trip distribution and assignment of the potential net increase in the number of trips estimated from the proposed zoning.

XX% PERCENT OF PRIMARY TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
PM	46	−2	44



NOTE: Proposed site access located at Ⓐ, Ⓑ, and ④



lancaster mobley

SITE TRIP DISTRIBUTION & ASSIGNMENT

Proportional Share Mitigation

PM Peak Hour

Figure 7

Sisters Woodlands

5/18/2020

Table 8 provides the methodology used to calculate proportional share fees based on the proposed zone change's trip generation impacts.

Table 8: Proportional Share Methodology Summary

N Locust Street at US Highway 20	
Mitigation Project Summary	Construct Roundabout
City TSP Project ID	2A
Peak Hour	Weekday PM
Scenario When Mitigation is Triggered	Existing (2019)
2040 Planning Horizon Traffic Volume (X)	2515
Project Trips (PT)	13
Proportional Share (%, PT/(PT+X))	0.51%
Project Cost Estimate ($)	$3.552M
Proportional Share Cost (P)	$18,266
Proportional Share Cost per Trip (P/PT)	$1,405

Table Notes: *Table 7 of the 2019 City of Sisters Transportation System Development Charge Update, Final Report, shows that SDCs are planned to pay for 4% of the total project cost, with ODOT funding the remaining 96%. Since development of the industrial subdivision on the subject site will pay SDCs, the project cost was taken to be the ODOT share, which is $3,552,000.*

Based on a "worst-case" trip generation scenario, the proportional share cost payment is calculated to be $1,405 per trip. With a net increase of 13 trips, this equates to a total proportional share fee of $18,266.

Transportation Planning Rule

The Transportation Planning Rule (TPR) is in place to ensure that the transportation system is capable of supporting possible increases in traffic intensity that could result from changes to adopted plans and land-use regulations. The applicable elements of the TPR are each quoted directly in italics below, with responses following

660-012-0060 Plan and Land Use Regulation Amendments

1. *If an amendment to a functional plan, an acknowledged comprehensive plan, or a land use regulation (including a zoning map) would significantly affect an existing or planned transportation facility, then the local government must put in place measures as provided in section (2) of this rule, unless the amendment is allowed under section (3), (9) or (10) of this rule. A plan or land use regulation amendment significantly affects a transportation facility if it would:*

    (a) Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);

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

(c) Result in any of the effects listed in paragraphs (A) through (C) of this subsection based on projected conditions measured at the end of the planning period identified in the adopted TSP. As part of evaluating projected conditions, the amount of traffic projected to be generated within the area of the amendment may be reduced if the amendment includes an enforceable, ongoing requirement that would demonstrably limit traffic generation, including, but not limited to, transportation demand management. This reduction may diminish or completely eliminate the significant effect of the amendment.

(A) Types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;

(B) Degrade the performance of an existing or planned transportation facility such that it would not meet the performance standards identified in the TSP or comprehensive plan; or

(C) Degrade the performance of an existing or planned transportation facility that is otherwise projected to not meet the performance standards identified in the TSP or comprehensive plan.

Based on the analysis findings in this report, subsections (a) and (b) are not triggered since the proposed zone change will not impact or alter the functional classification of any existing or planned facility, and the proposal does not include a change to any functional classification standards.

Upon rezoning properties within the subject site, two study intersections are currently or projected to operate with v/c ratios in excess of acceptable levels of operation per their respective jurisdictional standards. However, these intersections may be reasonably mitigated as detailed in the *Mitigation Analysis* section of this report.

The identified mitigation offsets the potential impacts from the project and avoids further degradation of key infrastructure in Sisters. Accordingly, the Transportation Planning Rule is satisfied.

Conclusions

The proposed Sisters Woodlands involves a change in zoning from Public Facility (PF), Urban Area Reserve (UAR), and Open Space (OS) to North Sisters Business Park (NSBP), Downtown Commercial (DC), Multi-Family Residential (MFR), and Open Space (OS) on a site located between Highway 20, W Barclay Drive, and N Pine Street in Sisters, Oregon.

Eventually, a land division is expected to be proposed to subdivide the northern portion of the lot into a mixed-use housing development, which is expected to contain a mix of light industrial, commercial, recreational, cottage housing, and multi-family housing land uses. The proposed Sisters Woodlands will include the construction of approximately 40,000 square feet of industrial buildings, approximately 24,000 square feet of commercial buildings, an approximately 20,000 square foot multi-use facility, and up to 346 units of multi-family housing (to include 2nd and 3rd-story flats above commercial buildings, duplex units, and cottage housing units).

The "worst-case scenario" trip generation calculations show that the proposed zoning is expected to generate a net increase of 44 trips during the evening peak hour when compared to the number of trips assigned to the

existing land use. The *Sisters Transportation System Plan* (TSP) has assigned 312 trips to the existing property during the evening peak hour.

All intersections were calculated has having a crash rate below 1.00 CMEV. No significant trends or crash patterns were identified at any of the study intersections that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

The most recent site plan shows that proposed site access locations are in compliance with the access spacing standards shown in Development Code 3.1.300(I)(1) and the *1999 Oregon Highway Plan*. Actual site access locations will be determined at the time of a future land division application, following the zone change.

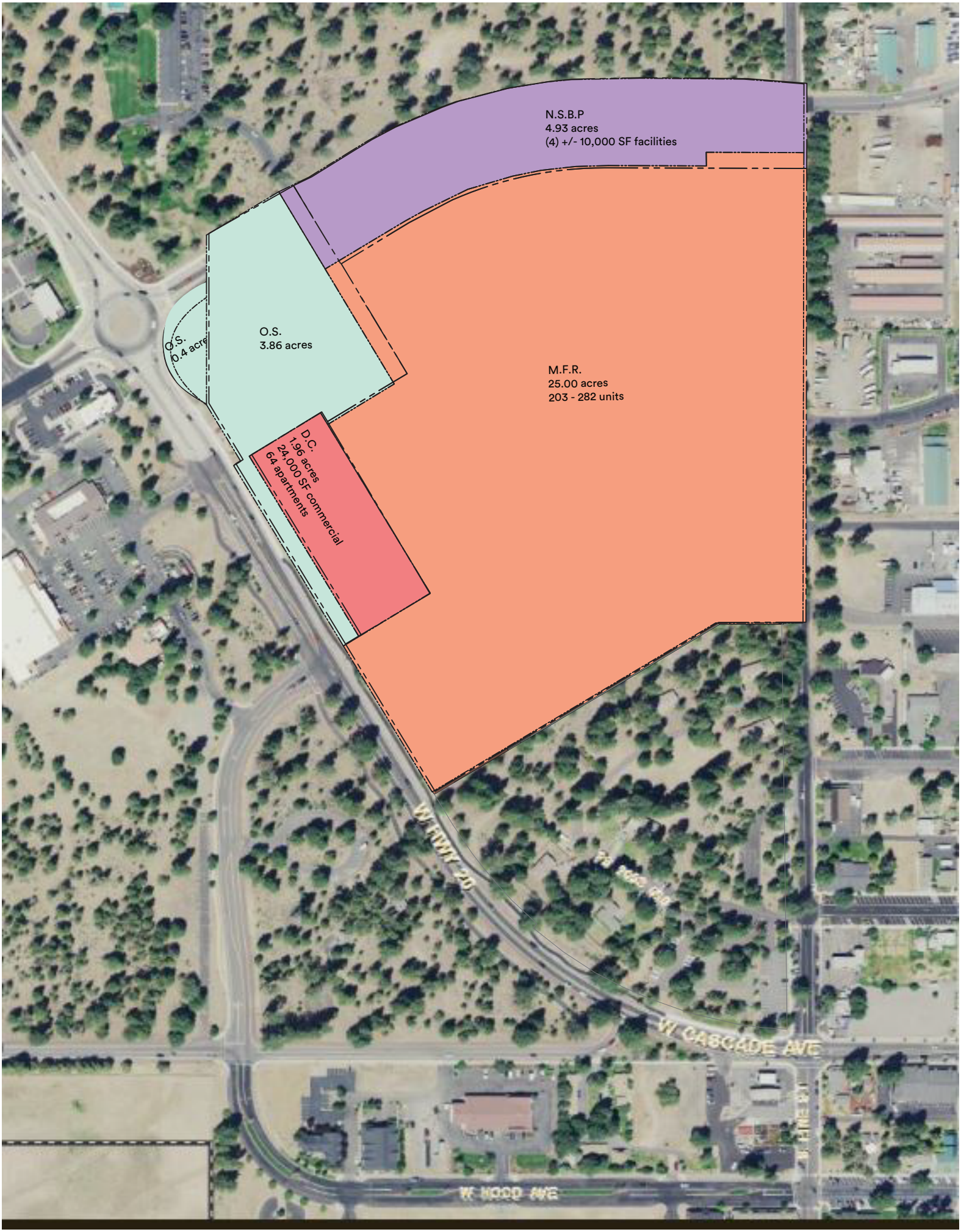
Due to insufficient traffic volumes, traffic signal warrants are not projected to be met at the unsignalized study intersections of W Barclay Drive at N Pine Street, W Hood Avenue at US Highway 20, and N Pine Street at US Highway 20 under any of the analysis scenarios. Left-turn lane warrants are projected to be met under the year 2040 planning horizon plus zone change scenario for the intersection of W Barclay Drive at N Pine Street, specifically for the westbound approach.

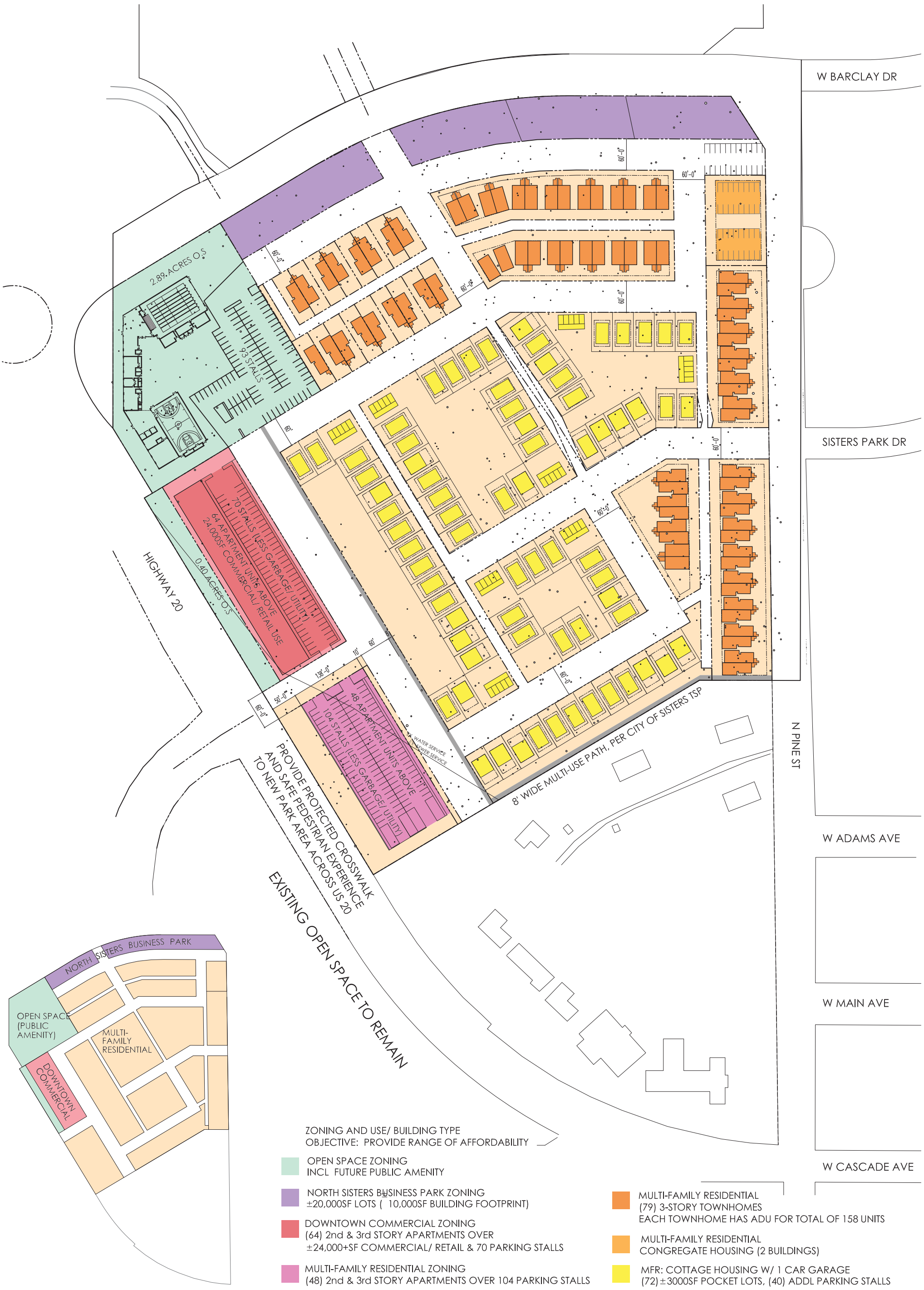
Two study intersections are either currently or projected to operate with v/c ratios in excess of the maximum allowable ODOT performance standards. These intersections are N Pine Street at US Highway 20 and N Locust Street at US Highway 20. Suggested mitigation may include the following:

- N Pine Street at US Highway 20: During peak hours when delays are long, drivers will self-select how they enter US Highway 20 to avoid excessive delays. Local traffic may choose a number of other routes to avoid US Highway 20 and utilize the local street system. For this reason, no mitigation is recommended.
- N Locust Street at US Highway 20: The applicant proposes mitigation in the form of a proportional share payment for improvements at the intersection of N Locust Street at US Highway 20.

The mitigation described above offsets the potential impacts from the project and avoids further degradation of key infrastructure in Sisters. Accordingly, the Transportation Planning Rule is satisfied.

Appendix


N.S.B.P
4.93 acres
(4) +/- 10,000 SF facilities
O.S.
3.86 acres
O.S.
0.4 acre
M.F.R.
25.00 acres
203 - 282 units
D.C.
1.96 acres
24,000 SF commercial
64 apartments
W HWY 20
W CASCADE AVE
W HOOD AVE



SISTER'S WOODLANDS SCHEMATIC 9

COMPLIANCE W/ FINAL ZONING MAP

05.14.20 SCALE: 1:2000

SISTERS VISION A LIVABLE CITY AND REGION THAT REMAIN WELCOMING EVEN AS THEY GROW

TRIP GENERATION CALCULATIONS
Proposed Zone Change Worst-Case Scenario
Proposed Development Plan

Land Use: General Light Industrial
Land Use Code: 110
Setting/Location General Urban/Suburban
Variable: 1,000 Square Feet of Gross Floor Area
Variable Quantity: 40

AM PEAK HOUR

Trip Rate: 0.70

	Enter	Exit	Total
Directional Distribution	88%	12%	
Trip Ends	**25**	**3**	**28**

PM PEAK HOUR

Trip Rate: 0.63

	Enter	Exit	Total
Directional Distribution	13%	87%	
Trip Ends	**3**	**22**	**25**

WEEKDAY

Trip Rate: 4.96

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**99**	**99**	**198**

SATURDAY

Trip Rate: 1.99

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**40**	**40**	**80**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS
Proposed Zone Change Worst-Case Scenario

Land Use: Multifamily Housing (Low-Rise)
Land Use Code: 220
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 346

AM PEAK HOUR

Trip Rate: 0.46

	Enter	Exit	Total
Directional Distribution	23%	77%	
Trip Ends	**37**	**122**	**159**

PM PEAK HOUR

Trip Rate: 0.56

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**122**	**72**	**194**

WEEKDAY

Trip Rate: 7.32

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1,266**	**1,266**	**2,532**

SATURDAY

Trip Rate: 8.14

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**1,408**	**1,408**	**2,816**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS
Proposed Development Plan

Land Use: Multifamily Housing (Low-Rise)
Land Use Code: 220
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 186

AM PEAK HOUR

Trip Rate: 0.46

	Enter	Exit	Total
Directional Distribution	23%	77%	
Trip Ends	**20**	**66**	**86**

PM PEAK HOUR

Trip Rate: 0.56

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**66**	**38**	**104**

WEEKDAY

Trip Rate: 7.32

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**681**	**681**	**1,362**

SATURDAY

Trip Rate: 8.14

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**757**	**757**	**1,514**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS
Proposed Development Plan

Land Use: Multifamily Housing (Mid-Rise)
Land Use Code: 221
Setting/Location General Urban/Suburban
Variable: Dwelling Units
Variable Value: 79

AM PEAK HOUR

Trip Rate: 0.36

	Enter	Exit	Total
Directional Distribution	26%	74%	
Trip Ends	**7**	**21**	**28**

PM PEAK HOUR

Trip Rate: 0.44

	Enter	Exit	Total
Directional Distribution	61%	39%	
Trip Ends	**21**	**14**	**35**

WEEKDAY

Trip Rate: 5.44

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**215**	**215**	**430**

SATURDAY

Trip Rate: 4.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**194**	**194**	**388**

Source: TRIP GENERATION, Tenth Edition

TRIP GENERATION CALCULATIONS
Proposed Zone Change Worst-Case Scenario
Proposed Development Plan

Land Use: Recreational Community Center
Land Use Code: 495
Variable: 1000 Square Feet Gross Floor Area
Variable Quantity: 20

AM PEAK HOUR

Trip Rate: 1.76

	Enter	Exit	Total
Directional Distribution	66%	34%	
Trip Ends	**23**	**12**	**35**

PM PEAK HOUR

Trip Rate: 2.31

	Enter	Exit	Total
Directional Distribution	47%	53%	
Trip Ends	**22**	**24**	**46**

WEEKDAY

Trip Rate: 28.82

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**288**	**288**	**576**

SATURDAY

Trip Rate: 9.10

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**91**	**91**	**182**

Source: TRIP GENERATION, Ninth Edition

TRIP GENERATION CALCULATIONS
Proposed Zone Change Worst-Case Scenario
Proposed Development Plan

Land Use: Shopping Center
Land Use Code: 820
Setting/Location General Urban/Suburban
Variable: 1,000 Sq. Ft. GFA
Variable Value: 24

AM PEAK HOUR

Trip Rate: 0.94

	Enter	Exit	Total
Directional Distribution	62%	38%	
Trip Ends	**14**	**9**	**23**

PM PEAK HOUR

Trip Rate: 3.81

	Enter	Exit	Total
Directional Distribution	48%	52%	
Trip Ends	**44**	**47**	**91**

WEEKDAY

Trip Rate: 37.75

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**453**	**453**	**906**

SATURDAY

Trip Rate: 46.12

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**553**	**553**	**1,106**

Source: Trip Generation Manual, Tenth Edition

Key Data Network
5477 SW Joshua St

Tualatin, Oregon, United States 97062
503.804.3294 conley@k-d-n.com
Key People serving Key Clients

Location: 44.295756, -121.559593

Count Name: Hwy 20 at W Barclay Rd
Site Code:
Start Date: 10/15/2019
Page No: 1

Turning Movement Data

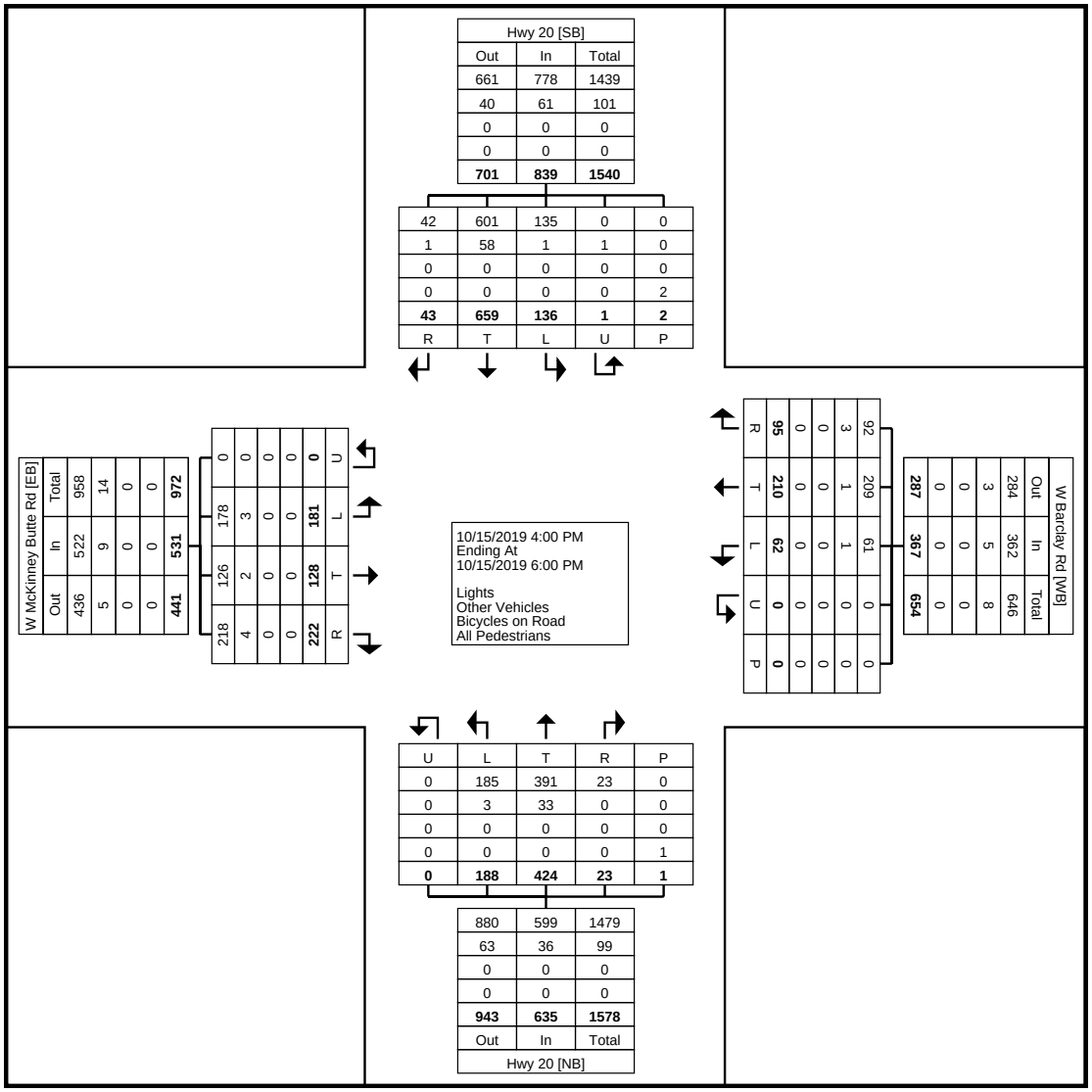
Start Time	Hwy 20 Northbound						Hwy 20 Southbound						W McKinney Butte Rd Eastbound					W Barclay Rd Westbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:00 PM	20	59	4	0	0	83	21	85	3	0	0	109	28	12	26	0	66	15	19	17	0	0	51	309
4:15 PM	25	69	1	0	0	95	18	95	9	0	0	122	20	14	29	0	63	3	26	12	0	0	41	321
4:30 PM	31	56	3	0	0	90	14	66	6	1	0	87	21	19	31	0	71	16	30	14	0	0	60	308
4:45 PM	22	63	2	0	1	87	15	90	6	0	0	111	19	25	27	0	71	8	25	12	0	0	45	314
Hourly Total	98	247	10	0	1	355	68	336	24	1	0	429	88	70	113	0	271	42	100	55	0	0	197	1252
5:00 PM	22	43	3	0	0	68	20	102	5	0	0	127	27	21	26	0	74	4	27	13	0	0	44	313
5:15 PM	15	49	3	0	0	67	18	108	5	0	1	131	24	11	31	0	66	7	28	12	0	0	47	311
5:30 PM	21	48	5	0	0	74	13	39	1	0	1	53	18	13	29	0	60	3	28	6	0	0	37	224
5:45 PM	32	37	2	0	0	71	17	74	8	0	0	99	24	13	23	0	60	6	27	9	0	0	42	272
Hourly Total	90	177	13	0	0	280	68	323	19	0	2	410	93	58	109	0	260	20	110	40	0	0	170	1120
Grand Total	188	424	23	0	1	635	136	659	43	1	2	839	181	128	222	0	531	62	210	95	0	0	367	2372
Approach %	29.6	66.8	3.6	0.0	-	-	16.2	78.5	5.1	0.1	-	-	34.1	24.1	41.8	0.0	-	16.9	57.2	25.9	0.0	-	-	-
Total %	7.9	17.9	1.0	0.0	-	26.8	5.7	27.8	1.8	0.0	-	35.4	7.6	5.4	9.4	0.0	22.4	2.6	8.9	4.0	0.0	-	15.5	-
Lights	185	391	23	0	-	599	135	601	42	0	-	778	178	126	218	0	522	61	209	92	0	-	362	2261
% Lights	98.4	92.2	100.0	-	-	94.3	99.3	91.2	97.7	0.0	-	92.7	98.3	98.4	98.2	-	98.3	98.4	99.5	96.8	-	-	98.6	95.3
Other Vehicles	3	33	0	0	-	36	1	58	1	1	-	61	3	2	4	0	9	1	1	3	0	-	5	111
% Other Vehicles	1.6	7.8	0.0	-	-	5.7	0.7	8.8	2.3	100.0	-	7.3	1.7	1.6	1.8	-	1.7	1.6	0.5	3.2	-	-	1.4	4.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
All Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0	-	-
% All Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-

Key Data Network
5477 SW Joshua St

Tualatin, Oregon, United States 97062
503.804.3294 conley@k-d-n.com
Key People serving Key Clients

Location: 44.295756, -121.559593

Count Name: Hwy 20 at W Barclay Rd
Site Code:
Start Date: 10/15/2019
Page No: 2



Turning Movement Data Plot

Key Data Network
5477 SW Joshua St

Tualatin, Oregon, United States 97062
503.804.3294 conley@k-d-n.com
Key People serving Key Clients

Location: 44.295756, -121.559593

Count Name: Hwy 20 at W Barclay Rd
Site Code:
Start Date: 10/15/2019

Approach Data

Start Time	Nb Street Northbound						Sb Street Southbound						Eb Street Eastbound				Wb Street Westbound					
	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next
4:00 PM	0	0	62	126	82	4	0	0	53	106	108	3	119	42	66	26	0	0	106	39	50	17
4:15 PM	0	0	53	126	97	1	0	0	53	100	123	9	117	59	64	29	0	0	116	32	41	12
4:30 PM	0	0	54	114	89	3	0	0	78	94	87	6	98	66	71	31	0	0	108	37	60	14
4:45 PM	0	1	60	125	88	2	0	0	57	93	112	6	114	53	72	27	0	0	106	42	46	12
Hourly Total	0	1	229	491	356	10	0	0	241	393	430	24	448	220	273	113	0	0	436	150	197	55
5:00 PM	0	0	67	132	68	3	0	0	54	83	128	5	127	53	73	26	0	0	92	44	45	13
5:15 PM	0	0	51	145	68	3	1	0	48	84	131	5	134	47	66	31	0	0	90	31	46	12
5:30 PM	0	0	46	70	74	5	0	1	52	73	53	1	55	50	62	29	0	0	86	30	36	6
5:45 PM	0	0	54	104	71	2	0	0	66	71	99	8	97	67	60	23	0	0	93	32	43	9
Hourly Total	0	0	218	451	281	13	1	1	220	311	411	19	413	217	261	109	0	0	361	137	170	40
Grand Total	0	1	447	942	637	23	1	1	461	704	841	43	861	437	534	222	0	0	797	287	367	95
Approach %	-	-	21.8	46.0	31.1	1.1	-	-	22.5	34.4	41.0	2.1	41.9	21.3	26.0	10.8	-	-	51.6	18.6	23.7	6.1
Total %	-	-	5.8	12.2	8.3	0.3	-	-	6.0	9.1	10.9	0.6	11.2	5.7	6.9	2.9	-	-	10.4	3.7	4.8	1.2
Lights	-	-	439	876	600	23	-	-	457	662	781	42	801	432	524	218	-	-	756	283	363	92
% Lights	-	-	98.2	93.0	94.2	100.0	-	-	99.1	94.0	92.9	97.7	93.0	98.9	98.1	98.2	-	-	94.9	98.6	98.9	96.8
Other Vehicles	-	-	8	66	37	0	-	-	4	41	60	1	60	5	10	4	-	-	41	4	4	3
% Other Vehicles	-	-	1.8	7.0	5.8	0.0	-	-	0.9	5.8	7.1	2.3	7.0	1.1	1.9	1.8	-	-	5.1	1.4	1.1	3.2
Bicycles on Road	-	-	0	0	0	0	-	-	0	1	0	0	0	0	0	0	-	-	0	0	0	0
% Bicycles on Road	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0
Bicycles on Crosswalk	0	1	-	-	-	-	1	0	-	-	-	-	-	-	-	-	0	0	-	-	-	-
% Bicycles on Crosswalk	-	100.0	-	-	-	-	100.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	0	0	-	-	-	-	0	1	-	-	-	-	-	-	-	-	0	0	-	-	-	-
% Pedestrians	-	0.0	-	-	-	-	0.0	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Key Data Network
5477 SW Joshua St

Tualatin, Oregon, United States 97062
503.804.3294 conley@k-d-n.com
Key People serving Key Clients

Location: 44.295756, -121.559593

Count Name: Hwy 20 at W Barclay Rd
Site Code:
Start Date: 10/15/2019

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Hwy 20 Northbound						Hwy 20 Southbound						W McKinney Butte Rd Eastbound					W Barclay Rd Westbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	25	69	1	0	0	95	18	95	9	0	0	122	20	14	29	0	63	3	26	12	0	0	41	321
4:30 PM	31	56	3	0	0	90	14	66	6	1	0	87	21	19	31	0	71	16	30	14	0	0	60	308
4:45 PM	22	63	2	0	1	87	15	90	6	0	0	111	19	25	27	0	71	8	25	12	0	0	45	314
5:00 PM	22	43	3	0	0	68	20	102	5	0	0	127	27	21	26	0	74	4	27	13	0	0	44	313
Total	100	231	9	0	1	340	67	353	26	1	0	447	87	79	113	0	279	31	108	51	0	0	190	1256
Approach %	29.4	67.9	2.6	0.0	-	-	15.0	79.0	5.8	0.2	-	-	31.2	28.3	40.5	0.0	-	16.3	56.8	26.8	0.0	-	-	-
Total %	8.0	18.4	0.7	0.0	-	27.1	5.3	28.1	2.1	0.1	-	35.6	6.9	6.3	9.0	0.0	22.2	2.5	8.6	4.1	0.0	-	15.1	-
PHF	0.806	0.837	0.750	0.000	-	0.895	0.838	0.865	0.722	0.250	-	0.880	0.806	0.790	0.911	0.000	0.943	0.484	0.900	0.911	0.000	-	0.792	0.978
Lights	98	211	9	0	-	318	66	323	25	0	-	414	84	78	111	0	273	31	108	48	0	-	187	1192
% Lights	98.0	91.3	100.0	-	-	93.5	98.5	91.5	96.2	0.0	-	92.6	96.6	98.7	98.2	-	97.8	100.0	100.0	94.1	-	-	98.4	94.9
Other Vehicles	2	20	0	0	-	22	1	30	1	1	-	33	3	1	2	0	6	0	0	3	0	-	3	64
% Other Vehicles	2.0	8.7	0.0	-	-	6.5	1.5	8.5	3.8	100.0	-	7.4	3.4	1.3	1.8	-	2.2	0.0	0.0	5.9	-	-	1.6	5.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
All Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	0	-	-
% All Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Key Data Network
5477 SW Joshua St

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Key People serving Key Clients

Location: 44.295756, -121.559593

Count Name: Hwy 20 at W Barclay Rd
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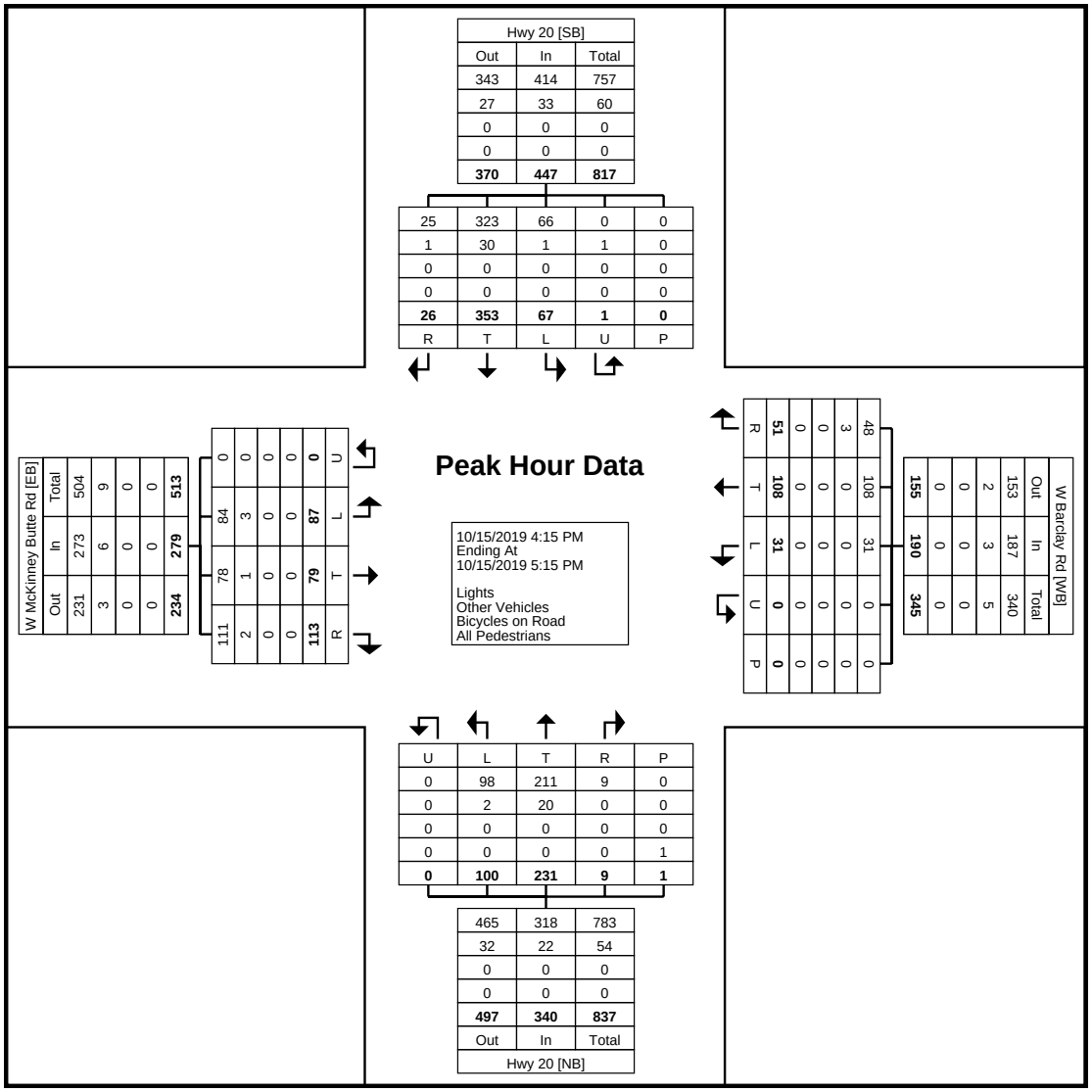
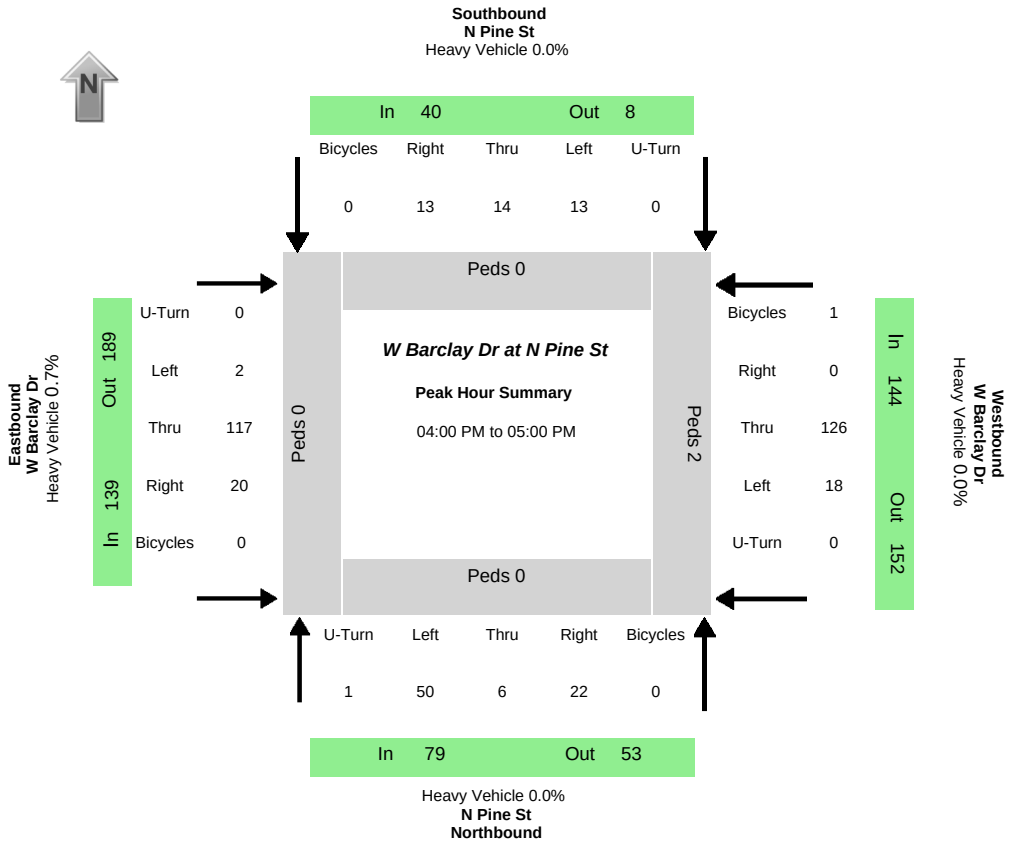
Start Date: 10/15/2019
Page No: 5



Turning Movement Peak Hour Data Plot (4:15 PM)

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*N Pine St*
E/W street	*W Barclay Dr*
City, State	Sisters OR
Site Notes	
Location	44.29704 - -121.55394
Start Date	Tuesday, October 15, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:30:00 PM
PHF (15-Min Int)	0.84



Peak-Hour Volumes (PHV)																							
Northbound				**Southbound**				**Eastbound**				**Westbound**				**Entering**				**Leaving**			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
50	6	22	1	13	14	13	0	2	117	20	0	18	126	0	0	79	40	139	144	53	8	189	152
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.7%

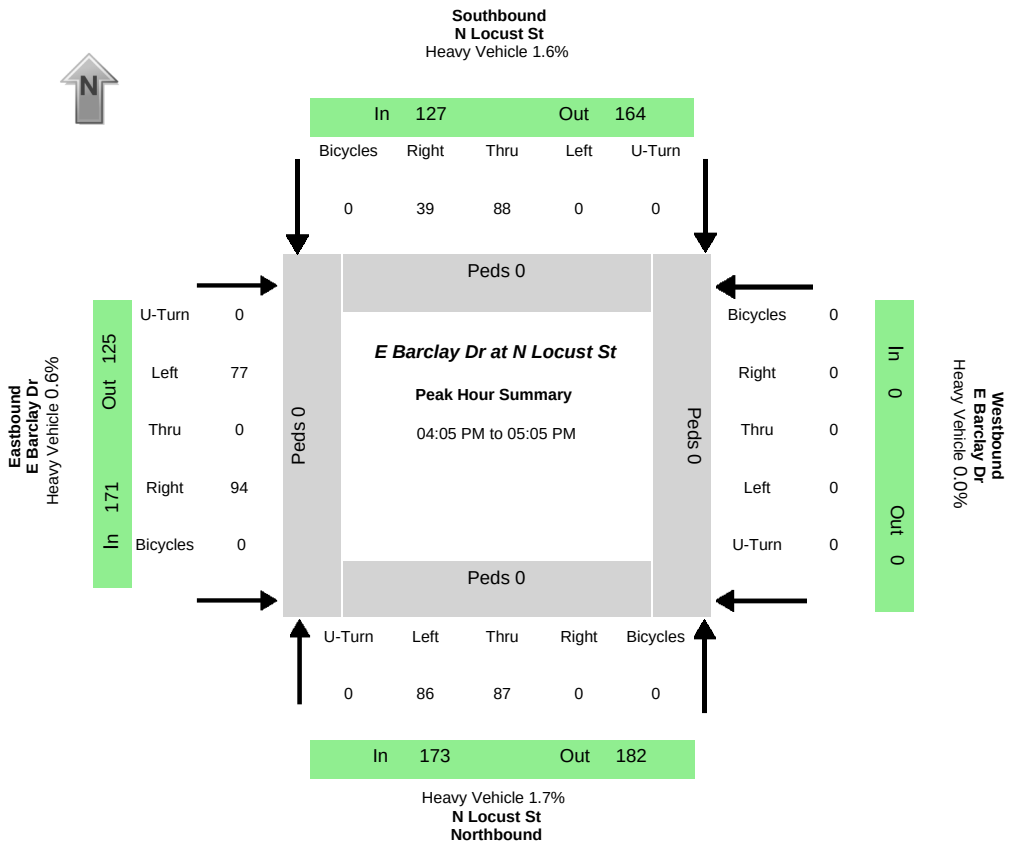
PHV- Bicycles																	PHV - Pedestrians				
Northbound				**Southbound**				**Eastbound**				**Westbound**					in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**	NB	SB	EB	WB	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2	2

All Vehicle Volumes

	Northbound N Pine St				**Southbound** N Pine St				**Eastbound** W Barclay Dr				**Westbound** W Barclay Dr				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	6	1	2	1	0	2	3	0	0	5	2	0	3	10	0	0		
04:05:00 PM	3	2	1	0	0	0	1	0	0	11	1	0	3	11	0	0		
04:10:00 PM	4	0	3	0	0	0	0	0	0	13	2	0	0	11	0	0	101	
04:15:00 PM	1	0	1	0	0	2	0	0	0	10	6	0	1	8	0	0	95	
04:20:00 PM	3	0	1	0	1	1	1	0	0	9	1	0	2	15	0	0	96	
04:25:00 PM	2	0	2	0	0	2	0	0	1	5	2	0	1	9	0	0	87	
04:30:00 PM	7	1	2	0	4	2	2	0	0	6	1	0	3	8	0	0	94	
04:35:00 PM	6	0	1	0	3	2	2	0	0	16	1	0	2	11	0	0	104	
04:40:00 PM	5	0	2	0	4	1	2	0	1	6	1	0	0	17	0	0	119	
04:45:00 PM	5	0	2	0	0	1	1	0	0	10	1	0	1	10	0	0	114	
04:50:00 PM	4	1	2	0	0	0	1	0	0	13	1	0	2	9	0	0	103	
04:55:00 PM	4	1	3	0	1	1	0	0	0	13	1	0	0	7	0	0	95	402
05:00:00 PM	3	0	2	0	1	0	2	0	0	11	1	0	1	6	0	0	91	394
05:05:00 PM	2	0	3	0	1	1	0	0	0	12	2	0	1	13	0	0	93	396
05:10:00 PM	5	1	1	0	0	1	0	0	0	14	1	0	1	12	1	0	99	400
05:15:00 PM	7	0	2	0	0	0	2	0	0	10	0	0	0	8	0	0	101	400
05:20:00 PM	3	0	0	0	0	0	0	0	1	8	0	0	0	17	1	0	96	396
05:25:00 PM	2	0	0	0	0	1	0	0	0	5	2	0	0	5	0	0	74	387
05:30:00 PM	2	1	5	0	0	0	0	0	1	7	0	0	0	7	0	0	68	374
05:35:00 PM	1	1	1	0	1	1	0	0	0	11	0	0	0	14	0	0	68	360
05:40:00 PM	6	1	0	0	0	1	0	0	0	8	2	0	0	8	0	0	79	347
05:45:00 PM	3	0	0	0	0	0	0	0	1	8	1	0	2	6	0	0	77	337
05:50:00 PM	0	0	2	0	0	0	2	0	0	10	0	0	0	16	0	0	77	334
05:55:00 PM	1	2	0	0	0	0	3	0	0	7	2	0	0	10	0	0	76	328

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*N Locust St*
E/W street	*E Barclay Dr*
City, State	Sisters OR
Site Notes	
Location	44.297603 - -121.543743
Start Date	Tuesday, October 15, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:05:00 PM
Peak 15 Min Start	04:35:00 PM
PHF (15-Min Int)	0.93



Peak-Hour Volumes (PHV)																							
Northbound				**Southbound**				**Eastbound**				**Westbound**				**Entering**				**Leaving**			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
86	87	0	0	0	88	39	0	77	0	94	0	0	0	0	0	173	127	171	0	182	164	125	0
Percent Heavy Vehicles																							
3.5%	0.0%	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	1.6%	0.6%	0.0%	1.6%	0.0%	2.4%	0.0%

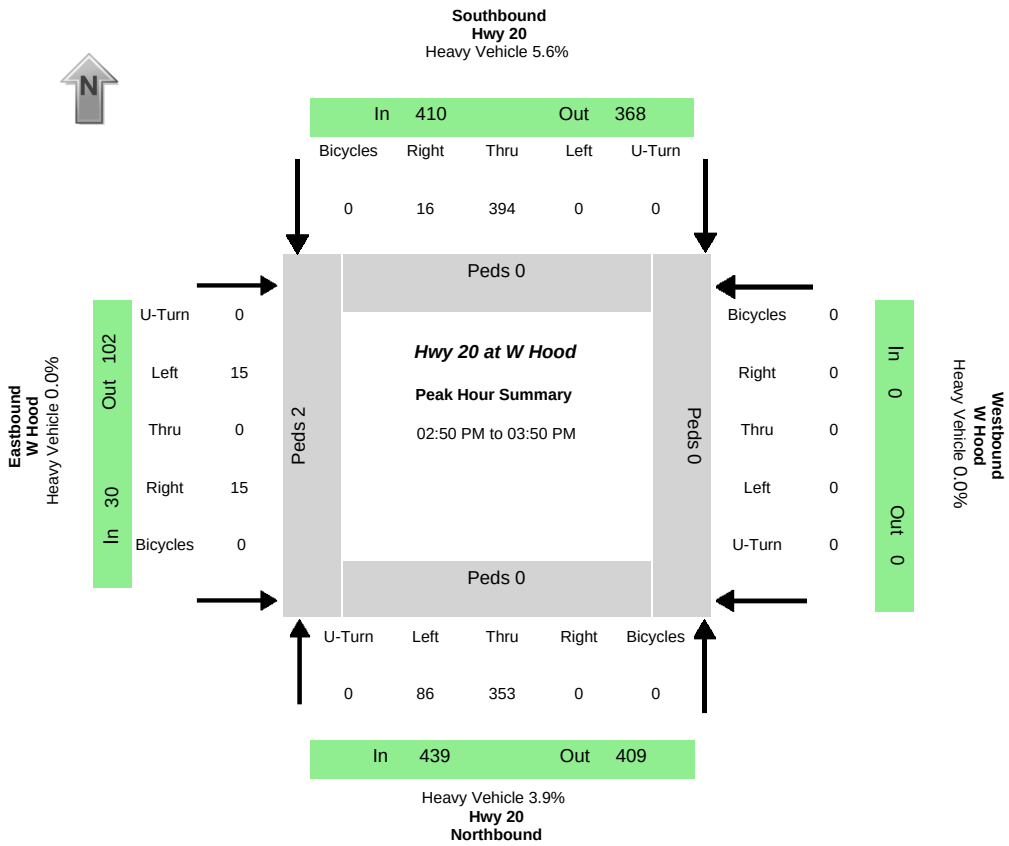
PHV- Bicycles																	PHV - Pedestrians				
Northbound				**Southbound**				**Eastbound**				**Westbound**					in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**	NB	SB	EB	WB	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

All Vehicle Volumes

	Northbound N Locust St				**Southbound** N Locust St				**Eastbound** E Barclay Dr				**Westbound** E Barclay Dr				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	8	13	0	0	0	4	3	0	3	0	5	0	0	0	0	0		
04:05:00 PM	12	6	0	0	0	8	3	0	5	0	8	0	0	0	0	0		
04:10:00 PM	7	9	0	0	0	7	1	0	7	0	9	0	0	0	0	0	118	
04:15:00 PM	8	7	0	0	0	9	3	0	5	0	7	0	0	0	0	0	121	
04:20:00 PM	8	5	0	0	0	9	5	0	8	0	4	0	0	0	0	0	118	
04:25:00 PM	9	6	0	0	0	3	4	0	3	0	8	0	0	0	0	0	111	
04:30:00 PM	7	9	0	0	0	6	3	0	3	0	6	0	0	0	0	0	106	
04:35:00 PM	4	8	0	0	0	7	3	0	11	0	12	0	0	0	0	0	112	
04:40:00 PM	7	5	0	0	0	8	7	0	7	0	9	0	0	0	0	0	122	
04:45:00 PM	5	9	0	0	0	7	3	0	7	0	8	0	0	0	0	0	127	
04:50:00 PM	10	8	0	0	0	8	1	0	8	0	9	0	0	0	0	0	126	
04:55:00 PM	0	8	0	0	0	6	5	0	7	0	6	0	0	0	0	0	115	466
05:00:00 PM	9	7	0	0	0	10	1	0	6	0	8	0	0	0	0	0	117	471
05:05:00 PM	9	9	0	0	0	3	1	0	5	0	6	0	0	0	0	0	106	462
05:10:00 PM	9	4	0	0	0	5	2	0	7	0	8	0	0	0	0	0	109	457
05:15:00 PM	5	10	0	0	0	8	5	0	4	0	10	0	0	0	0	0	110	460
05:20:00 PM	5	6	0	0	0	6	6	0	6	0	8	0	0	0	0	0	114	458
05:25:00 PM	6	17	0	0	0	3	2	0	3	0	0	0	0	0	0	0	110	456
05:30:00 PM	7	7	0	0	0	7	2	0	11	0	7	0	0	0	0	0	109	463
05:35:00 PM	5	11	0	0	0	7	4	0	6	0	5	0	0	0	0	0	110	456
05:40:00 PM	5	8	0	0	0	4	5	0	3	0	5	0	0	0	0	0	109	443
05:45:00 PM	7	11	0	0	0	7	3	0	2	0	2	0	0	0	0	0	100	436
05:50:00 PM	9	5	0	0	0	8	0	0	5	0	7	0	0	0	0	0	96	426
05:55:00 PM	7	3	0	0	0	6	1	0	9	0	2	0	0	0	0	0	94	422

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Hwy 20*
E/W street	*W Hood*
City, State	Sisters OR
Site Notes	
Location	44.293625 - -121.557933
Start Date	Wednesday, December 12, 2018
Start Time	02:00:00 PM
Weather	
Study ID #	
Peak Hour Start	02:50:00 PM
Peak 15 Min Start	03:05:00 PM
PHF (15-Min Int)	0.89



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
86	353	0	0	0	394	16	0	15	0	15	0	0	0	0	0	439	410	30	0	409	368	102	0

Percent Heavy Vehicles

1.2%	4.5%	0.0%	0.0%	0.0%	4.8%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	5.6%	0.0%	0.0%	4.6%	4.3%	4.9%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**
0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0

PHV - Pedestrians

in Crosswalk				
NB	SB	EB	WB	**Sum**
0	0	2	0	2

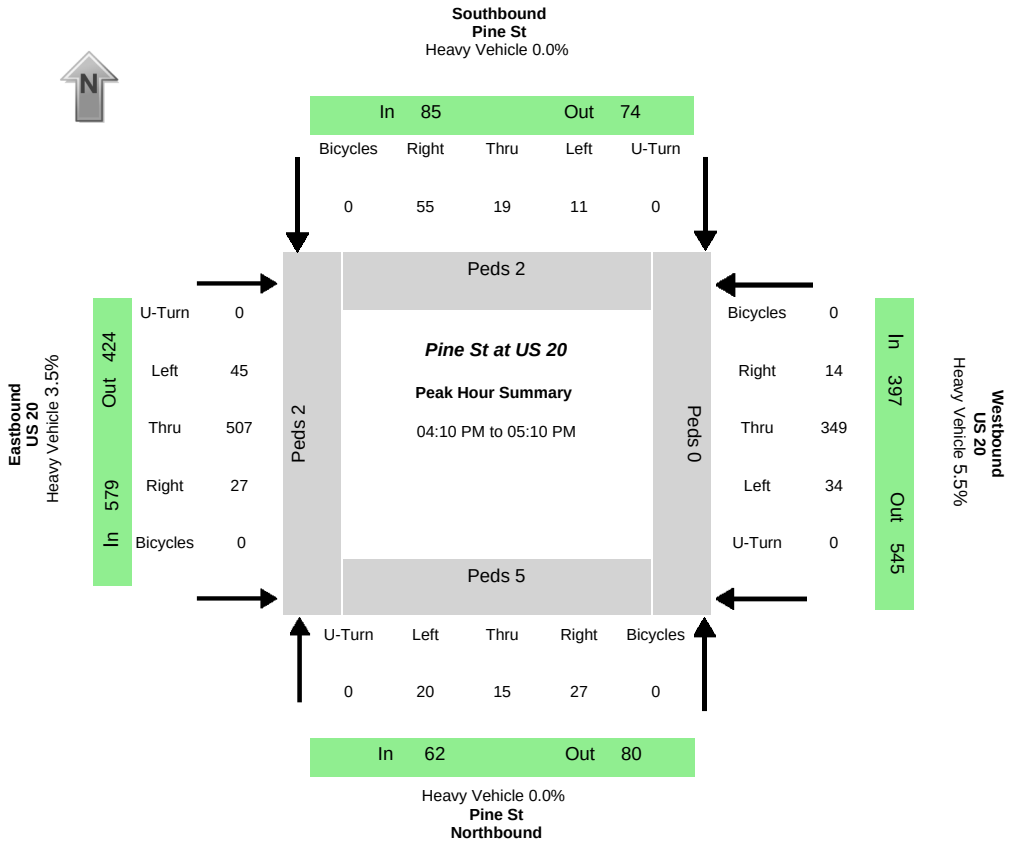
All Vehicle Volumes

	Northbound Hwy 20				Southbound Hwy 20				Eastbound W Hood				Westbound W Hood				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	1	25	0	0	0	29	0	0	3	0	1	0	0	0	0	0		
02:05:00 PM	4	17	0	0	0	26	1	0	1	0	2	0	0	0	0	0		
02:10:00 PM	6	26	0	0	0	24	3	0	4	0	1	0	0	0	0	0	174	
02:15:00 PM	7	22	0	0	0	20	0	0	1	0	4	0	0	0	0	0	169	
02:20:00 PM	2	27	0	0	0	42	0	0	1	0	2	0	0	0	0	0	192	
02:25:00 PM	3	30	0	0	0	10	0	0	0	0	2	0	0	0	0	0	173	
02:30:00 PM	2	28	0	0	0	26	2	0	1	0	2	0	0	0	0	0	180	
02:35:00 PM	2	35	0	0	0	37	1	0	2	0	1	0	0	0	0	0	184	
02:40:00 PM	4	27	0	0	0	31	1	0	1	0	3	0	0	0	0	0	206	
02:45:00 PM	6	20	0	0	0	30	0	0	0	0	2	0	0	0	0	0	203	
02:50:00 PM	12	34	0	0	0	27	2	0	2	0	2	0	0	0	0	0	204	
02:55:00 PM	15	40	0	0	0	23	6	0	0	0	4	0	0	0	0	0	225	778
03:00:00 PM	5	22	0	0	0	24	1	0	0	0	1	0	0	0	0	0	220	772
03:05:00 PM	6	29	0	0	0	39	0	0	2	0	1	0	0	0	0	0	218	798
03:10:00 PM	9	36	0	0	0	48	1	0	5	0	0	0	0	0	0	0	229	833
03:15:00 PM	7	27	0	0	0	33	0	0	0	0	3	0	0	0	0	0	246	849
03:20:00 PM	5	25	0	0	0	36	1	0	2	0	0	0	0	0	0	0	238	844
03:25:00 PM	5	32	0	0	0	32	0	0	0	0	1	0	0	0	0	0	209	869
03:30:00 PM	6	26	0	0	0	22	2	0	1	0	0	0	0	0	0	0	196	865
03:35:00 PM	4	31	0	0	0	38	1	0	1	0	2	0	0	0	0	0	204	864
03:40:00 PM	10	28	0	0	0	36	1	0	1	0	1	0	0	0	0	0	211	874
03:45:00 PM	2	23	0	0	0	36	1	0	1	0	0	0	0	0	0	0	217	879
03:50:00 PM	3	15	0	0	0	33	0	0	4	0	4	0	0	0	0	0	199	859
03:55:00 PM	1	28	0	0	0	32	0	0	0	0	2	0	0	0	0	0	185	834

04:00:00 PM	6	31	0	0	0	28	1	0	1	0	3	0	0	0	0	0	192	851
04:05:00 PM	4	35	0	0	0	42	2	0	2	0	0	0	0	0	0	0	218	859
04:10:00 PM	4	20	0	0	0	31	2	0	1	0	3	0	0	0	0	0	216	821
04:15:00 PM	3	24	0	0	0	23	2	0	3	0	2	0	0	0	0	0	203	808
04:20:00 PM	6	23	0	0	0	30	0	0	1	0	2	0	0	0	0	0	180	801
04:25:00 PM	2	19	0	0	0	33	1	0	0	0	1	0	0	0	0	0	175	787
04:30:00 PM	7	24	0	0	0	28	2	0	3	0	3	0	0	0	0	0	185	797
04:35:00 PM	1	18	0	0	0	31	2	0	0	0	4	0	0	0	0	0	179	776
04:40:00 PM	5	17	0	0	0	39	0	0	0	0	0	0	0	0	0	0	184	760
04:45:00 PM	3	15	0	0	0	25	4	0	1	0	2	0	0	0	0	0	167	747
04:50:00 PM	4	20	0	0	0	30	0	0	0	0	2	0	0	0	0	0	167	744
04:55:00 PM	2	23	0	0	0	40	0	0	0	0	0	0	0	0	0	0	171	746
05:00:00 PM	7	27	0	0	0	33	0	0	4	0	1	0	0	0	0	0	193	748
05:05:00 PM	2	15	0	0	0	20	1	0	0	0	0	0	0	0	0	0	175	701
05:10:00 PM	1	25	0	0	0	21	3	0	1	0	0	0	0	0	0	0	161	691
05:15:00 PM	1	26	0	0	0	36	2	0	2	0	2	0	0	0	0	0	158	703
05:20:00 PM	6	11	0	0	0	31	1	0	0	0	1	0	0	0	0	0	170	691
05:25:00 PM	3	14	0	0	0	14	0	0	0	0	2	0	0	0	0	0	152	668
05:30:00 PM	4	14	0	0	0	27	1	0	1	0	0	0	0	0	0	0	130	648
05:35:00 PM	5	24	0	0	0	25	2	0	0	0	3	0	0	0	0	0	139	651
05:40:00 PM	2	26	0	0	0	22	0	0	0	0	0	0	0	0	0	0	156	640
05:45:00 PM	3	17	0	0	0	17	0	0	1	0	4	0	0	0	0	0	151	632
05:50:00 PM	4	12	0	0	0	25	0	0	1	0	4	0	0	0	0	0	138	622
05:55:00 PM	5	19	0	0	0	24	0	0	0	0	1	0	0	0	0	0	137	606

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Pine St*
E/W street	*US 20*
City, State	Sisters OR
Site Notes	
Location	44.291346 - -121.553807
Start Date	Tuesday, October 15, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:10:00 PM
Peak 15 Min Start	04:20:00 PM
PHF (15-Min Int)	0.91



Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
20	15	27	0	11	19	55	0	45	507	27	0	34	349	14	0	62	85	579	397	80	74	424	545
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%	0.0%	3.5%	5.5%	0.0%	0.0%	5.2%	3.7%

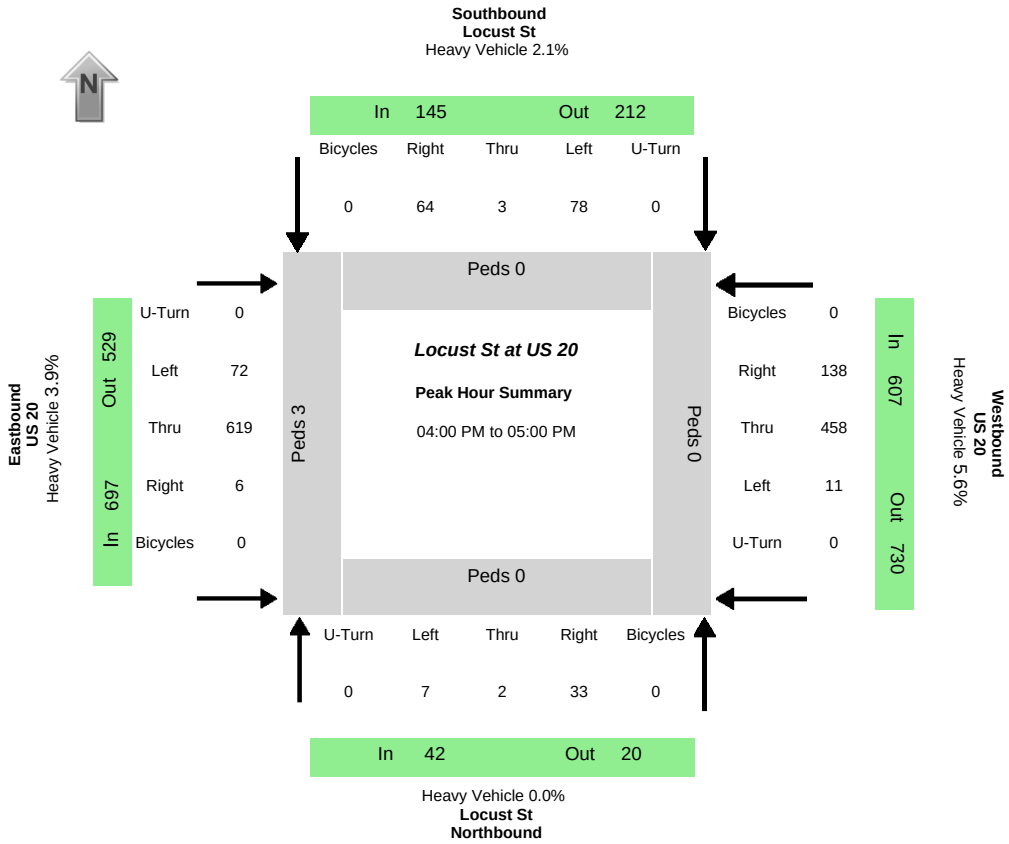
PHV- Bicycles																	PHV - Pedestrians				
Northbound				Southbound				Eastbound				Westbound					in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	2	0	9

All Vehicle Volumes

	Northbound Pine St				Southbound Pine St				Eastbound US 20				Westbound US 20				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	3	2	0	3	1	8	0	5	43	2	0	2	23	2	0		
04:05:00 PM	3	2	5	0	2	2	8	0	3	43	2	0	4	22	3	0		
04:10:00 PM	3	1	8	0	1	4	5	0	3	34	3	0	6	31	1	0	293	
04:15:00 PM	3	2	2	0	2	0	5	0	5	23	2	0	4	21	4	0	272	
04:20:00 PM	2	2	0	0	0	1	5	0	4	42	2	0	3	37	0	0	271	
04:25:00 PM	2	0	4	0	0	3	3	0	4	48	4	0	2	34	2	0	277	
04:30:00 PM	0	1	1	0	1	2	6	0	6	54	4	0	0	28	1	0	308	
04:35:00 PM	0	3	4	0	2	2	3	0	0	28	1	0	3	29	1	0	286	
04:40:00 PM	2	2	1	0	1	1	6	0	3	41	1	0	3	30	1	0	272	
04:45:00 PM	1	1	1	0	1	4	1	0	5	66	1	0	1	26	0	0	276	
04:50:00 PM	0	0	2	0	0	2	4	0	4	33	4	0	3	35	0	0	287	
04:55:00 PM	4	0	2	0	1	0	6	0	3	34	2	0	3	26	2	0	278	1120
05:00:00 PM	2	3	0	0	1	0	6	0	5	29	1	0	2	27	1	0	247	1103
05:05:00 PM	1	0	2	0	1	0	5	0	3	75	2	0	4	25	1	0	279	1123
05:10:00 PM	2	2	2	0	0	2	4	0	4	37	5	0	7	14	0	0	275	1102
05:15:00 PM	1	1	0	0	2	0	2	0	0	28	2	0	4	14	1	0	253	1084
05:20:00 PM	1	0	4	0	1	0	2	0	2	21	2	0	6	27	1	0	201	1053
05:25:00 PM	3	0	1	0	0	0	3	0	6	76	3	0	3	15	1	0	233	1058
05:30:00 PM	0	2	2	0	1	0	6	0	5	41	1	0	4	23	0	0	263	1039
05:35:00 PM	1	0	1	0	1	0	1	0	0	22	1	0	2	20	1	0	246	1013
05:40:00 PM	2	3	0	0	2	0	2	0	3	51	3	0	3	32	1	0	237	1023
05:45:00 PM	1	0	1	0	2	0	4	0	3	66	1	0	4	16	1	0	251	1014
05:50:00 PM	1	1	2	0	1	0	4	0	1	23	1	0	3	21	3	0	262	988
05:55:00 PM	1	1	0	0	0	1	5	0	1	15	3	0	2	30	2	0	221	966

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Locust St*
E/W street	*US 20*
City, State	Sisters OR
Site Notes	
Location	44.290153 - -121.543805
Start Date	Tuesday, October 15, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:20:00 PM
PHF (15-Min Int)	0.94

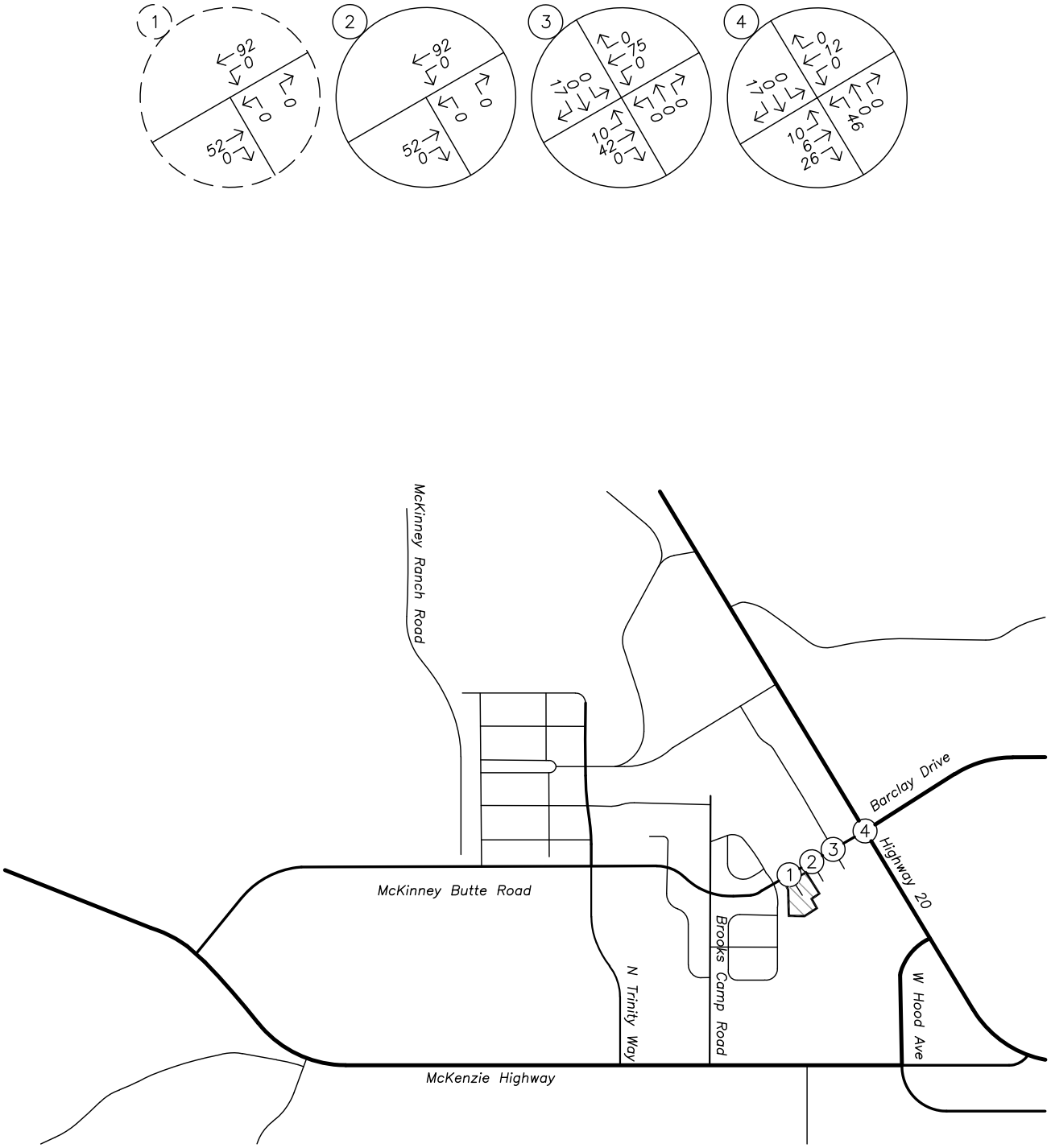


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
7	2	33	0	78	3	64	0	72	619	6	0	11	458	138	0	42	145	697	607	20	212	529	730
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	1.6%	0.0%	1.4%	4.2%	0.0%	0.0%	0.0%	5.2%	7.2%	0.0%	0.0%	2.1%	3.9%	5.6%	0.0%	5.2%	4.7%	3.8%

PHV- Bicycles																	PHV - Pedestrians				
Northbound				Southbound				Eastbound				Westbound					in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**	NB	SB	EB	WB	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3

All Vehicle Volumes

	Northbound Locust St				Southbound Locust St				Eastbound US 20				Westbound US 20				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	1	0	0	0	7	0	3	0	10	35	1	0	2	46	20	0		
04:05:00 PM	0	1	2	0	5	0	8	0	4	53	1	0	1	39	17	0		
04:10:00 PM	1	1	8	0	6	0	4	0	4	59	1	0	1	31	10	0	382	
04:15:00 PM	0	0	3	0	6	0	6	0	5	42	1	0	0	40	11	0	371	
04:20:00 PM	0	0	3	0	7	0	2	0	7	50	0	0	3	40	16	0	368	
04:25:00 PM	2	0	5	0	7	0	4	0	5	62	0	0	0	42	12	0	381	
04:30:00 PM	1	0	2	0	5	0	5	0	6	62	0	0	0	41	6	0	395	
04:35:00 PM	0	0	1	0	8	0	3	0	4	53	0	0	1	34	5	0	376	
04:40:00 PM	0	0	3	0	9	0	2	0	7	47	0	0	2	37	12	0	356	
04:45:00 PM	1	0	2	0	4	0	10	0	7	57	0	0	0	38	11	0	358	
04:50:00 PM	1	0	0	0	4	2	10	0	6	63	1	0	0	41	11	0	388	
04:55:00 PM	0	0	4	0	10	1	7	0	7	36	1	0	1	29	7	0	372	1491
05:00:00 PM	1	0	1	0	7	1	0	0	9	45	1	0	2	31	13	0	353	1477
05:05:00 PM	0	0	3	0	6	0	5	0	7	75	0	0	0	30	9	0	349	1481
05:10:00 PM	0	0	4	0	7	1	2	0	1	61	0	0	4	17	9	0	352	1461
05:15:00 PM	0	1	3	0	15	0	3	0	3	46	1	0	7	28	11	0	359	1465
05:20:00 PM	0	0	2	0	11	0	4	0	5	39	1	0	4	28	14	0	332	1445
05:25:00 PM	1	0	2	0	3	0	3	0	5	78	1	0	0	25	15	0	359	1439
05:30:00 PM	0	0	1	0	2	0	5	0	7	64	1	0	3	32	12	0	368	1438
05:35:00 PM	0	1	2	0	7	0	4	0	4	28	0	0	1	30	13	0	350	1419
05:40:00 PM	0	0	0	0	4	1	5	0	5	38	0	0	3	26	17	0	316	1399
05:45:00 PM	0	0	4	0	5	0	4	0	6	56	0	0	3	31	7	0	305	1385
05:50:00 PM	0	1	4	0	7	1	5	0	4	55	0	0	4	30	11	0	337	1368
05:55:00 PM	0	1	1	0	9	0	5	0	5	30	1	0	1	30	11	0	332	1359

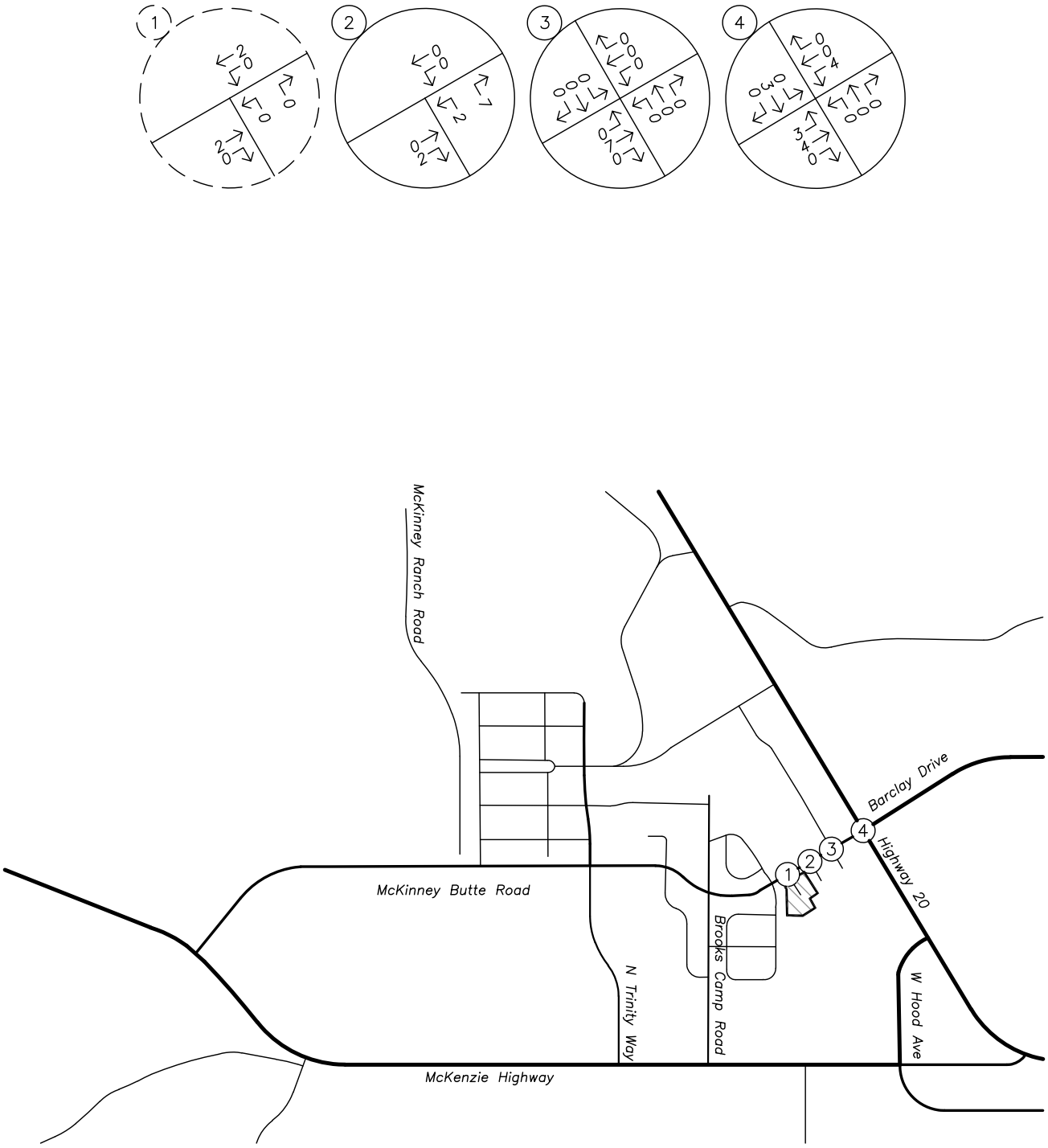


TRAFFIC VOLUMES
In-Process Trips – McKenzie Meadows
PM Peak Hour

no scale

FIGURE --

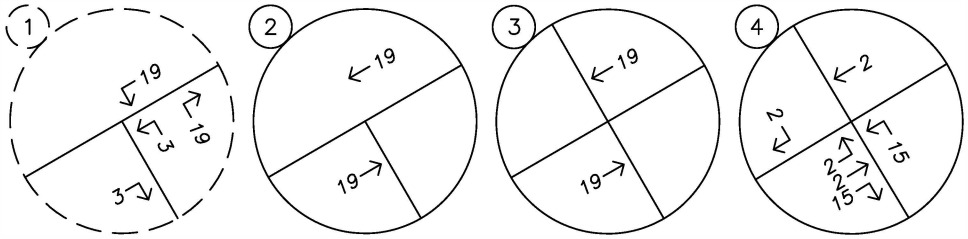
PAGE --

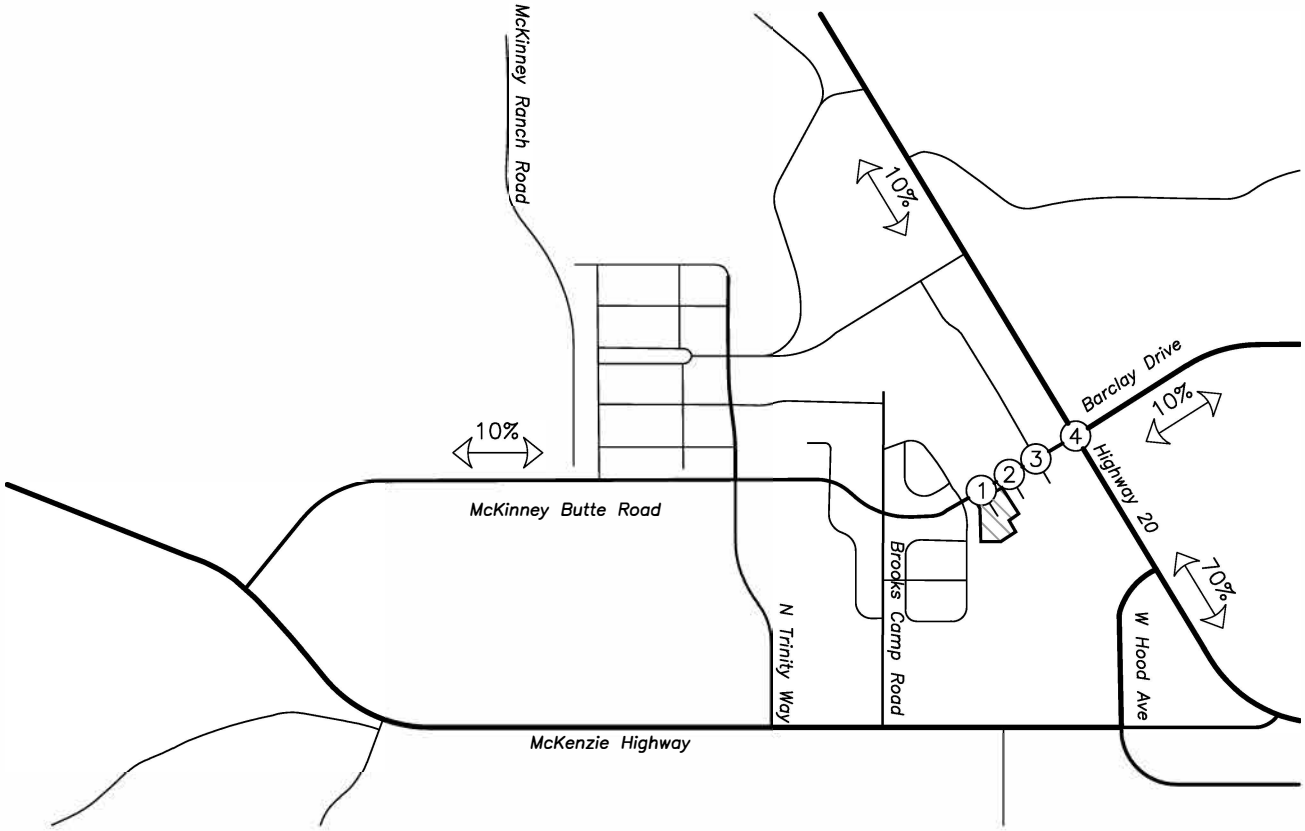

1
2
0
0
0
0
2
0
2
0
2
0
0
0
0
2
0
2
0
0
0
0

LEGEND

XX% PERCENT OF PRIMARY TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	8	3	11
PM	22	22	44





TRAFFIC VOLUMES
In–Process Trips – Dollar General
PM Peak Hour

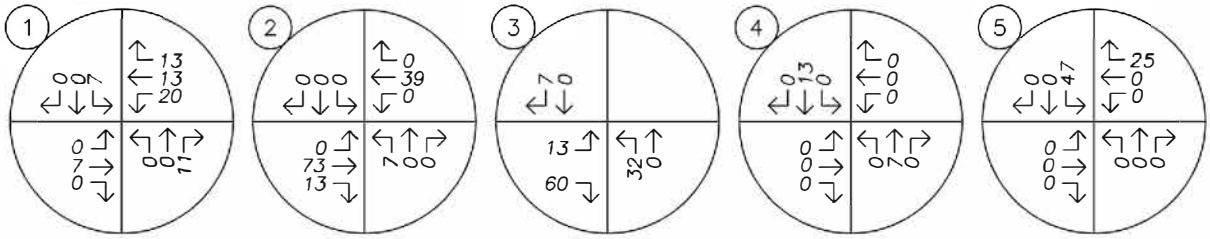
no scale

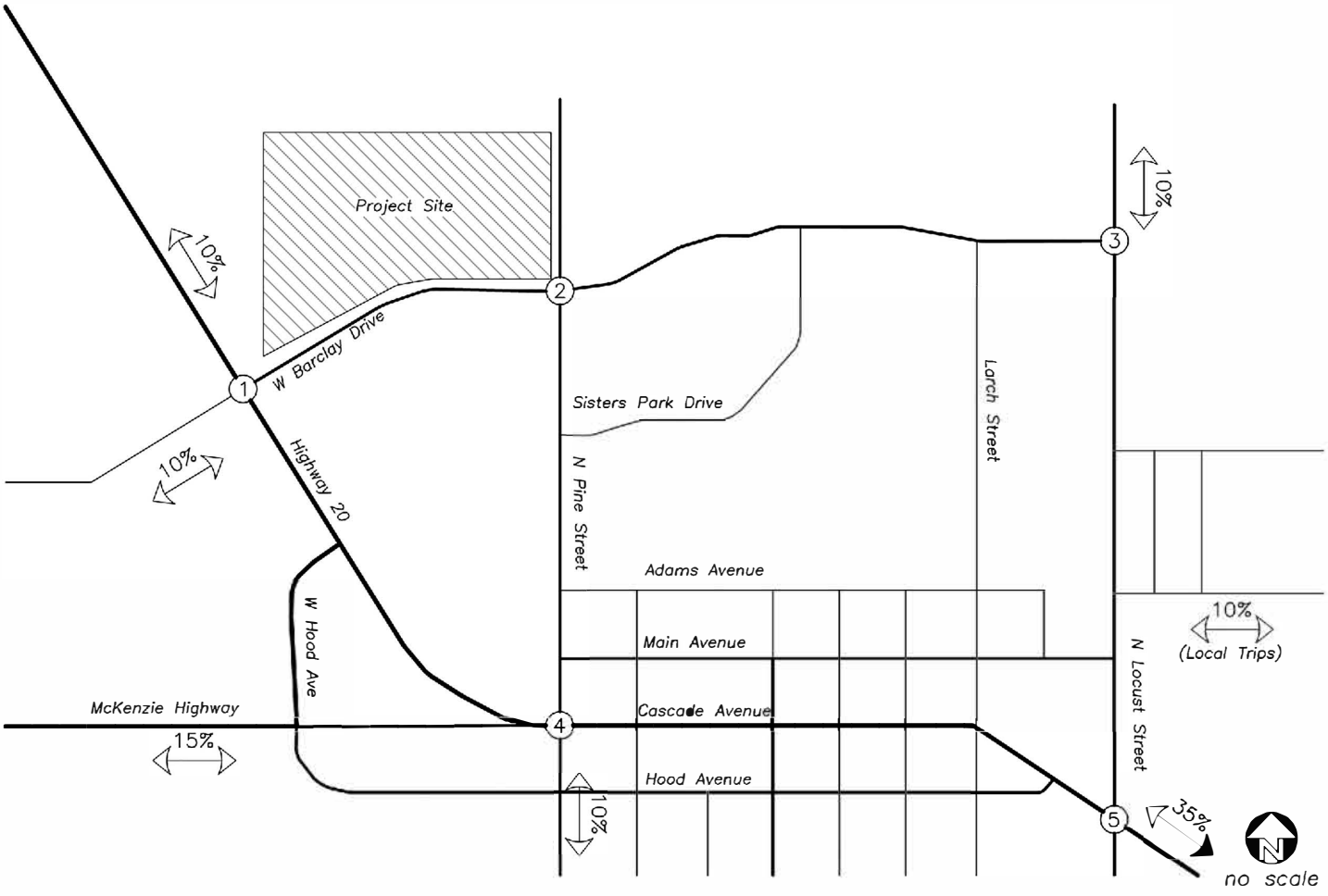
FIGURE 5

LEGEND

XX% PERCENT OF PRIMARY TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
PM	70	131	201





lancaster mobley

SITE TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Plan - Site Trips

PM Peak Hour

Figure 3

Sisters Industrial Subdivision

1/24/2020

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

CITY OF SISTERS, DESCHUTES COUNTY

BARCLAY DR at SANTIAM HY, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

1 - 3 of 6 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J N V	S I H L	C N	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
02337	N	N	N		N	N		12/26/2016	02	BARCLAY WAY	INTER	CROSS	N	Y	CLR	FIX OBJ	01	NONE 9	STRGHT										058,092	26
COUNTY								MO		SANTIAM HY	NW		STOP SIGN	N	ICE	FIX		N/A	SE-NW									007		00
N								4P			05	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk	UNK		000	000		00
N								44 17 44.72	-121 33 34.75	001600100S00															UNK					
00553	N	N	N					05/05/2013	02	BARCLAY WAY	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY								SU		SANTIAM HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	NE-SW									000		00
N								12P			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	65	F	OR-Y		028	000		02
N								44 17 44.7192239	-121 33 34.7473079	001600100S00															OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	NW-SE									000		00
																		MTRCYCLE		01	DRVR	INJA	57	M	OR-Y		000	000		00
																									OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	NW-SE									000		00
																		MTRCYCLE		02	PSNG	INJA	59	F			000	000		00
00737	N	N	N		N	N		06/12/2013	02	BARCLAY WAY	INTER		N	N	CLR	ANGL-OTH	01	NONE	STRGHT										082	02
COUNTY								WE		SANTIAM HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	S -N									000		00
N								3P			02	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJB	84	F	OR-Y		028	000	082	02
N								44 17 44.7192239	-121 33 34.7473079	001600100S00															OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	E -W									000		00
																		PSNGR CAR		01	DRVR	INJA	35	F	OR-Y		000	000	082	00
																									OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	E -W									000		00
																		PSNGR CAR		02	PSNG	INJA	12	M			000	000		00
																	02	NONE 0	STRGHT											
																		PRVTE	E -W									000		00
																		PSNGR CAR		03	PSNG	INJA	08	F			000	000		00
00981	N	N	N		N	N		07/27/2013	02	BARCLAY WAY	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										010	02
COUNTY								SA		SANTIAM HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	NE-SW									000		00
N								12P			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	20	M	OR-Y		028	000		02
N								44 17 44.7192239	-121 33 34.7473079	001600100S00															OR<25					
																	02	NONE 0	STRGHT											
																		PRVTE	NW-SE									000		00
																		PSNGR CAR		01	DRVR	INJB	34	M	OR-Y		000	000		00
																									OR<25					

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SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J N V	S I H L	C N K	W O R	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
																	02	NONE 0	STRGHT										
																		PRVTE	NW-SE								000		00
																		PSNGR CAR		02	PSNG	INJB	34	F		000	000		00
																	02	NONE 0	STRGHT										
																		PRVTE	NW-SE								000		00
																		PSNGR CAR		03	PSNG	INJB	01	M		000	000		00
																	02	NONE 0	STRGHT										
																		PRVTE	NW-SE								000		00
																		PSNGR CAR		04	PSNG	INJB	07	M		000	000		00
																	02	NONE 0	STRGHT										
																		PRVTE	NW-SE								000		00
																		PSNGR CAR		05	PSNG	NO<5	04	F		000	000		00
01224	N	N	N		N	N		09/07/2013	02	BARCLAY WAY	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										02
COUNTY								SA		SANTIAM HY	CN		STOP SIGN	N	DRY	ANGL		PRVTE	SW-NE								000		00
N								12P			02	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	48	F	OR-Y	028	000		02
N								44 17 44.7192239	-121 33 34.7473079	001600100S00															OR<25				
																	02	NONE 0	STRGHT										
																		PRVTE	SE-NW								000		00
																		PSNGR CAR		01	DRVR	NONE	30	M	OR-Y OR<25	000	000		00
01738	N	N	N		N	N		12/07/2013	02	BARCLAY WAY	INTER	CROSS	N	N	SNOW	ANGL-OTH	01	NONE 0	STRGHT										02
CITY								SA		SANTIAM HY	CN		STOP SIGN	N	ICE	ANGL		PRVTE	SW-NE								000		00
N								11A			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	66	M	OR-Y	028	000		02
N								44 17 44.7192239	-121 33 34.7473079	001600100S00															OR<25				
																	02	NONE 0	STRGHT										
																		PRVTE	SE-NW								000		00
																		PSNGR CAR		01	DRVR	NONE	60	M	OR-Y OR<25	000	000		00

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

CITY OF SISTERS, DESCHUTES COUNTY

BARCLAY DR at PINE ST, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

1 - 3 of 3 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
00962	N	N	N		N	N	05/20/2017	07	BARCLAY DR	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									010	03,27
COUNTY							SA	0	PINE ST	CN		STOP SIGN	N	DRY	ANGL		PRVTE	W -E								000		00
N							3P			03	0		N	DAY	INJ		PSNGR CAR		01	DRVR INJC	46	F	OR-Y		000	000		00
N							44 17 49.37 -121 33 14.16																OR<25					
																01	NONE 0	STRGHT										
																	PRVTE	W -E								000		00
																	PSNGR CAR		02	PSNG INJC	18	F			000	000		00
																02	NONE 0	STRGHT										
																	PRVTE	N -S								000	010	00
																	PSNGR CAR		01	DRVR INJB	52	F	OR-Y		021,016	038		03,27
																							OR<25					
01334	N	N	N		N	N	07/12/2017	07	BARCLAY DR	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT									010	03
COUNTY							WE	0	PINE ST	CN		STOP SIGN	N	DRY	ANGL		PUBLC	E -W								000		00
N							1P			02	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	42	M	OR-Y		000	000		00
N							44 17 49.37 -121 33 14.16																OR>25					
																02	NONE 0	STRGHT										
																	PRVTE	S -N								000	010	00
																	PSNGR CAR		01	DRVR INJB	63	F	OR-Y		021	000		03
																							OR>25					
																02	NONE 0	STRGHT										
																	PRVTE	S -N								000	010	00
																	PSNGR CAR		02	PSNG INJB	08	F			000	000		00
01581	N	N	N		N	N	08/20/2017	07	BARCLAY DR	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT										03
COUNTY							SU	0	PINE ST	CN		STOP SIGN	N	DRY	ANGL		PRVTE	N -S								000		00
N							7P			01	0		N	DAY	INJ		PSNGR CAR		01	DRVR INJB	18	F	OR-Y		021	000		03
N							44 17 49.37 -121 33 14.16																OR<25					
																01	NONE 0	STRGHT										
																	PRVTE	N -S								000		00
																	PSNGR CAR		02	PSNG INJC	18	F			000	000		00
																02	NONE 0	STRGHT										
																	PRVTE	E -W								000		00
																	PSNGR CAR		01	DRVR INJB	70	M	OR-Y		000	000		00
																							OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	E -W								000		00
																	PSNGR CAR		02	PSNG INJB	62	F			000	000		00

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

CITY OF SISTERS, DESCHUTES COUNTY

BARCLAY DR at LOCUST ST, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

1 - 1 of 1 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D / A L C / D / M R G S / J U N / I / C N / S V / W H / O L / R / K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
00370	N N N	02/13/2017	07	BARCLAY DR	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE 0	TURN-L											02
NONE		MO	0	LOCUST ST	CN		STOP SIGN	N	DRY	TURN		UNKN	W -N									015		00
N		4P			04	0		N	DAY	INJ		UNKNOWN		01	DRVR	NONE	00	Unk	UNK		028	000		02
N		44 17 51.38	-121 32 37.46																UNK					
											02	NONE 0	TURN-L											
												PRVTE	S -W									000		00
												PSNGR CAR		01	DRVR	INJC	61	M	OR-Y		000	000		00
																			OR>25					

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

CITY OF SISTERS, DESCHUTES COUNTY

HOOD AVE at SANTIAM HY, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

1 - 1 of 1 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
00419	N	N	N		N	N	04/04/2015	02	W HOOD AVE	INTER	3-LEG	N	N	CLD	ANGL-OTH	01	NONE 0	STRGHT											02
COUNTY							SA		SANTIAM HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	W -E									000		00
N							3P			04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	55	M	OR-Y		000	000		00
N							44 17 37.19	-121 33 28.32	001600100S00															OR<25					
																02	NONE 0	TURN-L											
																	PRVTE	SW-W									000		00
																	MOTRHOME		01	DRVR	NONE	63	F	OR-Y		028	000		02
																								OR<25					

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

CITY OF SISTERS, DESCHUTES COUNTY

PINE ST at CASCADE AVE, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

1 - 4 of 5 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
01056	N	N	N				07/17/2014	02	CASCADE AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT									006	06
NONE							TH		PINE ST	UN		STOP SIGN	N	DRY	REAR		PRVTE	E -W								000		00
N							4P			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	00	M	UNK		026	000		07
N							44 17 28.86	-121 33 13.82	001500100S00														UNK					
																02	NONE 0	STOP										
																	PRVTE	E -W								011	006	00
																	PSNGR CAR		01	DRVR INJC	52	M	OR-Y		000	000		00
																							OR<25					
																02	NONE 0	STOP										
																	PRVTE	E -W								011	006	00
																	PSNGR CAR		01	PSNG INJC	46	M			000	000		00
01077	N	N	N				08/11/2013	02	CASCADE AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
NONE							SU		PINE ST	E		STOP SIGN	N	DRY	REAR		PRVTE	E -W								000		00
N							9A			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR NONE	25	M	OR-Y		026	000		07
N							44 17 28.8605039	-121 33 13.824504	001500100S00														OR<25					
																02	NONE 0	STOP										
																	PRVTE	E -W								011		00
																	PSNGR CAR		01	DRVR NONE	36	F	OR-Y		000	000		00
																							OR<25					
00158	N	N	N	N	N		01/30/2014	02	CASCADE AVE	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
COUNTY							TH		PINE ST	E		UNKNOWN	N	DRY	REAR		PRVTE	E -W								000		00
N							1P			06	0		N	DAY	PDO		PSNGR CAR		01	DRVR NONE	17	F	OR-Y		026	000		07
N							44 17 28.8605399	-121 33 13.824504	001500100S00														OR<25					
																02	NONE 0	STOP										
																	PRVTE	E -W								011		00
																	PSNGR CAR		01	DRVR NONE	20	M	OR-Y		000	000		00
																							OR<25					
01855	N	N	N	N	N		09/20/2017	02	CASCADE AVE	INTER	CROSS	N	N	CLD	PED	01	NONE 0	STRGHT										02,29
COUNTY							WE		PINE ST	E		STOP SIGN	N	DRY	PED		PRVTE	W -E								006		00
N							11A			05	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	70	M	OR-Y		029	000		02
N							44 17 28.86	-121 33 13.82	001500100S00														OR>25					
																		- STRGHT	01	PED INJC	34	M		I XWLK	000	034		00
																		S N										
																02	NONE 0	STRGHT										
																	PRVTE	W -E								022		00
																	PSNGR CAR		01	DRVR NONE	70	F	OR-Y		026	000		29
																							OR<25					

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CITY OF SISTERS, DESCHUTES COUNTY

PINE ST at CASCADE AVE, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

5 - 5 of 5 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE		MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
01379	N	N	N		N	N	09/15/2014	02	CASCADE AVE	INTER	CROSS	N	N	CLD	O-1 L-TURN	01	NONE	0	TURN-L											02
CITY							MO		PINE ST	CN		STOP SIGN	N	DRY	TURN		PRVTE		S -W									000		00
N							11A			01	0		N	DAY	INJ		PSNGR CAR			01	DRVR	NONE	29	M	OR-Y		028,004	000		02
N							44 17 28.86	-121 33 13.82	001500100S00																OR<25					
																01	NONE	0	TURN-L											
																	PRVTE		S -W									000		00
																	PSNGR CAR			01	PSNG	INJC	28	F			000	000		00
																02	NONE	0	STRGHT											
																	PRVTE		N -S									000		00
																	PSNGR CAR			01	DRVR	NONE	17	M	OR-Y		000	000		00
																									OR<25					

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

CITY OF SISTERS, DESCHUTES COUNTY

LOCUST ST at MCKENZIE HY, City of Sisters, Deschutes County, 01/01/2013 to 12/31/2017

1 - 4 of 6 Crash records shown.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A L C	D R U G S	M J I N V	S C H L	W O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE	MOVE / FROM / TO	P#	PRTC / INJ / SVRTY	A G E	S E X	LICNS / RES	PED LOC	ERROR	ACT	EVENT	CAUSE
00228	N	N	N				02/16/2013	07	LOCUST ST	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE 0	STRGHT										07
NONE							SA	0	MCKENZIE HY	N		TRF SIGNAL	N	DRY	REAR		PRVTE	S -N								000		00
N							10A			05	0		N	DAY	PDO		PSNGR CAR		01	DRVR NONE	29	M	OR-Y		026	000		07
N							44 17 24.665424	-121 32 37.808088															OR<25					
																02	NONE 0	STOP										
																	PRVTE	S -N								011		00
																	PSNGR CAR		01	DRVR NONE	53	F	OR-Y		000	000		00
																							OR<25					
01641	N	N	N		N	N	08/28/2017	02	LOCUST ST	INTER	CROSS	N	N	SMOK	S-1STOP	01	NONE 0	STRGHT										27,29
COUNTY							MO		MCKENZIE HY	SE		STOP SIGN	N	DRY	REAR		PRVTE	SE-NW								000		00
N							10A			06	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	36	F	OR-Y		016,026,014	038		27,29
N							44 17 24.67	-121 32 37.81	001500100S00														OR<25					
																02	NONE 0	STOP										
																	PRVTE	SE-NW								012		00
																	PSNGR CAR		01	DRVR INJC	67	F	OTH-Y		000	000		00
																							OR<25					
00110	N	N	N		N	N	01/20/2013	02	LOCUST ST	INTER	CROSS	N	N	CLR	ANGL-OTH	01	POLCE 0	STRGHT										02
STATE							SU		MCKENZIE HY	CN		STOP SIGN	N	DRY	ANGL		PUBLC	S -N								000		00
N							1P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	41	M	OR-Y		028	000		02
N							44 17 24.66546	-121 32 37.808088	001500100S00														OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	W -E								000		00
																	PSNGR CAR		01	DRVR INJC	58	F	OR-Y		000	000		00
																							OR<25					
00243	N	N	N		N	N	02/21/2013	02	LOCUST ST	INTER	CROSS	N	N	CLR	O-1 L-TURN	01	NONE 0	TURN-L										02
STATE							TH		MCKENZIE HY	CN		STOP SIGN	N	DRY	TURN		PRVTE	N -SE								000		00
N							2P			04	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	26	M	OR-Y		028	000		02
N							44 17 24.66546	-121 32 37.808088	001500100S00														OR<25					
																02	NONE 0	STRGHT										
																	PRVTE	S -N								000		00
																	PSNGR CAR		01	DRVR INJC	33	M	NONE		000	000		00
																							OR<25					
00604	N	N	N		N	N	05/07/2015	02	LOCUST ST	INTER	CROSS	N	N	CLR	S-1STOP	01	POLCE 0	STRGHT									004	29,27
STATE							TH		MCKENZIE HY	CN		STOP SIGN	N	DRY	REAR		PUBLC	SE-NW								000		00
N							9A			02	0		N	DAY	INJ		PSNGR CAR		01	DRVR NONE	33	M	OR-Y		026	038		29,16
N							44 17 24.67	-121 32 37.81	001500100S00														OR<25					
																02	NONE 0	STOP										
																	PRVTE	SE-NW								011	004	00
																	PSNGR CAR		01	DRVR NONE	48	M	OR-Y		000	000		00
																							OR<25					

Disclaimer: The information contained in this report is compiled from individual driver and police crash reports submitted to the Oregon Department of Transportation as required in ORS 811.720. The Crash Analysis and Reporting Unit is committed to providing the highest quality crash data to customers. However, because submittal of crash report forms is the responsibility of the individual driver, the Crash Analysis and Reporting Unit can not guarantee that all qualifying crashes are represented nor can assurances be made that all details pertaining to a single crash are accurate. Note: Legislative changes to DMV's vehicle crash reporting requirement, effective 01/01/2004, may result in fewer property damage only crashes being eligible for inclusion in the Statewide Crash Data File.

SER# / INVEST / RD DPT / UNLOC?	S P E D	A	D R U L G C	M J N S	S I V	W C H L	O R K	DATE / DAY / TIME / LAT	CLASS / DIST / FROM / LONG	CITY STREET / FIRST STREET / SECOND STREET / LRS	RD CHAR / DIRECT / LOCTN	INT-TYPE / (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CONTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH / COLL / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / TYPE		MOVE / FROM / TO	P#	PRTC / TYPE	INJ / SVRTY	A G E	S E X	LICNS / RES	PED / LOC	ERROR	ACT	EVENT	CAUSE
																	02	NONE	0	STOP											
																		PRVTE		SE-NW									011	004	00
																		PSNGR	CAR		02	PSNG	INJC	41	F			000	000		00
																	02	NONE	0	STOP											
																		PRVTE		SE-NW									011	004	00
																		PSNGR	CAR		03	PSNG	NO<5	02	F			000	000		00
																	02	NONE	0	STOP											
																		PRVTE		SE-NW									011	004	00
																		PSNGR	CAR		04	PSNG	NO<5	01	F			000	000		00
01686	Y	N	N		N	N		09/05/2017	02	LOCUST ST	INTER	CROSS	N	N	SMOK	ANGL-OTH	01	NONE	0	TURN-L											02,40
COUNTY								TU		MCKENZIE HY	CN		STOP SIGN	N	DRY	TURN		PRVTE		N -SE									015		00
N								3P			01	0		N	DAY	INJ		PSNGR	CAR		01	DRVR	NONE	24	M	OR-Y		028	000		02,40
N								44 17 24.67 -121 32 37.81		001500100S00																OR<25					
																	02	NONE	0	STRGHT											
																		PRVTE		SE-NW									000		00
																		PSNGR	CAR		01	DRVR	NONE	26	M	OTH-Y		000	000		00
																										OR<25					
																	02	NONE	0	STRGHT											
																		PRVTE		SE-NW									000		00
																		PSNGR	CAR		02	PSNG	INJC	26	F			000	000		00

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Traffic Signal Warrant Analysis

Project: 20011 Sisters Woodlands
Date: 5/20/2020
Scenario: 2040 Planning Horizon + Zone Change Volumes

Major Street:	W Barclay Drive	Minor Street:	N Pine Street
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	596	PM Peak Hour Volumes:	117

Warrant Used:

_____ 100 percent of standard warrants used
X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	5,960	6,200	
Minor Street*	1,170	1,850	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	5,960	9,300	
Minor Street*	1,170	950	**No**
Combination Warrant			
Major Street	5,960	7,440	
Minor Street*	1,170	1,480	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 20011 Sisters Woodlands
Date: 5/20/2020
Scenario: 2040 Planning Horizon + Zone Change Volumes

Major Street:	US Highway 20	Minor Street:	W Hood Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	1,230	PM Peak Hour Volumes:	68

Warrant Used:

_____ 100 percent of standard warrants used
X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	12,300	6,200	
Minor Street*	680	1,850	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	12,300	9,300	
Minor Street*	680	950	**No**
Combination Warrant			
Major Street	12,300	7,440	
Minor Street*	680	1,480	**No**

* Minor street right-turning traffic volumes reduced by 25%

Traffic Signal Warrant Analysis

Project: 20011 Sisters Woodlands
Date: 5/20/2020
Scenario: 2040 Planning Horizon + Zone Change Volumes

Major Street:	US Highway 20	Minor Street:	N Pine Street
Number of Lanes:	1	Number of Lanes:	2
PM Peak Hour Volumes:	1,502	PM Peak Hour Volumes:	121

Warrant Used:

_____ 100 percent of standard warrants used
X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
WARRANT 1, CONDITION A		100%	70%	100%	70%
Major St.	Minor St.	Warrants	Warrants	Warrants	Warrants
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

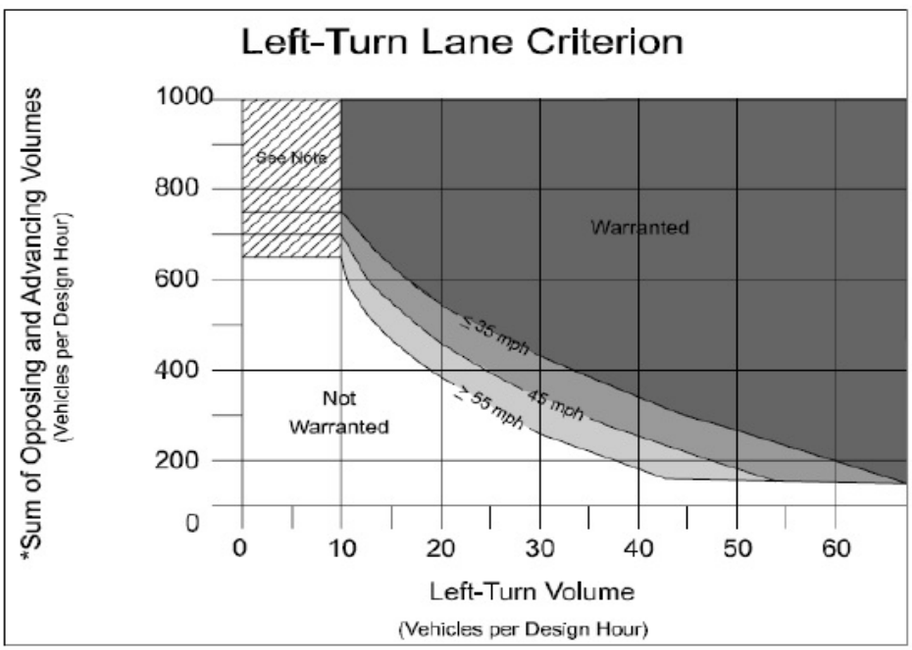
	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
Condition A: Minimum Vehicular Volume			
Major Street	15,020	6,200	
Minor Street*	1,210	2,500	**No**
Condition B: Interruption of Continuous Traffic			
Major Street	15,020	9,300	
Minor Street*	1,210	1,250	**No**
Combination Warrant			
Major Street	15,020	7,440	
Minor Street*	1,210	2,000	**No**

* Minor street right-turning traffic volumes reduced by 25%

Project: 20011 Sisters Woodlands
Intersection: W Barclay Drive at N Pine Street, Westbound Approach
Date: 5/20/2020
Scenario: 2040 Planning Horizon + Zone Change Volumes

Speed? 30 mph

AM Peak Hour		**PM Peak Hour**	
Left-Turn Volume		Left-Turn Volume	31
Approaching DHV		Approaching DHV	288
# of Advancing Through Lanes		# of Advancing Through Lanes	1
Opposing DHV		Opposing DHV	305
# of Opposing Through Lanes		# of Opposing Through Lanes	1
O+A DHV		**O+A DHV**	**593**
Lane Needed?		Lane Needed?	**Yes**



Source: Oregon DOT Analysis Procedures Manual 2008

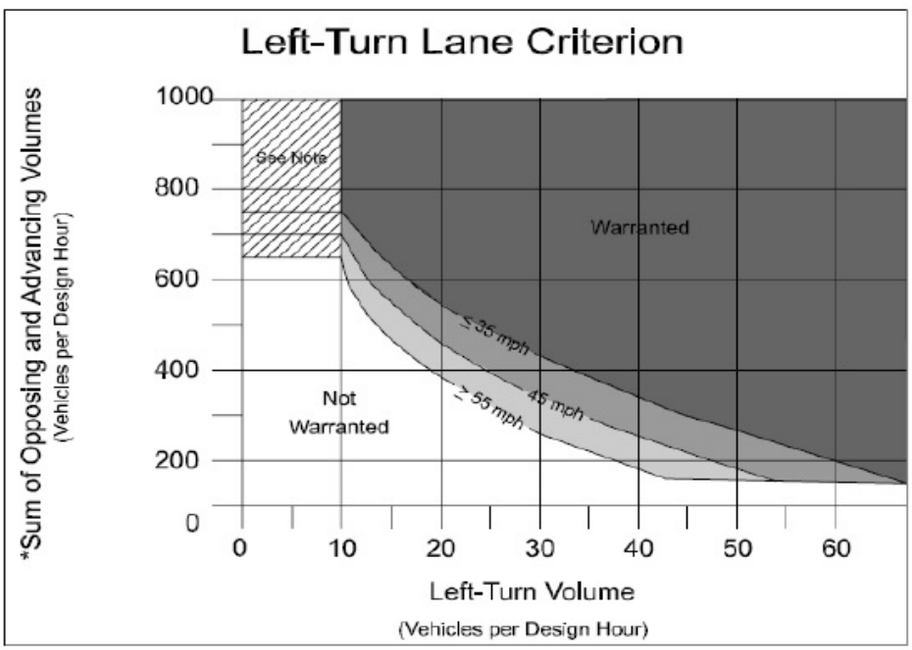
*(Advancing Vol/ # of Advancing Through Lanes)+
(Opposing Vol/ # of Opposing Through Lanes)

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

Project: 20011 Sisters Woodlands
Intersection: W Barclay Drive at N Pine Street, Eastbound Approach
Date: 5/20/2020
Scenario: 2040 Planning Horizon + Zone Change Volumes

Speed? 30 mph

AM Peak Hour		**PM Peak Hour**	
Left-Turn Volume		Left-Turn Volume	3
Approaching DHV		Approaching DHV	308
# of Advancing Through Lanes		# of Advancing Through Lanes	1
Opposing DHV		Opposing DHV	257
# of Opposing Through Lanes		# of Opposing Through Lanes	1
O+A DHV		**O+A DHV**	**565**
Lane Needed?		Lane Needed?	**No**



Source: Oregon DOT Analysis Procedures Manual 2008

*(Advancing Vol/ # of Advancing Through Lanes)+
(Opposing Vol/ # of Opposing Through Lanes)

Note: The criterion is not met from zero to ten left turn vehicles per hour, but careful consideration should be given to installing a left turn lane due to the increased potential for accidents in the through lanes. While the turn volumes are low, the adverse safety and operational impacts may require installation of a left turn. The final determination will be based on a field study.

LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.

LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

Vistro File: Z:\...\Sisters Woodlands.vistro
Report File: Z:\...\New Existing.pdf

Scenario 4 Existing Volumes
5/15/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	US 20 at W Barclay Drive	Roundabout	HCM 6th Edition	SEB Thru		8.9	A
2	N Pine Street at W Barclay Drive	Two-way stop	HCM 6th Edition	NB Left	0.106	12.4	B
3	N Locust Street at W Barclay Drive	Two-way stop	HCM 6th Edition	EB Left	0.145	13.0	B
4	US 20 at W Hood Avenue	Two-way stop	HCM 6th Edition	NEB Left	0.091	26.2	D
5	Pine Street at US 20	Two-way stop	HCM 6th Edition	NB Left	0.232	57.2	F
6	Locust Street at US 20	Two-way stop	HCM 6th Edition	SB Left	1.103	240.7	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

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Version 7.00-06

Intersection Level Of Service Report
Intersection 1: US 20 at W Barclay Drive

Control Type:	Roundabout	Delay (sec / veh):	8.9
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	87	79	113	31	108	51	100	273	9	67	418	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	2.20	2.20	1.60	1.60	1.60	6.50	6.50	6.50	7.40	7.40	7.40
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	79	113	31	108	51	100	273	9	67	418	26
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	20	29	8	28	13	26	70	2	17	107	7
Total Analysis Volume [veh/h]	89	81	115	32	110	52	102	279	9	68	427	27
Pedestrian Volume [ped/h]	0			0			1			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	564			497			247			253		
Exiting Flow Rate [veh/h]	249			165			609			441		
Demand Flow Rate [veh/h]	87	79	113	31	108	51	100	273	9	67	418	26
Adjusted Demand Flow Rate [veh/h]	89	81	115	32	110	52	102	279	9	68	427	27

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.94	0.93
Entry Flow Rate [veh/h]	292	198	416	561
Capacity of Entry and Bypass Lanes [veh/h]	777	832	1073	1067
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	760	819	1008	993
X, volume / capacity	0.38	0.24	0.39	0.53

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	B
95th-Percentile Queue Length [veh]	1.75	0.92	1.85	3.16
95th-Percentile Queue Length [ft]	43.76	23.03	46.27	78.93
Approach Delay [s/veh]	9.44	6.95	7.75	10.20
Approach LOS	A	A	A	B
Intersection Delay [s/veh]	8.90			
Intersection LOS	A			

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Version 7.00-06

Intersection Level Of Service Report
Intersection 2: N Pine Street at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	12.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.106

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	50	6	22	13	14	13	2	117	20	18	126	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.70	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	6	22	13	14	13	2	117	20	18	126	1
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	2	7	4	4	4	1	35	6	5	38	0
Total Analysis Volume [veh/h]	60	7	26	15	17	15	2	139	24	21	150	1
Pedestrian Volume [ped/h]	0			0			0			2		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.01	0.03	0.03	0.03	0.02	0.00	0.00	0.00	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	12.36	12.31	10.00	11.85	11.87	9.44	7.51	0.00	0.00	7.56	0.00	0.00
Movement LOS	B	B	B	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.52	0.52	0.52	0.24	0.24	0.24	0.00	0.00	0.00	0.04	0.04	0.04
95th-Percentile Queue Length [ft/ln]	12.88	12.88	12.88	5.94	5.94	5.94	0.10	0.10	0.10	1.12	1.12	1.12
d_A, Approach Delay [s/veh]	11.69			11.09			0.09			0.92		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	3.74											
Intersection LOS	B											

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Intersection Level Of Service Report
Intersection 3: N Locust Street at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	13.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.145

Intersection Setup

Name						
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name						
Base Volume Input [veh/h]	86	87	88	39	77	94
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	1.70	1.60	1.60	0.60	0.60
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	86	87	88	39	77	94
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	23	24	10	21	25
Total Analysis Volume [veh/h]	92	94	95	42	83	101
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.00	0.00	0.15	0.11
d_M, Delay for Movement [s/veh]	7.65	0.00	0.00	0.00	12.95	10.49
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.20	0.20	0.00	0.00	1.00	1.00
95th-Percentile Queue Length [ft/ln]	5.08	5.08	0.00	0.00	24.96	24.96
d_A, Approach Delay [s/veh]	3.79		0.00		11.60	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	5.60					
Intersection LOS	B					

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Intersection Level Of Service Report
Intersection 4: US 20 at W Hood Avenue

Control Type:	Two-way stop	Delay (sec / veh):	26.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.091

Intersection Setup

Name						
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	200.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		20.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name						
Base Volume Input [veh/h]	15	15	86	417	466	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	3.90	3.90	5.60	5.60
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	15	86	417	466	16
Peak Hour Factor	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	4	24	117	131	4
Total Analysis Volume [veh/h]	17	17	97	469	524	18
Pedestrian Volume [ped/h]	2		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.03	0.10	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	26.19	11.78	8.93	0.00	0.00	0.00
Movement LOS	D	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.30	0.10	0.32	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	7.40	2.40	7.92	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	18.98		1.53		0.00	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	1.32					
Intersection LOS	D					

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Intersection Level Of Service Report
Intersection 5: Pine Street at US 20

Control Type:	Two-way stop	Delay (sec / veh):	57.2
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.232

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	20	15	27	11	19	55	45	600	27	34	413	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	3.50	3.50	3.50	5.50	5.50	5.50
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	15	27	11	19	55	45	600	27	34	413	14
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	4	7	3	5	15	12	165	7	9	113	4
Total Analysis Volume [veh/h]	22	16	30	12	21	60	49	659	30	37	454	15
Pedestrian Volume [ped/h]	5			2			2			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.11	0.07	0.11	0.15	0.10	0.05	0.01	0.00	0.04	0.00	0.00
d_M, Delay for Movement [s/veh]	57.25	44.40	27.24	48.87	40.18	11.68	8.49	0.00	0.00	9.26	0.00	0.00
Movement LOS	F	E	D	E	E	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.81	1.81	1.81	0.98	0.98	0.33	0.14	0.00	0.00	0.13	0.00	0.00
95th-Percentile Queue Length [ft/ln]	45.35	45.35	45.35	24.50	24.50	8.31	3.56	0.00	0.00	3.28	0.00	0.00
d_A, Approach Delay [s/veh]	40.99			22.91			0.56			0.68		
Approach LOS	E			C			A			A		
d_I, Intersection Delay [s/veh]	4.04											
Intersection LOS	F											

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Intersection Level Of Service Report
Intersection 6: Locust Street at US 20

Control Type:	Two-way stop	Delay (sec / veh):	240.7
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.103

Intersection Setup

Name												
Approach	Northbound			Southbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			20.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	7	2	33	78	3	64	11	542	138	72	733	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	2.10	2.10	2.10	5.60	5.60	5.60	3.90	3.90	3.90
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	2	33	78	3	64	11	542	138	72	733	6
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	9	21	1	17	3	144	37	19	195	2
Total Analysis Volume [veh/h]	7	2	35	83	3	68	12	577	147	77	780	6
Pedestrian Volume [ped/h]	0			0			0			3		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.02	0.09	1.10	0.03	0.13	0.01	0.01	0.00	0.09	0.01	0.00
d_M, Delay for Movement [s/veh]	68.46	52.75	19.33	240.74	227.97	13.10	9.47	0.00	0.00	9.54	0.00	0.00
Movement LOS	F	F	C	F	F	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.83	0.83	0.83	6.34	6.34	0.46	0.04	0.04	0.00	0.29	0.00	0.00
95th-Percentile Queue Length [ft/ln]	20.85	20.85	20.85	158.51	158.51	11.38	1.12	1.12	0.00	7.26	0.00	0.00
d_A, Approach Delay [s/veh]	28.67			139.97			0.15			0.85		
Approach LOS	D			F			A			A		
d_I, Intersection Delay [s/veh]	13.17											
Intersection LOS	F											

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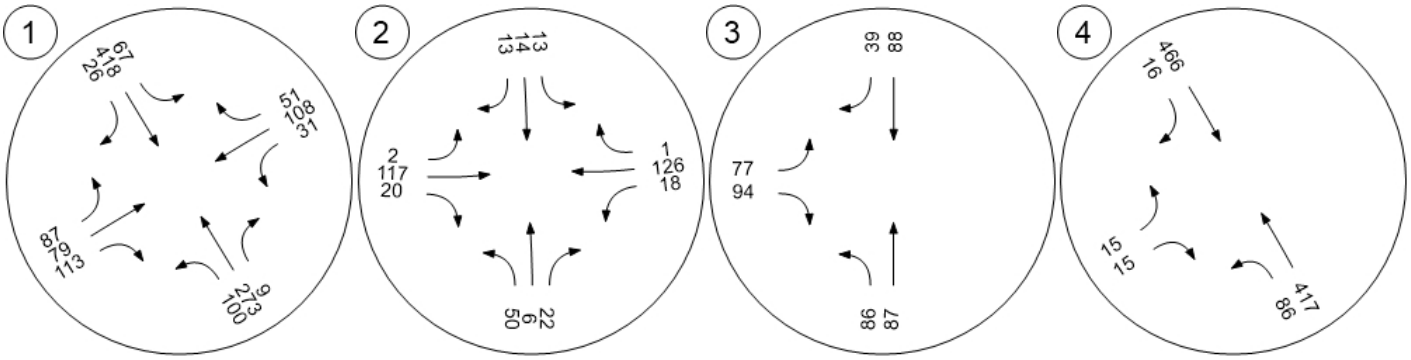
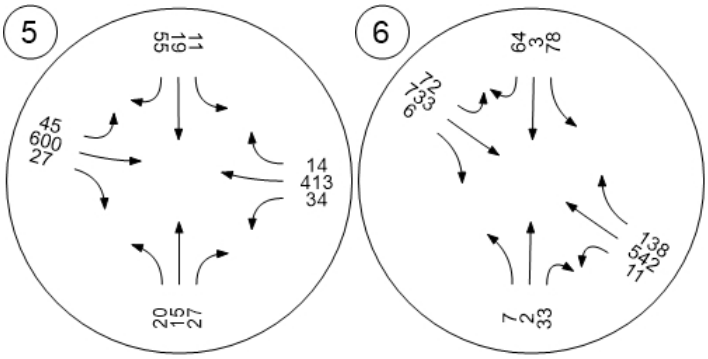
Traffic Volume - Base Volume





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Report File: Z:\...\2040 Planning Horizon.pdf

Scenario 2 2 2040 Planning Horizon Volumes
5/15/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	US 20 at W Barclay Drive	Roundabout	HCM 6th Edition	SEB Thru		19.2	C
2	N Pine Street at W Barclay Drive	Two-way stop	HCM 6th Edition	NB Left	0.327	23.8	C
3	N Locust Street at W Barclay Drive	Two-way stop	HCM 6th Edition	SB Thru	0.373	21.9	C
4	US 20 at W Hood Avenue	Two-way stop	HCM 6th Edition	NEB Left	0.390	58.4	F
5	Pine Street at US 20	Two-way stop	HCM 6th Edition	NB Left	1.632	826.1	F
6	Locust Street at US 20	Roundabout	HCM 6th Edition	SEB Thru		59.0	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

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Intersection Level Of Service Report
Intersection 1: US 20 at W Barclay Drive

Control Type:	Roundabout	Delay (sec / veh):	19.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	132	120	171	47	164	77	152	280	14	102	428	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	2.20	2.20	1.60	1.60	1.60	6.50	6.50	6.50	7.40	7.40	7.40
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	15	20	41	24	26	13	61	0	11	7	3	19
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	140	212	71	190	90	213	280	25	109	431	58
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	36	54	18	48	23	54	71	6	28	110	15
Total Analysis Volume [veh/h]	150	143	216	72	194	92	217	286	26	111	440	59
Pedestrian Volume [ped/h]	0			0			1			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	665			689			419			501		
Exiting Flow Rate [veh/h]	492			293			766			551		
Demand Flow Rate [veh/h]	147	140	212	71	190	90	213	280	25	109	431	58
Adjusted Demand Flow Rate [veh/h]	150	143	216	72	194	92	217	286	26	111	440	59

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.94	0.93
Entry Flow Rate [veh/h]	521	364	564	656
Capacity of Entry and Bypass Lanes [veh/h]	701	684	901	828
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	686	673	846	771
X, volume / capacity	0.74	0.53	0.63	0.79

Movement, Approach, & Intersection Results

Lane LOS	C	B	B	C
95th-Percentile Queue Length [veh]	6.65	3.16	4.50	8.12
95th-Percentile Queue Length [ft]	166.32	78.99	112.61	202.93
Approach Delay [s/veh]	22.54	13.94	14.23	23.90
Approach LOS	C	B	B	C
Intersection Delay [s/veh]	19.23			
Intersection LOS	C			

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Intersection Level Of Service Report
Intersection 2: N Pine Street at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	23.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.327

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	76	9	33	20	21	20	3	177	30	27	191	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.70	7.00	0.70	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	7	0	0	0	0	0	0	86	13	0	56	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	83	9	33	20	21	20	3	263	43	27	247	2
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	3	10	6	6	6	1	78	13	8	74	1
Total Analysis Volume [veh/h]	99	11	39	24	25	24	4	313	51	32	294	2
Pedestrian Volume [ped/h]	0			0			0			2		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.33	0.03	0.06	0.08	0.07	0.03	0.00	0.00	0.00	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	23.78	22.18	16.99	18.91	17.69	11.86	7.84	0.00	0.00	8.07	0.00	0.00
Movement LOS	C	C	C	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.97	1.97	1.97	0.67	0.67	0.67	0.01	0.01	0.01	0.08	0.08	0.08
95th-Percentile Queue Length [ft/ln]	49.29	49.29	49.29	16.73	16.73	16.73	0.24	0.24	0.24	2.04	2.04	2.04
d_A, Approach Delay [s/veh]	21.89			16.18			0.09			0.79		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	5.15											
Intersection LOS	C											

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Intersection Level Of Service Report
Intersection 3: N Locust Street at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	21.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.373

Intersection Setup

Name						
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		No	

Volumes

Name						
Base Volume Input [veh/h]	130	132	133	59	117	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	2.00	2.00	2.00	2.00	0.60
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	48	0	0	9	14	71
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	178	132	133	68	131	213
Peak Hour Factor	0.9300	1.0000	1.0000	1.0000	1.0000	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	33	33	17	33	57
Total Analysis Volume [veh/h]	191	132	133	68	131	229
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Stop	Free
Flared Lane		No	
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance		No	
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.37	0.09	0.10	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	21.91	16.42	8.06	0.00
Movement LOS	A	A	C	C	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	2.36	2.36	0.33	0.33
95th-Percentile Queue Length [ft/ln]	0.00	0.00	59.09	59.09	8.33	8.33
d_A, Approach Delay [s/veh]	0.00		20.05		2.93	
Approach LOS	A		C		A	
d_I, Intersection Delay [s/veh]	5.75					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 4: US 20 at W Hood Avenue

Control Type:	Two-way stop	Delay (sec / veh):	58.4
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.390

Intersection Setup

Name						
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	200.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		20.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

Volumes

Name						
Base Volume Input [veh/h]	23	23	130	447	500	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	3.90	3.90	5.60	5.60
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	14	19	18	58	38	10
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	37	42	148	505	538	34
Peak Hour Factor	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	12	42	142	151	10
Total Analysis Volume [veh/h]	42	47	166	567	604	38
Pedestrian Volume [ped/h]	2		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.39	0.10	0.18	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	58.37	13.17	9.71	0.00	0.00	0.00
Movement LOS	F	B	A	A	A	A
95th-Percentile Queue Length [veh/ln]	1.60	0.32	0.65	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	40.12	7.96	16.18	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	34.50		2.20		0.00	
Approach LOS	D		A		A	
d_I, Intersection Delay [s/veh]	3.20					
Intersection LOS	F					

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Intersection Level Of Service Report
Intersection 5: Pine Street at US 20

Control Type:	Two-way stop	Delay (sec / veh):	826.1
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.632

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	30	23	41	17	29	83	68	699	41	52	481	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	3.50	3.50	3.50	5.50	5.50	5.50
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	2	7	0	0	13	0	0	55	2	0	74	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	30	41	17	42	83	68	754	43	52	555	21
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	8	11	5	12	23	19	207	12	14	152	6
Total Analysis Volume [veh/h]	35	33	45	19	46	91	75	829	47	57	610	23
Pedestrian Volume [ped/h]	5			2			2			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.63	0.46	0.13	0.58	0.65	0.19	0.08	0.01	0.00	0.08	0.01	0.00
d_M, Delay for Movement [s/veh]	826.11	707.92	668.31	368.41	308.20	14.10	9.17	0.00	0.00	10.20	0.00	0.00
Movement LOS	F	F	F	F	F	B	A	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	11.44	11.44	11.44	5.75	5.75	0.68	0.26	0.00	0.00	0.25	0.00	0.00
95th-Percentile Queue Length [ft/ln]	286.11	286.11	286.11	143.87	143.87	17.03	6.49	0.00	0.00	6.16	0.00	0.00
d_A, Approach Delay [s/veh]	728.75			143.97			0.72			0.84		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	55.54											
Intersection LOS	F											

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Intersection Level Of Service Report
Intersection 6: Locust Street at US 20

Control Type:	Roundabout	Delay (sec / veh):	59.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			20.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	11	3	50	118	5	97	17	708	209	109	958	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	2.10	2.10	2.10	5.60	5.60	5.60	3.90	3.90	3.90
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	57	0	0	0	63	51	9	41	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	3	50	175	5	97	17	771	260	118	999	9
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	13	47	1	26	5	205	69	31	266	2
Total Analysis Volume [veh/h]	12	3	53	186	5	103	18	820	277	126	1063	10
Pedestrian Volume [ped/h]	0			0			0			3		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	1425			897			146			214		
Exiting Flow Rate [veh/h]	35			426			1347			983		
Demand Flow Rate [veh/h]	11	3	50	175	5	97	17	771	260	118	999	9
Adjusted Demand Flow Rate [veh/h]	12	3	53	186	5	103	18	820	277	126	1063	10

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	1.00	0.98	0.95	0.96
Entry Flow Rate [veh/h]	68	301	1178	1246
Capacity of Entry and Bypass Lanes [veh/h]	323	553	1190	1110
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	323	542	1127	1068
X, volume / capacity	0.21	0.54	0.99	1.12

Movement, Approach, & Intersection Results

Lane LOS	C	C	F	F
95th-Percentile Queue Length [veh]	0.78	3.23	19.77	30.98
95th-Percentile Queue Length [ft]	19.56	80.70	494.15	774.47
Approach Delay [s/veh]	15.18	16.98	43.74	85.90
Approach LOS	C	C	F	F
Intersection Delay [s/veh]	58.96			
Intersection LOS	F			

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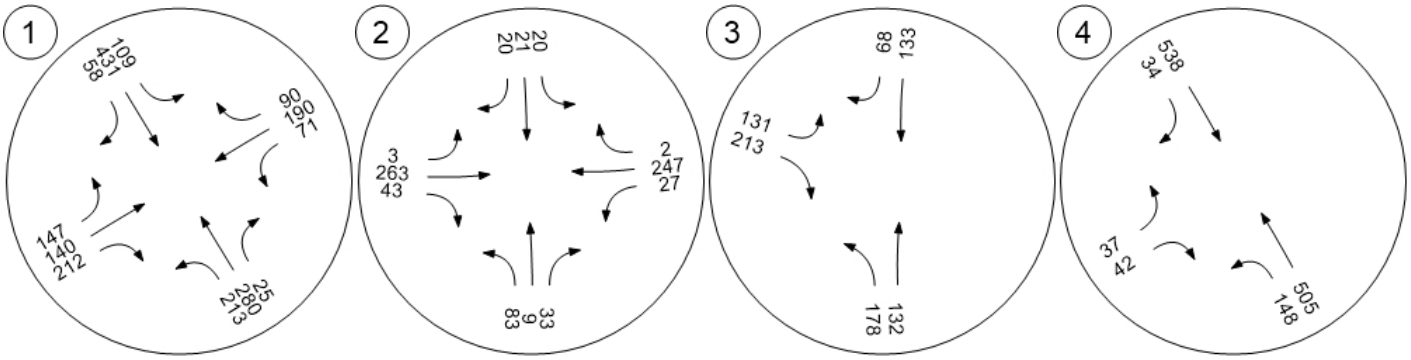
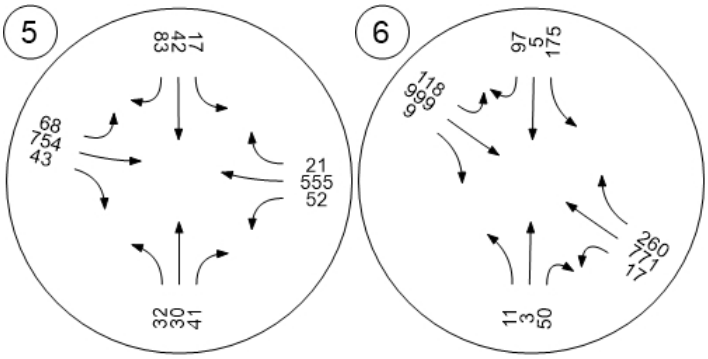
Traffic Volume - Future Background Volume





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Report File: Z:\...\2040 Planning Horizon + ZC.pdf

Scenario 5 5 5 2040 Planning Horizon + ZC Volumes
5/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	US 20 at W Barclay Drive	Roundabout	HCM 6th Edition	SEB Thru		19.6	C
2	N Pine Street at W Barclay Drive	Two-way stop	HCM 6th Edition	NB Left	0.341	25.0	C
3	N Locust Street at W Barclay Drive	Two-way stop	HCM 6th Edition	SB Thru	0.379	22.4	C
4	US 20 at W Hood Avenue	Two-way stop	HCM 6th Edition	NEB Left	0.502	85.2	F
5	Pine Street at US 20	Two-way stop	HCM 6th Edition	NB Left	1.682	905.0	F
6	Locust Street at US 20	Roundabout	HCM 6th Edition	SEB Thru		60.3	F
7	Site Access at W Barclay Drive	Two-way stop	HCM 6th Edition	SWB Left	0.006	7.2	A
8	Site Access at N Pine Street	Two-way stop	HCM 6th Edition	WB Thru	0.002	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

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Intersection Level Of Service Report
Intersection 1: US 20 at W Barclay Drive

Control Type:	Roundabout	Delay (sec / veh):	19.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	132	120	171	47	164	77	152	280	14	102	428	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	2.20	2.20	1.60	1.60	1.60	6.50	6.50	0.00	7.40	7.40	7.40
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	15	20	41	24	26	13	61	0	11	7	3	19
Site-Generated Trips [veh/h]	0	5	0	0	0	0	0	0	0	5	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	147	145	212	71	190	90	213	280	25	114	431	58
Peak Hour Factor	0.9800	0.9800	0.9800	1.0000	0.9800	0.9800	0.9800	0.9800	1.0000	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	37	54	18	48	23	54	71	6	29	110	15
Total Analysis Volume [veh/h]	150	148	216	71	194	92	217	286	25	116	440	59
Pedestrian Volume [ped/h]	0			0			1			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	669			689			429			500		
Exiting Flow Rate [veh/h]	492			301			765			551		
Demand Flow Rate [veh/h]	147	145	212	71	190	90	213	280	25	114	431	58
Adjusted Demand Flow Rate [veh/h]	150	148	216	71	194	92	217	286	25	116	440	59

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.94	0.93
Entry Flow Rate [veh/h]	526	363	561	661
Capacity of Entry and Bypass Lanes [veh/h]	698	684	891	829
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	683	673	839	772
X, volume / capacity	0.75	0.53	0.63	0.80

Movement, Approach, & Intersection Results

Lane LOS	C	B	B	C
95th-Percentile Queue Length [veh]	6.90	3.14	4.56	8.29
95th-Percentile Queue Length [ft]	172.51	78.57	113.99	207.19
Approach Delay [s/veh]	23.32	13.90	14.43	24.32
Approach LOS	C	B	B	C
Intersection Delay [s/veh]	19.63			
Intersection LOS	C			

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Intersection Level Of Service Report
Intersection 2: N Pine Street at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	25.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.341

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	76	9	33	20	21	20	3	177	30	27	191	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.70	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	7	0	0	0	0	0	0	86	13	0	56	0
Site-Generated Trips [veh/h]	0	0	0	0	1	1	0	0	0	4	8	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	83	9	33	20	22	21	3	263	43	31	255	2
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	3	10	6	7	6	1	78	13	9	76	1
Total Analysis Volume [veh/h]	99	11	39	24	26	25	4	313	51	37	304	2
Pedestrian Volume [ped/h]	0			0			0			2		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.34	0.03	0.06	0.08	0.08	0.03	0.00	0.00	0.00	0.03	0.00	0.00
d_M, Delay for Movement [s/veh]	24.99	23.20	17.68	19.54	18.23	12.12	7.86	0.00	0.00	8.08	0.00	0.00
Movement LOS	C	C	C	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	2.08	2.08	2.08	0.71	0.71	0.71	0.01	0.01	0.01	0.09	0.09	0.09
95th-Percentile Queue Length [ft/ln]	52.03	52.03	52.03	17.84	17.84	17.84	0.24	0.24	0.24	2.37	2.37	2.37
d_A, Approach Delay [s/veh]	22.95			16.61			0.09			0.87		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	5.34											
Intersection LOS	C											

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Intersection Level Of Service Report
Intersection 3: N Locust Street at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	22.4
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.379

Intersection Setup

Name						
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		No	

Volumes

Name						
Base Volume Input [veh/h]	130	132	133	59	117	142
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	2.00	2.00	2.00	2.00	0.60
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	48	0	0	9	14	71
Site-Generated Trips [veh/h]	10	0	0	2	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	188	132	133	70	131	213
Peak Hour Factor	0.9300	1.0000	1.0000	1.0000	1.0000	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	33	33	18	33	57
Total Analysis Volume [veh/h]	202	132	133	70	131	229
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Stop	Free
Flared Lane		No	
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance		No	
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.38	0.09	0.10	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	22.41	16.83	8.09	0.00
Movement LOS	A	A	C	C	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	2.45	2.45	0.34	0.34
95th-Percentile Queue Length [ft/ln]	0.00	0.00	61.17	61.17	8.42	8.42
d_A, Approach Delay [s/veh]	0.00		20.48		2.94	
Approach LOS	A		C		A	
d_I, Intersection Delay [s/veh]	5.82					
Intersection LOS	C					

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Intersection Level Of Service Report
Intersection 4: US 20 at W Hood Avenue

Control Type:	Two-way stop	Delay (sec / veh):	85.2
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.502

Intersection Setup

Name												
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			35.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	23	0	23	0	0	0	130	447	0	0	500	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.00	0.00	2.00	2.00	0.00	3.90	3.90	3.90	2.00	5.60	5.60
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	14	0	19	0	0	0	18	58	0	0	38	10
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	5	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	37	0	42	0	0	0	148	505	5	0	538	34
Peak Hour Factor	0.8900	1.0000	0.8900	1.0000	1.0000	0.8900	0.8900	0.8900	0.8900	1.0000	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	0	12	0	0	0	42	142	1	0	151	10
Total Analysis Volume [veh/h]	42	0	47	0	0	0	166	567	6	0	604	38
Pedestrian Volume [ped/h]	2			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.00	0.10	0.00	0.00	0.00	0.18	0.01	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	85.20	0.00	13.17	0.00	0.00	11.86	9.71	0.00	0.00	0.00	0.00	0.00
Movement LOS	F		B			B	A	A	A		A	A
95th-Percentile Queue Length [veh/ln]	2.14	0.00	0.32	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	53.55	0.00	7.96	0.00	0.00	0.00	16.18	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	47.16			11.86			2.18			0.00		
Approach LOS	E			B			A			A		
d_I, Intersection Delay [s/veh]	3.95											
Intersection LOS	F											

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Intersection Level Of Service Report
Intersection 5: Pine Street at US 20

Control Type:	Two-way stop	Delay (sec / veh):	905.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.682

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	30	23	41	17	29	83	68	699	41	52	481	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	3.50	3.50	3.50	5.50	5.50	5.50
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	2	7	0	0	13	0	0	55	2	0	74	0
Site-Generated Trips [veh/h]	0	7	0	0	0	0	0	0	0	0	5	5
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	37	41	17	42	83	68	754	43	52	560	26
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	10	11	5	12	23	19	207	12	14	154	7
Total Analysis Volume [veh/h]	35	41	45	19	46	91	75	829	47	57	615	29
Pedestrian Volume [ped/h]	5			2			2			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	1.68	0.58	0.13	0.70	0.65	0.19	0.08	0.01	0.00	0.08	0.01	0.00
d_M, Delay for Movement [s/veh]	904.96	782.41	741.98	447.21	365.11	14.22	9.21	0.00	0.00	10.20	0.00	0.00
Movement LOS	F	F	F	F	F	B	A	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	12.43	12.43	12.43	6.12	6.12	0.69	0.26	0.00	0.00	0.25	0.00	0.00
95th-Percentile Queue Length [ft/ln]	310.72	310.72	310.72	152.98	152.98	17.25	6.56	0.00	0.00	6.16	0.00	0.00
d_A, Approach Delay [s/veh]	802.82			170.42			0.73			0.83		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	64.80											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 6: Locust Street at US 20

Control Type:	Roundabout	Delay (sec / veh):	60.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			20.00			20.00			20.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	11	3	50	118	5	97	17	708	209	109	958	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	2.10	2.10	2.10	5.60	5.60	5.60	3.90	3.90	3.90
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	57	0	0	0	63	51	9	41	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	9	5	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	3	50	175	5	97	17	780	265	118	999	9
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	1	13	47	1	26	5	207	70	31	266	2
Total Analysis Volume [veh/h]	12	3	53	186	5	103	18	830	282	126	1063	10
Pedestrian Volume [ped/h]	0			0			0			3		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	1425			907			146			214		
Exiting Flow Rate [veh/h]	35			432			1347			994		
Demand Flow Rate [veh/h]	11	3	50	175	5	97	17	780	265	118	999	9
Adjusted Demand Flow Rate [veh/h]	12	3	53	186	5	103	18	830	282	126	1063	10

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	1.00	0.98	0.95	0.96
Entry Flow Rate [veh/h]	68	301	1194	1246
Capacity of Entry and Bypass Lanes [veh/h]	323	547	1190	1110
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	323	536	1127	1068
X, volume / capacity	0.21	0.55	1.00	1.12

Movement, Approach, & Intersection Results

Lane LOS	C	C	F	F
95th-Percentile Queue Length [veh]	0.78	3.29	20.83	30.98
95th-Percentile Queue Length [ft]	19.56	82.29	520.75	774.47
Approach Delay [s/veh]	15.18	17.34	46.98	85.90
Approach LOS	C	C	F	F
Intersection Delay [s/veh]	60.28			
Intersection LOS	F			

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Intersection Level Of Service Report
Intersection 7: Site Access at W Barclay Drive

Control Type:	Two-way stop	Delay (sec / veh):	7.2
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name						
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	20.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	10	9	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	10	9	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	3	2	0	0	0
Total Analysis Volume [veh/h]	0	10	9	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	7.25	0.00	8.64	8.34
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.02	0.02	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.42	0.42	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		7.25		8.49	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.43					
Intersection LOS	A					

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Intersection Level Of Service Report
Intersection 8: Site Access at N Pine Street

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	17	0	0	0	0	5	0	0	0	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	17	0	0	0	0	5	0	0	0	0	2	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	0	0	0	0	1	0	0	0	0	1	0
Total Analysis Volume [veh/h]	17	0	0	0	0	5	0	0	0	0	2	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.25	0.00	0.00	7.22	0.00	0.00	8.76	9.25	8.33	8.75	9.27	8.33
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.18
d_A, Approach Delay [s/veh]	7.25			0.00			8.78			9.27		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	5.91											
Intersection LOS	A											

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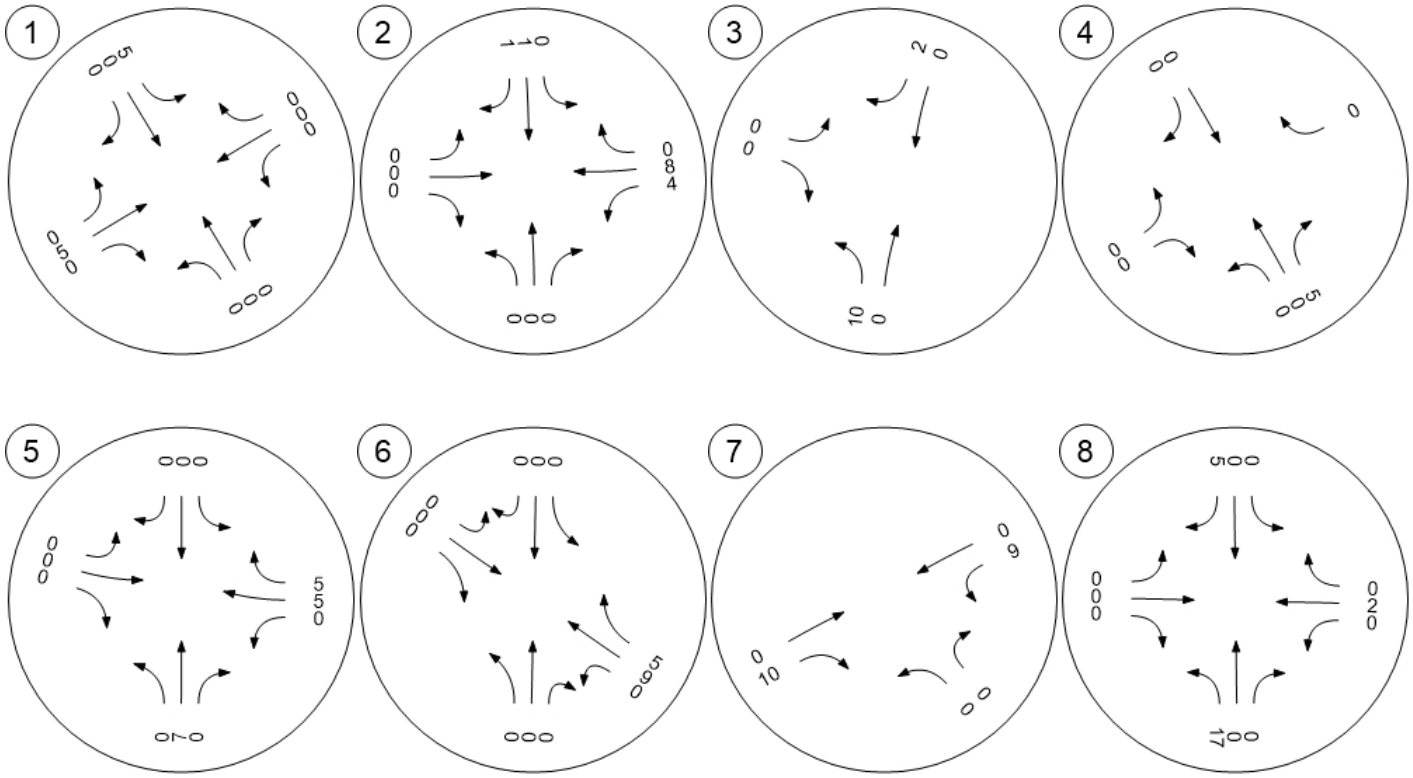
Traffic Volume - Net New Site Trips



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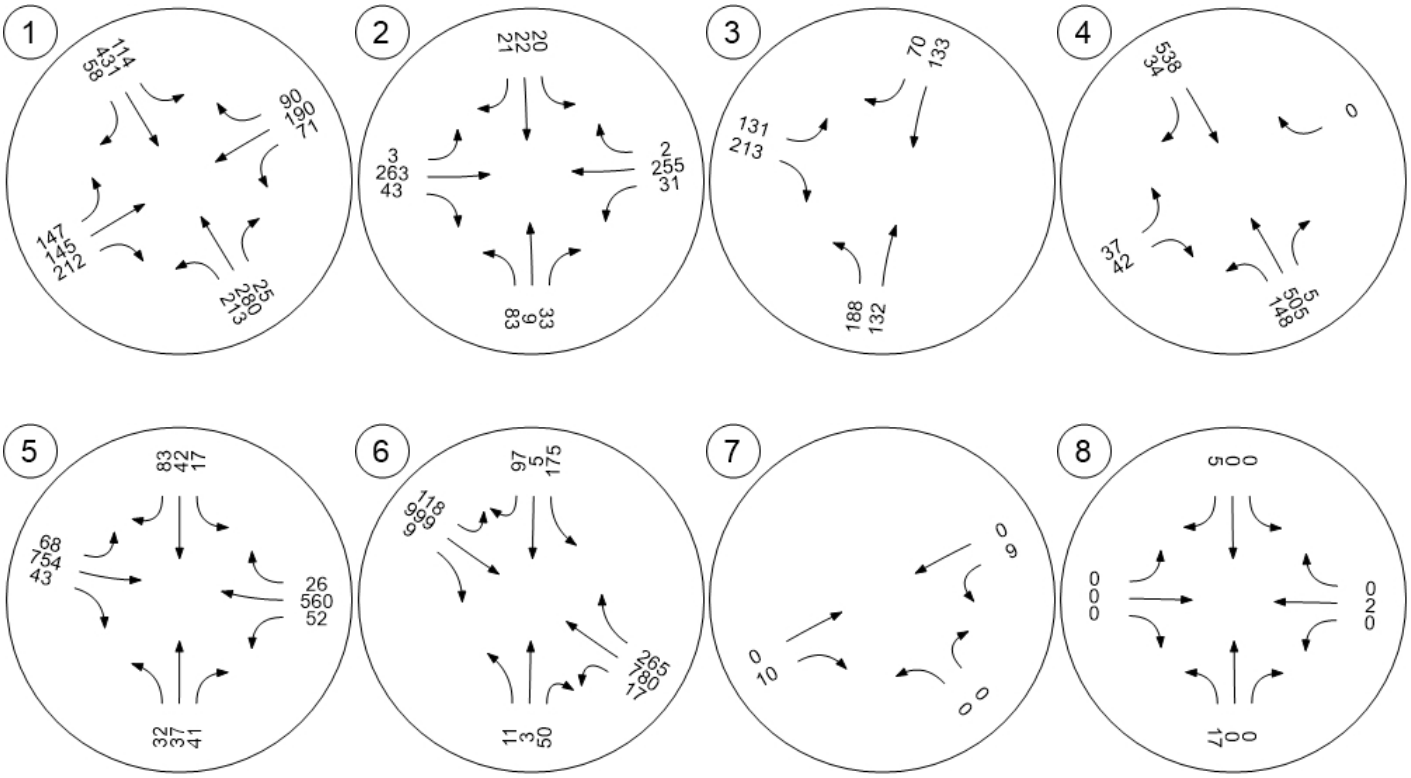
Traffic Volume - Future Total Volume



DKS *Associates*

TRANSPORTATION SOLUTIONS

MEMORANDUM

REGISTERED PROFESSIONAL ENGINEER 63,019 OREGON JANUARY 11, 2005 C. S. MACIEJEWSKI

EXPIRES: 12/31/12

DATE: January 27, 2011

TO: Tom Litster, Otak
Matt Crall, DLCD

FROM: Chris Maciejewski, P.E.
Garth Appanaitis

SUBJECT: **City of Sisters USFS Property Redevelopment – Revised Draft Redevelopment Plan Traffic Impact Analysis** P10115-000

The purpose of this memorandum is to summarize the potential transportation impacts of rezoning and developing the United States Forest Service (USFS) site in Sisters. A land use and trip generation summary of two redevelopment scenarios and year 2030 traffic analysis for the "worst case" (highest site trip generation scenario) and Existing Zoning scenario are provided.

Existing Conditions and Adopted Functional Plans

The *Sisters Transportation System Plan (TSP)*[1] documents the existing transportation system and functional plans for Sisters. The following subsections summarize the functional class of roadways adjacent to the site, existing conditions of selected intersections, and functional plans for the site area. Additional detail is available in the TSP.

Existing Conditions

Highway 20 and Barclay Drive are two arterial facilities that are located along the proposed USFS site. Arterials are intended to be low-access facilities that provide mobility for traffic traveling through the city. The City of Sisters requires a minimum of 660 feet spacing between public intersections along arterials (and 330 feet between public intersections and driveways), while ODOT requires 720 feet on Highway 20 along the site frontage. While Highway 20 has historically been the primary route through the city, the TSP includes improvements along Barclay Drive that would improve mobility as an alternate route to avoid seasonal congestion in the downtown area. The proposed site also shares frontage with Pine Street, a collector facility that provides connections between the high mobility (arterial) facilities and local/neighborhood streets.

The existing intersection operations of study area intersections are listed in Table 1. Two intersections along Highway 20 (at Barclay Drive and at Pine Street) are currently over capacity

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[1] *Sisters Transportation System Plan*, prepared by DKS Associates, January 2010.

and do not meet the mobility standards. Future improvements (as planned in the TSP) will be needed to improve traffic operations at these locations to support additional growth.

Table 1: 2006 PM Peak Hour Intersection Operations (Existing Conditions Scenario)

Intersection	Jurisdiction	TEV	Mobility Standard*	Delay	LOS	V/C
Highway 20 / Barclay Drive	ODOT	1,715	0.70/0.80	>50	A/F	**0.06/>1.0**
Highway 20 / Hood Avenue	ODOT	1,505	0.80/0.90	40.4	B/E	0.11/0.42
Highway 20 / Pine Street	ODOT	1,730	0.80/0.90	>50	A/F	**0.10/>1.0**
Adams Avenue / Barclay Drive	City of Sisters		0.90	*Not*	*In*	*TSP*
Pine Street/Barclay Drive	City of Sisters	370	0.90	10.5	A/B	0.12
Pine Street/Sisters Peak Drive	City of Sisters			*Not*	*In*	*TSP*
Pine Street / Main Avenue	City of Sisters			*Not*	*In*	*TSP*

Signalized Intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
V/C = Volume to Capacity Ratio
Shaded values do not meet standards

TEV= Total Entering Vehicles (PM peak hr)

Unsignalized Intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS / Minor Street LOS
V/C = Critical Movement Volume-to-Capacity Ratio
Shaded values do not meet standards
*Major/Minor movements for ODOT mobility std

Future Functional Plans

The TSP includes future plans for pedestrian, bicycle and motor vehicle connections and improvements in Sisters. These plans are attached.

The TSP (Figure 5-1 attached) shows a shared use path that would cross the proposed USFS site for pedestrian and bicycle trips. In addition, sidewalks are planned along Highway 20 and a shared path is also planned along the Pine Street frontage. To accommodate bicycle travel, bicycle lanes are planned for both sides of Pine Street along the project frontage (Figure 6-1). The facilities would support pedestrian and/or bicycle travel in and around the proposed site.

Figure 7-5 (attached) shows potential local street connections within the site for future development. The TSP includes a potential connection to Barclay Drive and three potential connections to Pine Street (at Sisters Park Drive, Adams Avenue and Main Avenue).

2030 Existing Zoning Conditions

This section summarizes the year 2030 existing zoning land use included for the project site in the *TSP*, as well as traffic operations at intersections in the vicinity of the USFS site.

Existing Zoning Land Use

The USFS site is composed of three parcels of land that are currently zoned as Public Facility (PF), Landscape Management (LM), and Urban Area Reserve (UAR). The City of Sisters TSP

assumed development through year 2030 based on the comprehensive plan zoning of each parcel inside the urban growth boundary (UGB). During the TSP process, City staff provided direct input on the land use to assume for the South Barclay Parcel of the USFS site, as the Comprehensive Plan maps and text were not consistent. The resulting land use for the three USFS parcels used during the TSP is listed in Table 2.

Table 2: Assumed 2030 Land Use in City of Sisters TSP (Existing Zoning Baseline Scenario)

Parcel Description	Households (# of homes)	Employment (# of employees)			
		Retail	Service	Other	Total
South Barclay Parcel	0	60	25	5	90
East Portal Parcel	0	0	0	0	0
North Barclay Parcel	0	0	0	0	0
TOTAL	**0**	**60**	**25**	**5**	**90**

Land use for other areas of the City was adjusted from the amounts reported in the City of Sisters TSP to reflect in-process developments based on a request from ODOT Region 4 staff. The adjusted land use allocation (which included increasing household growth in TAZ 16) is included in the Appendix.

Existing Zoning Traffic Conditions

Traffic volumes for the 2030 existing zoning land use and the reasonably likely to be funded transportation system were projected using the Sisters Forecast Tool (as documented in the project methodology memorandum). While the traffic volumes and operations for the majority of these locations were previously documented in the *City of Sisters Transportation System Plan (TSP*), traffic volumes would shift due to transportation network differences (i.e., only projects deemed "reasonably likely to be funded" by each agency were included) and adjustments to future land use assumptions to account for in-process developments[2]. Based on the funding evaluation provided in the Sisters TSP, the projects that were included as reasonably likely for this effort are listed in Table 3.

The updated volumes for each intersection are included in the Appendix.

[2] Email from David Boyd, ODOT Region 4, September, 23, 2010.

Table 3: Transportation Projects Assumed to be Funded by 2030

Project Location	Description	Reasonably Likely Funding Source	
		City of Sisters	ODOT
Creekside Court to Cascade Avenue	New bridge connecting Creekside Court to Cascade Avenue at eastern edge of City	X	
Rail Way to Trinity Way	New connection between Rail Way and Trinity Way in western portion of City	X	
Hwy 20/Barclay Dr	Install multi-lane roundabout or traffic signal (including additional lanes at intersection as documented in TSP)	X	X
Hwy 20/Locust St	Install multi-lane roundabout or traffic signal, close south leg	X	X
Hwy 20/Pine St	Install eastbound and westbound left-turn lanes, restrict northbound and southbound approaches to right turns	X	
Hwy 20/Oak St	Install northbound and southbound right-turn lanes	X	
Barclay Dr/Locust St	Construct single-lane roundabout with a diameter large enough for conversion to a multi-lane roundabout if needed	X	
Barclay Dr from Hwy 20 to Locust St, Locust St from Barclay Dr to Hwy 20	Widen to 3 lane arterial section, smooth curvature, adjust driveways, install a landscape buffer (including street trees) on Locust to screen fronting homes	X	
E. Cascade from Locust St to Rope St, Timber Creek from E. Cascade to Timber Pine, Rope St from E. Cascade to Timber Pine Dr, Timber Pine Dr from Rope S to Hwy 126	Implement traffic calming measures to manage vehicle speeds and cut-through traffic	X	

Traffic operations were analyzed at the six identified existing study intersection locations using the updated 2030 Existing Zoning traffic volumes and roadway network, as summarized in Table 4. While the majority of the intersections would operate adequately in 2030 under existing zoning, one intersection along Highway 20 would not meet mobility standards. The Highway 20/ Barclay Drive intersection would exceed the volume to capacity mobility standard, even assuming that a new traffic signal is constructed along with additional lanes.

Table 4: 2030 PM Peak Hour Intersection Operations (Existing Zoning Baseline Scenario)

Intersection	Jurisdiction	TEV	Mobility Standard*	Delay	LOS	V/C
Highway 20 / Barclay Drive	ODOT	3,155	0.70	37.8	D	**0.95**
Highway 20 / Hood Avenue	ODOT	1,575	0.80/0.90	96.4	B/F	0.41/0.77
Highway 20 / Pine Street	ODOT	1,855	0.80/0.90	21.2	B/C	0.47/0.54
Adams Avenue / Barclay Drive	City of Sisters	1,780	0.90	*Not included in the network in this scenario*		
Pine Street/Barclay Drive	City of Sisters	1,880	0.90	74.7	B/F	0.61
Pine Street/Sisters Peak Drive*	City of Sisters	330	0.90	10.2	A/B	0.07
Pine Street / Main Avenue*	City of Sisters	705	0.90	17.2	A/C	0.45

Signalized Intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
V/C = Volume to Capacity Ratio
Shaded values do not meet standards

TEV= Total Entering Vehicles (PM peak hr)

Unsignalized Intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS / Minor Street LOS
V/C = Critical Movement Volume-to-Capacity Ratio
Shaded values do not meet standards
*Major/Minor movements for ODOT mobility std

**Operations approximated using raw forecast volumes balanced with post-processed study area intersections.*

USFS Proposed Rezone Impacts

As noted in the analysis of the existing zoning, the intersection of Highway 20/ Barclay Drive would not meet mobility standards in 2030 with the existing zoning. Therefore, this intersection would require improvements if significant impact (a volume-to-capacity ratio increase of 0.01 or more) were to be added by the potential rezone of the USFS site. Other locations would require mitigation if the proposed rezone increased congestion above the mobility standard. The following sub-sections describe the potential impacts from the proposed rezone and development of the USFS area.

Assumed Rezone Land Use and Trip Generation

The year 2030 land use assumed in the TSP (Table 2) represents the existing zoning scenario (i.e., what the proposed rezone scenarios will be compared to). Land use for the proposed rezone of the USFS parcels was based on a reasonable worst case of development given the proposed zoning and a combination of land uses considered to be a representative mix of what may be developed on the site considering the site location. Two development options have been provided that represent different compositions of land uses within the site. These two options (Option A and Option B) are shown in Figure 1 and Figure 2, respectively.

Figure 1: Development Summary – Option A

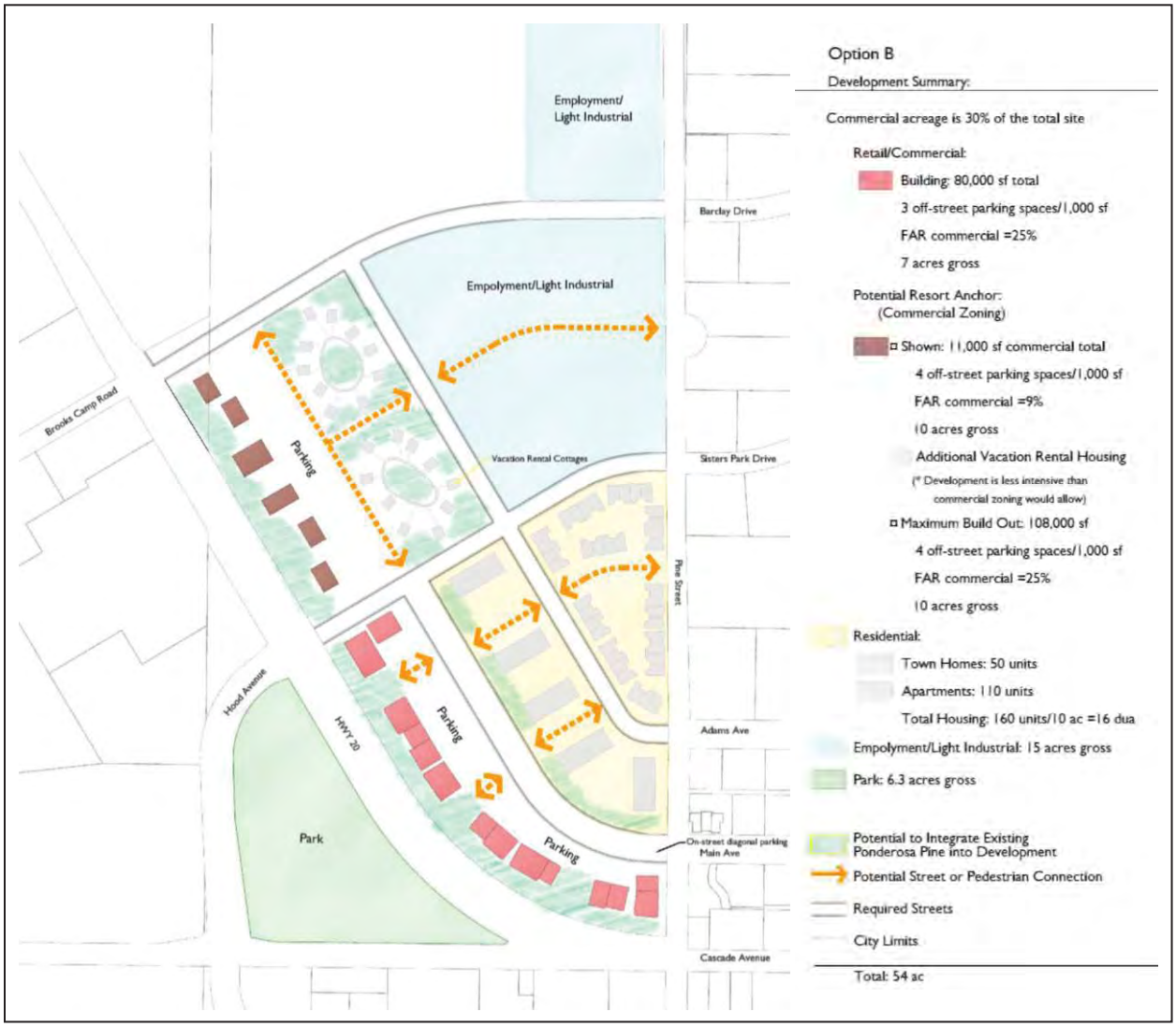


Figure 2: Development Summary – Option B

The development options vary both in land use and the internal transportation network. Option A extends Main Avenue to Barclay Drive, and connects Sisters Park Drive to Hood Avenue. Option A includes 140 ksf of retail/commercial use and 60 residential units, among other uses. Like Option A, Option B would connect Hood Avenue to Sisters Park Drive. However, Option B would only extend Main Avenue to Hood Avenue, while Adams Avenue would be extended to Barclay Drive. Option B has the potential for greater traffic impacts, with up to 188 ksf of retail/commercial development and 160 residential units, among other uses. Table 5 summarizes the land use intensity of each development option and compares the potential trip generation.

Table 5: Assumed 2030 USFS Land Use and PM Peak Hour Trip Generation

				Households + Employees					Trips		
Use	**Size**	**Units**	**Source***	**HH**	**RET**	**SER**	**EDU**	**OTH**	**In**	**Out**	**Total**
Option A											
Ret/Commercial	140	KSF	FCT		210				432	488	920
Residential	60	Units	FCT	60					38	22	60
Light Industrial	20	Acres	FCT					160	9	53	62
Park	6.3	Acres	ITE 411			1			1	1	2
USFS Total Trips (Option A Zoning)				**60**	**210**	**1**	**0**	**160**	**480**	**564**	**1,044**
Option B											
Ret/Commercial	188	KSF	FCT		282				581	655	1,236
Residential	160	Units	FCT	160					102	60	162
Light Industrial	15	Acres	FCT					120	7	40	47
Park	6.3	Acres	ITE 411			1			1	1	2
USFS Total Trips (Option B Zoning)				**160**	**282**	**1**	**0**	**120**	**691**	**756**	**1,447**

***Note:** FCT = Forecasting Tool Methodology

Both development options would represent an increase in households and employment from levels assumed in the City of Sisters TSP for the area (which had no households and 90 employees). As listed in Table 5, Option B (1,450 trips) would generate approximately 400 more trips than Option A (1,050 trips) during the PM peak hour. Therefore, Option B was determined to represent the reasonable worst-case scenario for this analysis. Table 6 lists the increase in site trips from the existing site zoning with the land use described in Option B.

Table 6: Assumed 2030 USFS Land Use and PM Peak Hour Trip Generation

				Land Use Totals (households and employees)					Trips		
Use	**Size**	**Units**	**Source**	**HH**	**RET**	**SER**	**EDU**	**OTH**	**In**	**Out**	**Total**
Ret/Commercial	188	KSF	FCT		282				581	655	1,236
Residential	160	Units	FCT	160					102	60	162
Light Industrial	15	Acres	FCT					120	7	40	47
Park	6.3	Acres	ITE 411			1			1	1	2
USFS Total Trips (Option B Zoning)				**160**	**282**	**1**	**0**	**120**	**691**	**756**	**1,447**
TSP Total Land Use and Trips (Existing Zoning)					60	25		5	145	167	312
Zone Change Difference				**160**	**222**	**-24**	**0**	**115**	**546**	**589**	**1,135**

While the internal transportation network varies between Option A and Option B, the primary difference in relation to the surrounding network is the access configuration along Barclay Drive. This difference in transportation network was evaluated to determine significant impact through a sensitivity test of traffic queues at the Barclay Drive approach to Highway 20, as Option A includes an access close to Highway 20 that would not meet access spacing standards. The results are described on page 12.

As land use was added to the USFS parcels for rezoning analysis, the land use growth forecasting in other parts of the City was adjusted to retain the citywide "control totals" (i.e. fixed amount of future land use by category in the city). Overall PM peak hour USFS site trips would increase from approximately 300, as assumed in the TSP, to approximately 1,450 under the initial mix of proposed land uses analyzed. However, allowing the site to develop with a mix of land uses (and retaining the assumed citywide land use control total) would reduce overall motor vehicle trips on many streets outside the USFS site since some internal trips (such as those between new households and employment) would occur on site without using external streets. In addition, to assess the greatest potential for impacts to state facilities, the assumption was made that all retail/commercial trips to/from the site would be trips to/from the major regional gateways (Highway 20, OR 242 and OR 126).

Proposed Rezone Traffic Impacts

Modifying the future land use allocations in Sisters to account for redevelopment Option B of the USFS property would result in future traffic shifts. Figure 3 shows the PM peak hour traffic volume differences that would occur due to the proposed land use scenario. Many intersections in Sisters would have reduced traffic volumes with the proposed redevelopment (shown in the figure as a green box). No state-controlled intersections are projected to increase by 50 or more vehicles per hour. Only intersections along Main Avenue (and within the USFS site) are projected to increase by 50 or more trips.

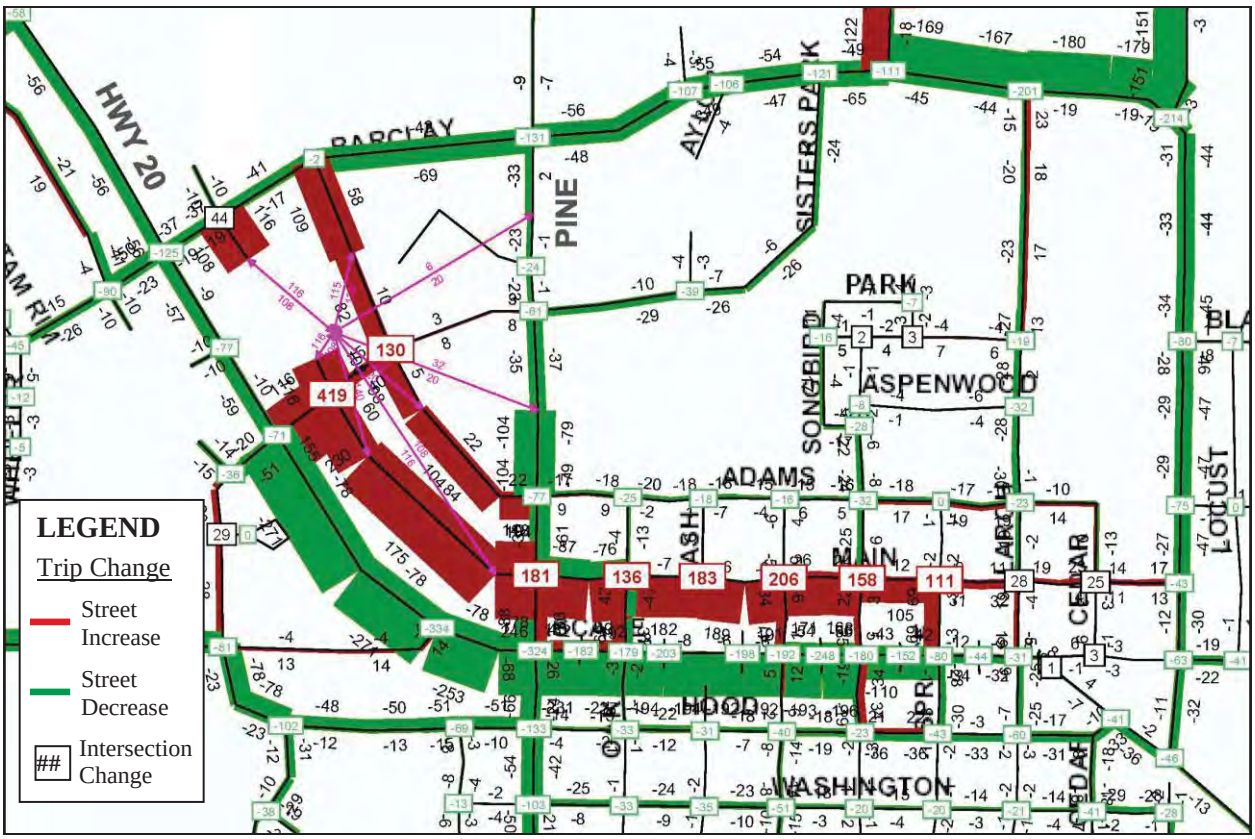


Figure 3: Trip Impacts on Streets and Intersections – Development Option B

The study intersections for impact analysis were selected as follows based on intersection jurisdiction:

- ODOT intersections – No collector/collector or above intersections within the city are projected to have an increase of 50 vehicles per hour or 300 vehicles per day. The intersections analyzed for this rezone study include the following locations based on proximity to the site (located along frontage):
    - Hwy 20/Barclay Drive
    - Hwy 20/Hood Avenue
    - Hwy 20/Pine Street
- City of Sisters intersections – Major intersections that are along the site frontage and are most likely to be impacted by the site:
    - Adams Avenue/Barclay Drive (potential future intersection)
    - Pine Street/Barclay Drive
    - Pine Street/Sisters Peak Drive
    - Pine Street/Main Avenue

The study intersections were analyzed with the updated traffic to determine the level of impact of rezoning the USFS site. Table 7 compares the study intersection operations for the 2030 existing zoning and 2030 proposed zoning (Option B) scenarios for the PM peak hour. Due to the citywide land use control total and the increase of internal site trips (trips between residential and employment purposes that don't travel on roadways external to the site), projected traffic volumes would decrease at many of the study intersections. The total entering volume (TEV) during the 2030 PM peak hour was projected to only increase at one of the seven study intersections (Pine Street/ Main Avenue), as listed in Table 6.

Table 7: 2030 PM Peak Hour Intersection Operations – Existing and Proposed Zoning Scenarios

Intersection	Agency	Mobility Standard*	2030 Existing Zoning				2030 Proposed Zoning (Option B)			
			TEV	Delay	LOS	V/C	TEV	Delay	LOS	V/C
Highway 20 / Barclay Drive	ODOT	0.70	3,155	37.8	D	**0.95**	3,030	37.4	D	**0.93**
Highway 20 / Hood Avenue	ODOT	0.80/0.90	1,575	96.4	B/F	0.41/ 0.77	1,505	>100	A/F	0.29/0.77
Highway 20 / Pine Street	ODOT	0.80/0.90	1,855	21.2	B/C	0.47/ 0.54	1,530	17.4	A/C	0.38/0.35
Adams Avenue / Barclay Drive*	City of Sisters	0.90	1,780	*N/A*	*N/A*	*N/A*	1,780	47.3	B/E	0.54
Pine Street/ Barclay Drive	City of Sisters	0.90	1,880	74.7	B/F	0.61	1,750	51.6	B/F	0.52
Pine Street/ Sisters Park Drive*	City of Sisters	0.90	330	10.2	A/B	0.07	270	10.7	A/B	0.04
Pine Street / Main Avenue*	City of Sisters	0.90	705	17.2	A/C	0.45	840	43.6	A/E	0.72

Signalized Intersection:
Delay = Average Intersection Delay (sec.)
LOS = Level of Service
V/C = Volume to Capacity Ratio
Shaded values do not meet standards

Unsignalized Intersection:
Delay = Critical Movement Approach Delay (sec.)
LOS = Major Street LOS / Minor Street LOS
V/C = Critical Movement Volume-to-Capacity Ratio
Shaded values do not meet standards
*Major/Minor movements for ODOT mobility std

TEV=Total Entering Vehicles (PM peak hr)

**Operations approximated using raw forecast volumes balanced with post-processed study area intersections.*

Along with the reduction in traffic volumes, some of the study intersections would operate with less congestion under the proposed redevelopment Option B. While the intersection of Highway 20/ Barclay Drive would continue to not meet mobility standards with the proposed redevelopment, the intersection mobility would improve upon the existing zoning conditions and would not trigger additional transportation improvements.

Considerations for Internal Circulation Variations

The impact analysis addresses the off-site impacts for a "worst case" trip generation for the site. However, additional impacts may occur with variations to the internal street network (such as Option A) that require additional considerations.

The first consideration is the potential impact on traffic circulation and flow through and around the site. Option B assumes a road extension (Main Avenue) that runs parallel to Highway 20 and serves as an alternate route to Highway 20 for local trips. Reducing mobility along this route would have the potential to remove traffic from the Main Avenue extension and add traffic to Highway 20. For this reason, a parallel route to Highway 20 (as well as the connection to Hood Avenue) should be designed as a collector to remain consistent with the findings of this analysis. Designing these routes with lower mobility could impact traffic circulation through the site and may require an analysis update.

The second consideration is the access spacing along site frontage. Option A includes an extension of Main Avenue that intersects Barclay Drive approximately 250 feet from Highway 20. The intersection capacity analysis at Highway 20/ Barclay Drive (with an assumed traffic signal control that would likely have longer queues than a roundabout) indicates that the 95th percentile vehicle queue for westbound traffic stopped on Barclay Drive at Highway 20 would be approximately 400 feet for Option B (worst case trip generation). Therefore, if Option A is pursued to develop the site, the access to Barclay may need to be limited to right-in/right-out or the intersection may need to be located further from Highway 20.

Findings

This section summarizes the findings of the traffic impact analysis, consistency with the TSP, and required mitigation.

Off-site Impacts

Additional traffic from the proposed rezone was not found to trigger the need for mitigation at the study intersections. Many intersections would actually have less traffic (see Figure 3) with the proposed rezone land use scenario (<u>and</u> the addition of the internal street network) compared to the existing zoning condition.

On-site Impacts

The proposed site access to Highway 20 at Hood Avenue would be located approximately 800 feet from Barclay Drive and 950 feet from the Old McKenzie Highway - meeting ODOT spacing standards (720 feet). The internal street network of Option A includes a connection to Barclay Drive that is located approximately 250 feet from Highway 20 and is less than the City of Sisters access spacing standard for an arterial facility (660 feet). Therefore, access to Barclay Drive under Option A would potentially require mitigation to restrict movements or shift the

intersection out of the influence area of Highway 20/ Barclay Drive. However, the internal network included in Option B would meet access spacing requirements.

Future intersection control will affect the circulation of traffic in the vicinity of the site. The impact analysis indicated that two-way stop control would be sufficient for site access along Barclay Drive, Pine Street, and Highway 20.

Consistency with TSP

The elements of the proposed development were compared to the future plans for each transportation mode in the Sisters TSP to determine consistency. The pedestrian and bicycle plans in the TSP indicate that a shared-use path (conceptual alignment) would cross the proposed site to provide a connection between Pine Street and Barclay Drive. In addition, a sidewalk or pathway improvements are identified along all sides of the site frontage. Half-street improvements along the project frontage as well as the internal street network with pedestrian and bicycle facilities (included in both Option A and Option B) would meet the desired connectivity proposed for the pedestrian and bicycle systems.

The TSP also includes a local street connectivity map (Figure 7-5) that indicates future access for additional development should connect to Barclay Drive, Sisters Park Drive, Adams Avenue, and Main Avenue. Both Option A and Option B provide these connections with the exception that Option A, which may have a pedestrian-only connection to Adams Avenue. Both options also include a connection to Highway 20 at Hood Avenue. While this connection is not specifically identified in Figure 7-5 of the TSP, the connection would further enhance the connectivity of the street system, reduce vehicle miles travelled (VMT), and provide the desired effect (and intent of the TSP) of improved connectivity in Sisters.

The traffic impacts to facilities in Sisters with the proposed development (Figure 3) would not significantly alter the intended function of the roadways. However, the primary internal roadway between Pine Street and Barclay Drive (as well as the connection to Highway 20 at Hood Avenue) should be designated and constructed as a collector roadway.

Recommended Mitigation

The following improvements would be needed for development of the site to mitigate impacts on the transportation system and provide consistency with the City's TSP and the Oregon Highway Plan to satisfy OAR 660-012-0060 requirements:

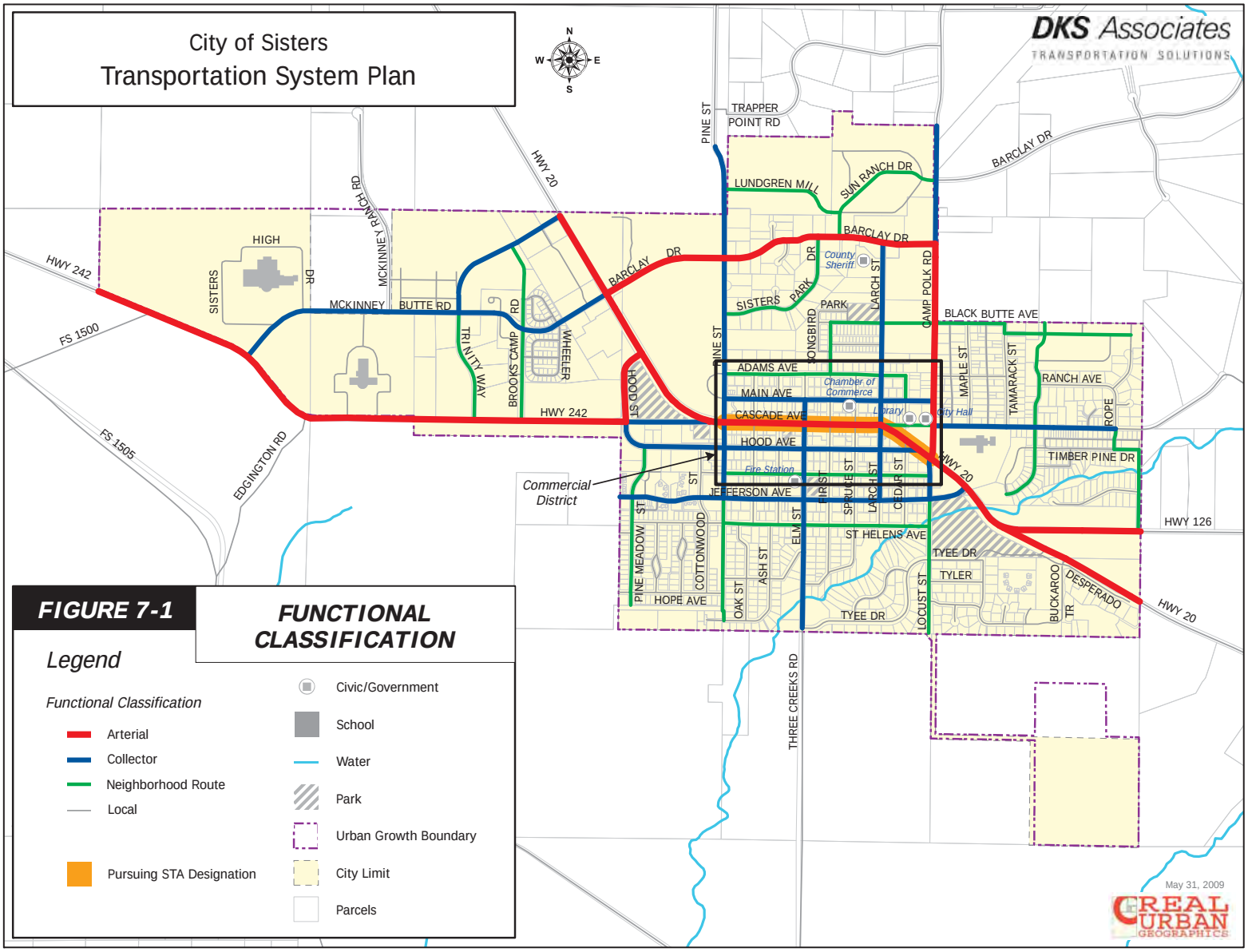
- Construct half-street improvements along project frontage, including pedestrian and bicycle facilities as shown in the City's TSP
- Provide an internal street network that creates connectivity through the site for all modes (pedestrian, bicycle, motor vehicle). This should include a collector roadway connecting to Highway 20 at Hood Avenue, as well as a collector connecting Pine Street to Barclay Drive (either as an extension of Main Avenue or Adams Avenue) to provide the desired connectivity and benefit of reducing traffic reliance on Highway 20.

- Under Option A, modify the access to Barclay Drive near Highway 20 to restrict left-turn movements or shift the access out of the influence area of Highway 20/ Barclay Drive intersection.

Appendix

The following items are attached as Appendix material:

1. Sisters TSP Functional Class Map (Figure 7-1)
2. Sisters TSP Bicycle Plan Map (Figure 6-1)
3. Sisters TSP Pedestrian Plan Map (Figure 5-1)
4. Sisters TSP Local Street Connections Map (Figure 7-5)
5. In Process Trips and TSP, Rezone Land Use by TAZ
6. Traffic Volume Projections –
    a. 2030 Financially Constrained (FC) Network with Existing Zoning
    b. 2030 FC Network + USFS Option B (TWSC at Hood Access)
7. HCM Calculation Sheets
    a. 2030 Financially Constrained (FC) Network with Existing Zoning
    b. 2030 FC Network + USFS Option B (TWSC at Hood Access)
8. Option A Layout
9. Option B Layout


City of Sisters
Transportation System Plan
DKS Associates
TRANSPORTATION SOLUTIONS
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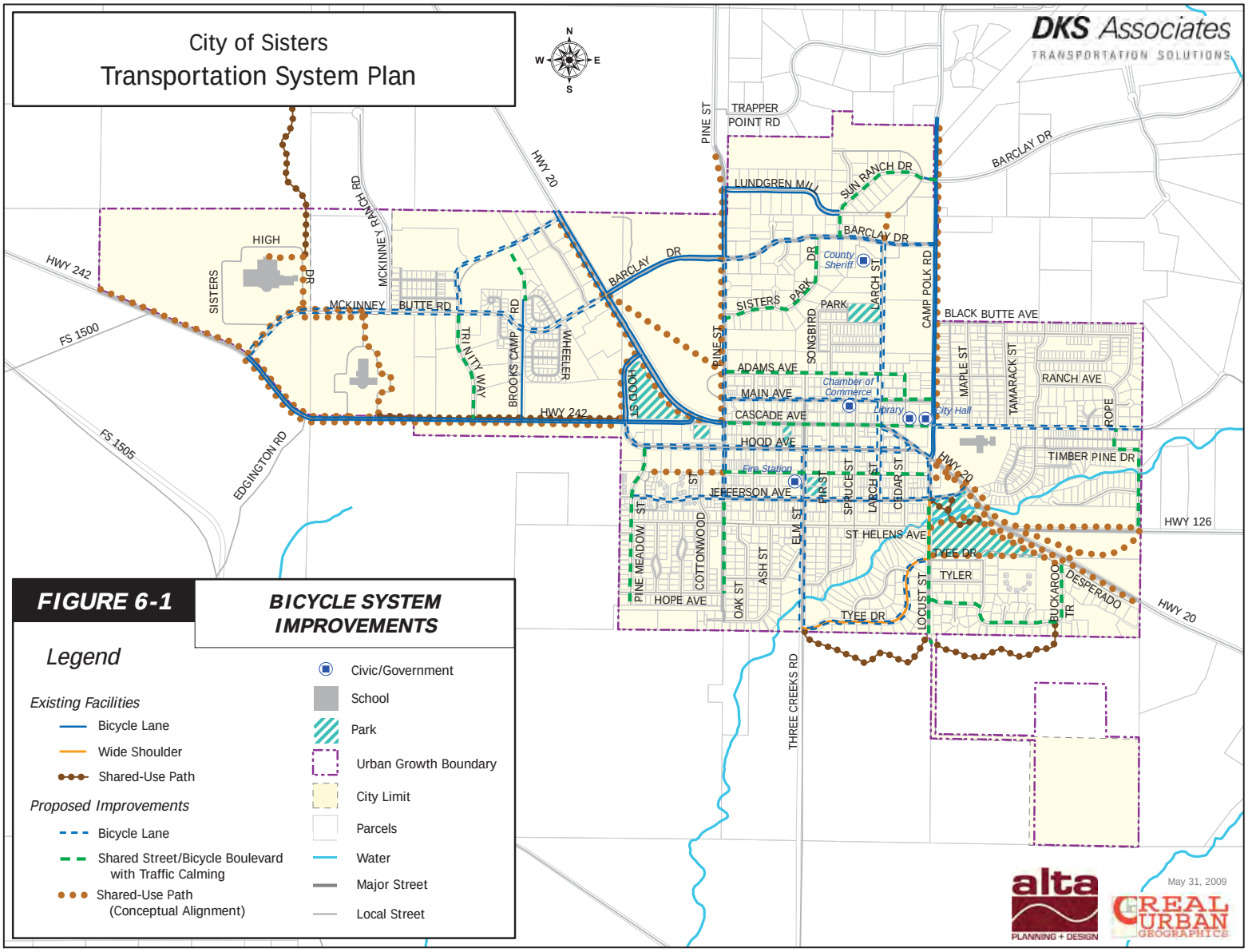
S
TRAPPER POINT RD
PINE ST
BARCLAY DR
SUN RANCH DR
LUNDGREN MILL
HWY 20
HIGH
SISTERS
DR
MCKINNEY RANCH RD
HWY 242
FS 1500
MCKINNEY
BUTTE RD
TRINITY WAY
BROOKS CAMP RD
WHEELER
County Sheriff
SISTERS PARK
PARK
LONGBIRD DR
LARCH ST
CAMP POLK RD
BLACK BUTTE AVE
ADAMS AVE
MAIN AVE
CASCADE AVE
HOOD AVE
Chamber of Commerce
Library
City Hall
MAPLE ST
TAMARACK ST
RANCH AVE
ROPE
TIMBER PINE DR
HOOD ST
Fire Station
JEFFERSON AVE
Commercial District
FS 1505
EDGINGTON RD
PINE MEADOW ST
COTTONWOOD ST
ELM ST
FIRST ST
SPRUCE ST
CEDAR ST
ST HELENS AVE
TYEE DR
TYLER
HOPE AVE
OAK ST
ASH ST
LOCUST ST
BUCKAROO TR
DESPERADO
HWY 126
THREE CREEKS RD
May 31, 2009
GREAT URBAN GEOGRAPHICS
FIGURE 7-1
FUNCTIONAL CLASSIFICATION
Legend
Functional Classification
Arterial
Collector
Neighborhood Route
Local
Pursuing STA Designation
Civic/Government
School
Water
Park
Urban Growth Boundary
City Limit
Parcels


City of Sisters
Transportation System Plan
DKS Associates
TRANSPORTATION SOLUTIONS
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LUNDGREN MILL
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HWY 242
HIGH
SISTERS
MCKINNEY RANCH RD
MCKINNEY BUTTE RD
FS 1500
FS 1505
EDGINGTON RD
TRINITY WAY
BROOKS CAMP RD
WHEELER
HOOD ST
County Sheriff
SISTERS PARK
PARK
LARCH ST
CAMP POLK RD
BLACK BUTTE AVE
SONGBIRD
ADAMS AVE
MAIN AVE
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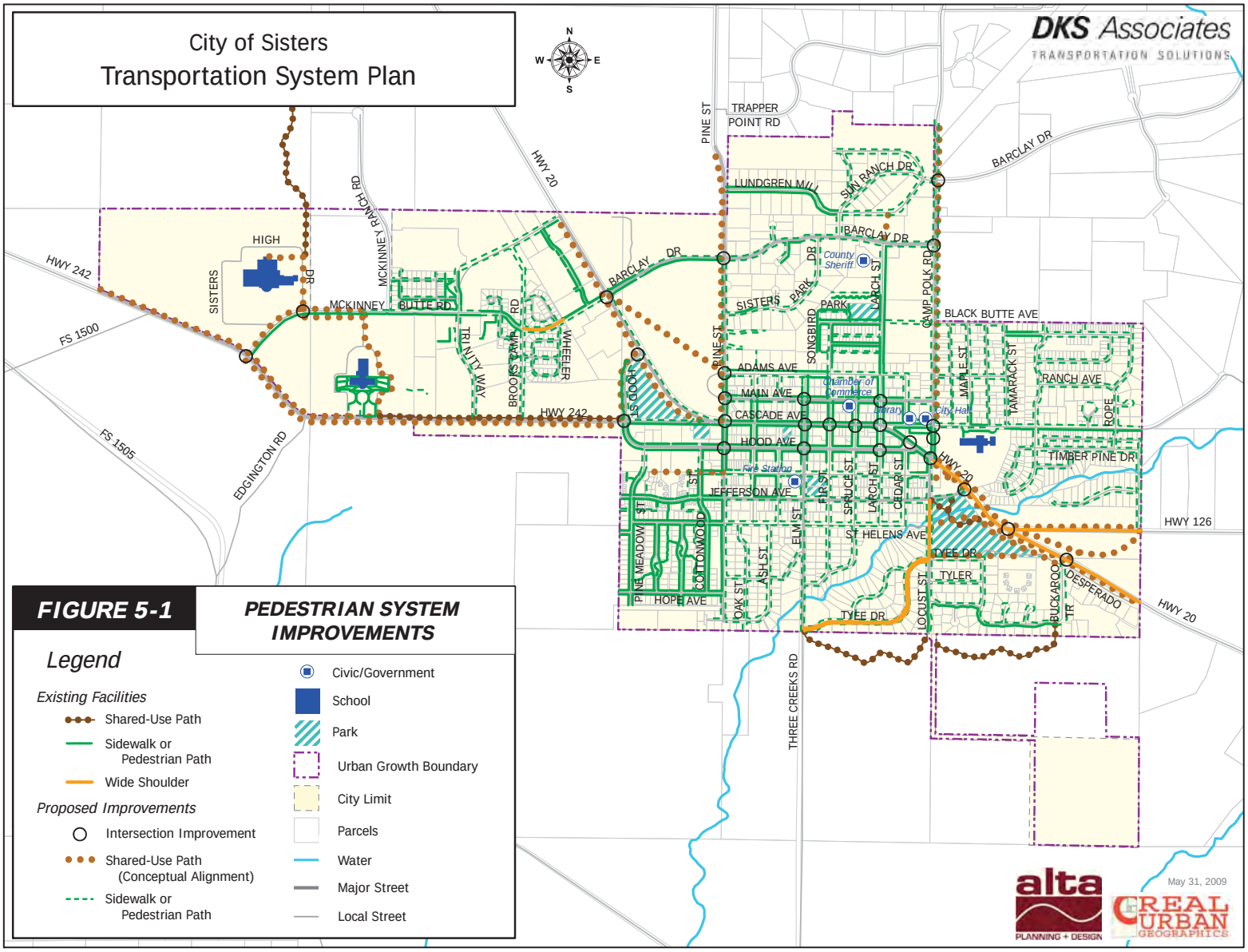
RANCH AVE
ROPE
HOOD AVE
Fire Station
JEFFERSON AVE
TIMBER PINE DR
HWY 126
PINE MEADOW ST
COTTONWOOD ST
HOPE AVE
OAK ST
ASH ST
ELM ST
FIR ST
SPRUCE ST
CEDAR ST
ST HELENS AVE
TYEE DR
TYLER
LOCUST ST
BUCKAROO TR
DESPERADO
THREE CREEKS RD
FIGURE 6-1
BICYCLE SYSTEM IMPROVEMENTS
Legend
Existing Facilities
Bicycle Lane
Wide Shoulder
Shared-Use Path
Proposed Improvements
Bicycle Lane
Shared Street/Bicycle Boulevard with Traffic Calming
Shared-Use Path (Conceptual Alignment)
Civic/Government
School
Park
Urban Growth Boundary
City Limit
Parcels
Water
Major Street
Local Street
alta
PLANNING + DESIGN
May 31, 2009
REAL URBAN GEOGRAPHICS


City of Sisters
Transportation System Plan
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HWY 20
LUNDGREN MILL
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HIGH
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SISTERS
MCKINNEY BUTTE RD
MCKINNEY RANCH RD
FS 1500
FS 1505
EDGINGTON RD
TRINITY WAY
BROOKS RANCH RD
WHEELER
FS DOOR
County Sheriff
SISTERS PARK
SONGBIRD
LARCH ST
CAMP POLK RD
BLACK BUTTE AVE
ADAMS AVE
MAIN AVE
CASCADE AVE
HOOD AVE
Chamber of Commerce
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City Hall
MAPLE ST
TAMARACK ST
RANCH AVE
ROPE
TIMBER PINE DR
Fire Station
JEFFERSON AVE
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SPRUCE ST
CEDAR ST
ST HELENS AVE
ELM ST
ASH ST
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COTTONWOOD ST
PINE MEADOW ST
HOPE AVE
TYEE DR
TYLER
LOCUST ST
BUCKAROO TR
DESPERADO
HWY 126
THREE CREEKS RD
May 31, 2009
alta PLANNING + DESIGN
GREAT URBAN GEOGRAPHICS
FIGURE 5-1
PEDESTRIAN SYSTEM IMPROVEMENTS
Legend
Existing Facilities
Shared-Use Path
Sidewalk or Pedestrian Path
Wide Shoulder
Proposed Improvements
Intersection Improvement
Shared-Use Path (Conceptual Alignment)
Sidewalk or Pedestrian Path
Civic/Government
School
Park
Urban Growth Boundary
City Limit
Parcels
Water
Major Street
Local Street

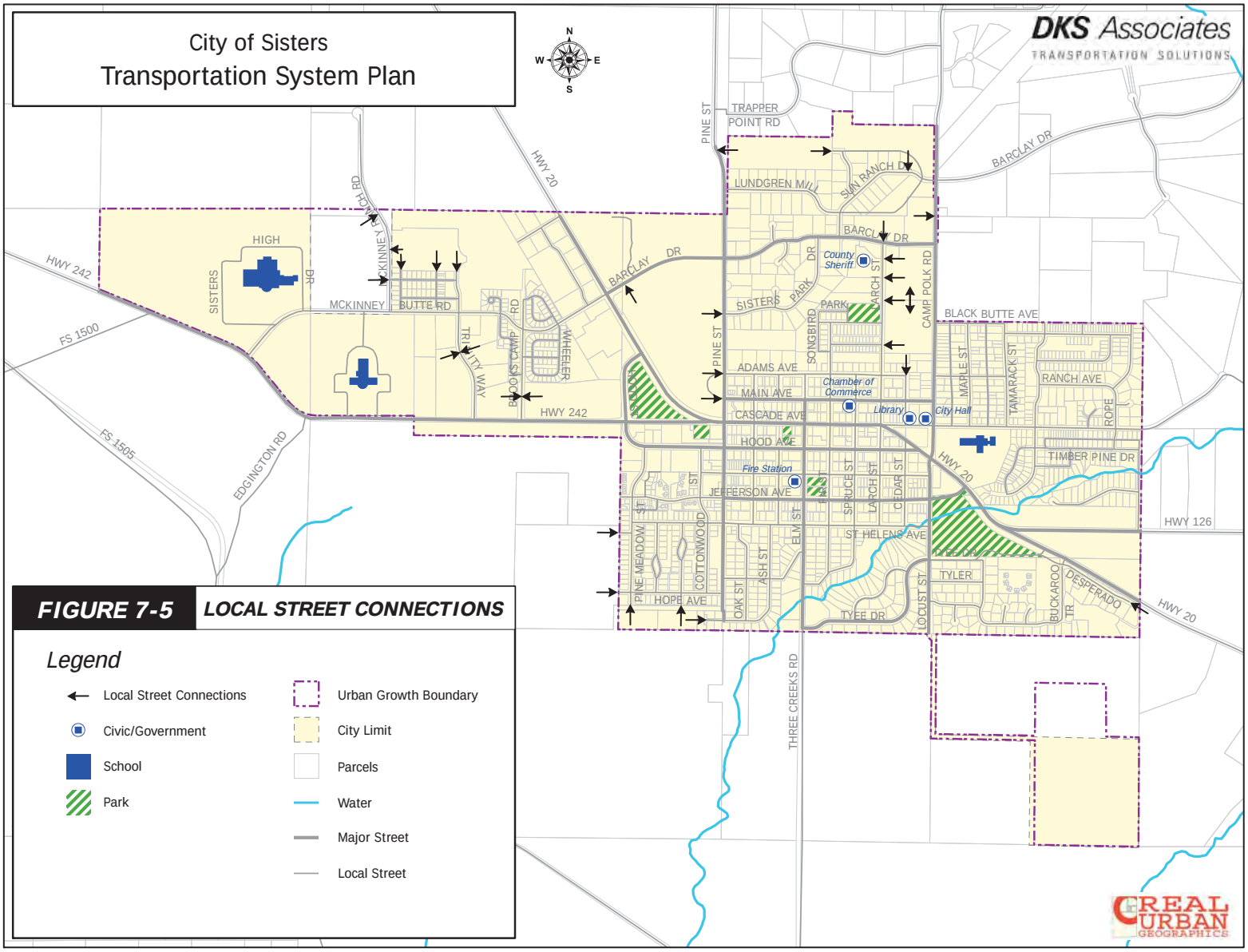

FIGURE 7-5 **LOCAL STREET CONNECTIONS**

Legend

- Local Street Connections
- Civic/Government
- School
- Park
- Urban Growth Boundary
- City Limit
- Parcels
- Water
- Major Street
- Local Street

USFS Sisters Rezone

Land Use Adjustments

	TSP BASE					TSP FUTURE					TSP FUTURE (Adjusted for In Process)					REZONE FUTURE					CHANGE (REZONE - TSP)				
TAZ	HH	RET	SER	EDU	OTH	HH	RET	SER	EDU	OTH	HH	RET	SER	EDU	OTH	HH	RET	SER	EDU	OTH	HH	RET	SER	EDU	OTH
11	0	0	0	100		0	0	0	200		0	0	0	200	0	0	0	0	200	0	0	0	0	0	0
12	70	0	40		25	635	10	50		75	605	10	50	0	75	523	5	51	0	59	-83	-5	1	0	-16
13	0	110	70		0	0	210	95		10	0	210	95	0	10	0	159	98	0	7	0	-51	3	0	-3
14 (USFS)	0	0	0		0	0	60	25		5	0	60	25	0	5	160	282	1	0	120	160	222	-24	0	115
15	120	15	40		15	335	95	55		40	324	95	55	0	40	292	61	57	0	32	-31	-33	2	0	-8
16	50	55	140		195	170	205	245		425	228	205	245	0	425	228	149	257	0	350	0	-56	12	0	-75
17	15	175	20		130	15	200	25		140	15	200	25	0	140	15	187	25	0	137	0	-13	1	0	-3
18	30	40	10		65	30	75	15		75	30	75	15	0	75	30	57	16	0	72	0	-18	1	0	-3
19	5	210	15		95	5	215	15		95	5	215	15	0	95	5	212	15	0	95	0	-3	0	0	0
20	5	90	15		55	5	100	15		60	5	100	15	0	60	5	95	15	0	58	0	-5	0	0	-2
21	225	0	0		10	290	10	5		15	287	10	5	0	15	277	5	6	0	13	-9	-5	1	0	-2
22	45	0	0		0	65	30	15		5	64	30	15	0	5	61	15	17	0	3	-3	-15	2	0	-2
23	285	0	0	45		435	10	10	115		427	10	10	115	0	405	5	11	115	0	-22	-5	1	0	0
24	70	0	25		20	150	25	35		25	146	25	35	0	25	134	12	36	0	23	-12	-13	1	0	-2
Total	920	695	375	145	610	2,135	1,244	605	315	970	2,135	1,244	605	315	970	2,135	1,244	605	315	970	0	0	0	0	-0

In Process Development

	PM pk Hr Trips		Land Use		
Site	Resi	Comm	HH	RET	TAZ
Saddlestone Residential	81		80	0	23
Village at Cold Springs	290		287	0	12
Village Meadows	59		58	0	12
Sun Ranch Industrial		205	0	47	16
Three Sisters Industrial		205	0	47	16
New Sisters Village		144	0	33	15
Black Butte Crossing	180		178	0	16
Sisters Villiage Hotel		64	0	15	15
Sisters Center		37	0	8	13
TOTAL	610	655	604	150	

Growth Check

TAZ	IP HH	IP RET	RZ HH	RZ RET	HH	RET
12	346	0	453	5	ok	ok
13	0	8	0	49	ok	ok
15	0	47	172	47	ok	ok
16	178	94	178	94	ok	ok
23	80	0	120	5	ok	ok
TOTAL	**604**	**150**				

			2030 Existing Zoning (Financially Constrained) + In Process Trips											
			Northbound			Southbound			Eastbound			Westbound		
N/S	E/W	#	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Existing Intersections														
US 20	Barclay Dr (McKinney Butte	42	47	391	90	488	536	31	211	294	69	149	371	477
US 20	Hood St (OR 242)	43	234	485	0	0	647	123	24	0	62	0	0	0
Pine St	Cascade Ave (US 20/OR 12	44	0	0	144	0	0	233	109	569	167	98	504	31
Pine St	Barclay Dr	48	45	5	17	6	21	51	52	705	71	48	851	9
Pine St	Main Ave	0	0	97	54	194	138	0	0	0	0	95	0	127
Adams	Barclay		0	0	0	0	0	0	0	862	0	0	919	0
Sisters Peak	Pine		0	13	103	10	165	0	0	0	0	35	0	5

			2030 USFS Option B (TWSC)											
			Northbound			Southbound			Eastbound			Westbound		
N/S	E/W	#	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Existing Intersections														
US 20	Barclay Dr (McKinney Butte	42	23	408	89	480	488	30	206	284	60	148	347	465
US 20	Hood St (OR 242)	43	188	402	51	172	420	119	12	7	17	2	30	85
Pine St	Cascade Ave (US 20/OR 12	44	0	0	118	0	0	145	107	364	120	77	515	85
Pine St	Barclay Dr	48	47	5	17	5	19	45	46	658	56	33	812	7
Pine St	Main Ave	0	93	68	43	201	86	4	4	136	56	4	51	92
Adams	Barclay		53	0	6	0	0	0	0	787	57	52	825	0
Sisters Peak	Pine		0	12	67	10	140	2	0	7	0	25	1	5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	24	62	234	485	647	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	67	254	527	703	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)					874	
pX, platoon unblocked	0.83	0.83	0.83			
vC, conflicting volume	1739	703	703			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1887	644	644			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	40	83	68			
cM capacity (veh/h)	44	394	784			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	93	254	527	703	134
Volume Left	26	254	0	0	0
Volume Right	67	0	0	0	134
cSH	122	784	1700	1700	1700
Volume to Capacity	0.77	0.32	0.31	0.41	0.08
Queue Length 95th (ft)	111	35	0	0	0
Control Delay (s)	96.4	11.8	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	96.4	3.8		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1316	1630	1716	1458	2829	3233	
Flt Permitted	0.16	1.00	1.00	0.38	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	272	1716	1458	658	1716	1316	1630	1716	1458	2829	3233	
Volume (vph)	211	294	69	149	371	477	47	391	90	488	536	31
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)	229	320	75	162	403	518	51	425	98	530	583	34
RTOR Reduction (vph)	0	0	54	0	0	0	0	0	71	0	5	0
Lane Group Flow (vph)	229	320	21	162	403	518	51	425	27	530	612	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	13%	2%	2%	2%	14%	2%	2%
Turn Type	pm+pt		Perm	pm+pt		Free	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free			2			
Actuated Green, G (s)	35.0	25.2	25.2	28.8	22.1	91.1	4.4	25.2	25.2	18.0	38.8	
Effective Green, g (s)	35.0	25.2	25.2	28.8	22.1	91.1	4.4	25.2	25.2	18.0	38.8	
Actuated g/C Ratio	0.38	0.28	0.28	0.32	0.24	1.00	0.05	0.28	0.28	0.20	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	251	475	403	280	416	1316	79	475	403	559	1377	
v/s Ratio Prot	c0.10	0.19		0.04	0.23		0.03	c0.25		c0.19	0.19	
v/s Ratio Perm	c0.25		0.01	0.14		0.39			0.02			
v/c Ratio	0.91	0.67	0.05	0.58	0.97	0.39	0.65	0.89	0.07	0.95	0.44	
Uniform Delay, d1	22.6	29.3	24.2	24.1	34.2	0.0	42.6	31.7	24.3	36.1	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.2	3.8	0.1	2.9	35.6	0.9	16.7	19.0	0.1	25.5	0.2	
Delay (s)	56.8	33.0	24.2	27.0	69.7	0.9	59.3	50.6	24.4	61.5	18.8	
Level of Service	E	C	C	C	E	A	E	D	C	E	B	
Approach Delay (s)		40.7			30.4			46.9			38.5	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	91.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	109	569	167	98	504	31	0	0	144	0	0	233
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	118	618	182	107	548	34	0	0	157	0	0	253
Pedestrians		50			50							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		4			4							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	582			800			2010	1741	759	1840	1815	615
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	582			800			2010	1741	759	1840	1815	615
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			87			100	100	60	100	100	46
cM capacity (veh/h)	993			823			16	67	389	27	60	471

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	118	800	107	582	157	253
Volume Left	118	0	107	0	0	0
Volume Right	0	182	0	34	157	253
cSH	993	1700	823	1700	389	471
Volume to Capacity	0.12	0.47	0.13	0.34	0.40	0.54
Queue Length 95th (ft)	10	0	11	0	47	78
Control Delay (s)	9.1	0.0	10.0	0.0	20.3	21.2
Lane LOS	A		B		C	C
Approach Delay (s)	1.2		1.6		20.3	21.2
Approach LOS					C	C

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	95	127	97	54	194	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	103	138	105	59	211	150
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	707	135			164	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	707	135			164	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	85			85	
cM capacity (veh/h)	342	914			1414	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	241	164	361
Volume Left	103	0	211
Volume Right	138	59	0
cSH	533	1700	1414
Volume to Capacity	0.45	0.10	0.15
Queue Length 95th (ft)	58	0	13
Control Delay (s)	17.2	0.0	5.2
Lane LOS	C		A
Approach Delay (s)	17.2	0.0	5.2
Approach LOS	C		

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	35	5	13	103	10	165
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	5	14	112	11	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	271	70			126	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	271	70			126	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			99	
cM capacity (veh/h)	713	993			1460	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	43	126	190
Volume Left	38	0	11
Volume Right	5	112	0
cSH	739	1700	1460
Volume to Capacity	0.06	0.07	0.01
Queue Length 95th (ft)	5	0	1
Control Delay (s)	10.2	0.0	0.5
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.5
Approach LOS	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	52	705	71	48	851	9	45	5	17	6	21	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	766	77	52	925	10	49	5	18	7	23	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	935			843			2014	1957	805	1935	1991	930
vC1, stage 1 conf vol							918	918		1034	1034	
vC2, stage 2 conf vol							1096	1039		901	957	
vCu, unblocked vol	935			843			2014	1957	805	1935	1991	930
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			93			47	96	95	95	85	83
cM capacity (veh/h)	732			793			93	147	383	132	148	324

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	57	843	52	935	73	85
Volume Left	57	0	52	0	49	7
Volume Right	0	77	0	10	18	55
cSH	732	1700	793	1700	119	226
Volume to Capacity	0.08	0.50	0.07	0.55	0.61	0.37
Queue Length 95th (ft)	6	0	5	0	77	41
Control Delay (s)	10.3	0.0	9.9	0.0	74.7	30.1
Lane LOS	B		A		F	D
Approach Delay (s)	0.6		0.5		74.7	30.1
Approach LOS					F	D

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	787	57	52	825	53	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	855	62	57	897	58	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					0	
Upstream signal (ft)	861					
pX, platoon unblocked			0.93		0.93	0.93
vC, conflicting volume			917		1896	886
vC1, stage 1 conf vol					886	
vC2, stage 2 conf vol					1010	
vCu, unblocked vol			911		1966	878
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			92		58	98
cM capacity (veh/h)			694		138	322

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	917	57	897	64
Volume Left	0	57	0	58
Volume Right	62	0	0	7
cSH	1700	694	1700	147
Volume to Capacity	0.54	0.08	0.53	0.44
Queue Length 95th (ft)	0	7	0	49
Control Delay (s)	0.0	10.6	0.0	47.3
Lane LOS		B		E
Approach Delay (s)	0.0	0.6		47.3
Approach LOS				E

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	7	17	2	30	85	188	402	51	172	420	119
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	8	18	2	33	92	204	437	55	187	457	129
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											874	
pX, platoon unblocked	0.93	0.93	0.93	0.93	0.93		0.93					
vC, conflicting volume	1785	1732	457	1726	1704	465	457			492		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1844	1787	415	1781	1757	465	415			492		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	26	85	97	94	38	85	81			83		
cM capacity (veh/h)	18	50	592	38	53	598	1063			1071		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	13	26	2	125	204	492	187	457	129
Volume Left	13	0	2	0	204	0	187	0	0
Volume Right	0	18	0	92	0	55	0	0	129
cSH	18	143	38	161	1063	1700	1071	1700	1700
Volume to Capacity	0.74	0.18	0.06	0.77	0.19	0.29	0.17	0.27	0.08
Queue Length 95th (ft)	49	16	4	124	18	0	16	0	0
Control Delay (s)	419.7	35.7	105.6	78.4	9.2	0.0	9.1	0.0	0.0
Lane LOS	F	E	F	F	A		A		
Approach Delay (s)	163.7		78.8		2.7		2.2		
Approach LOS	F		F						

Intersection Summary			
Average Delay	12.2		
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1316	1630	1716	1458	2829	3231	
Flt Permitted	0.17	1.00	1.00	0.37	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	295	1716	1458	629	1716	1316	1630	1716	1458	2829	3231	
Volume (vph)	206	284	60	148	347	465	23	408	89	480	488	30
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)	224	309	65	161	377	505	25	443	97	522	530	33
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	68	0	5	0
Lane Group Flow (vph)	224	309	17	161	377	505	25	443	29	522	558	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	13%	2%	2%	2%	14%	2%	2%
Turn Type	pm+pt		Perm	pm+pt		Free	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free			2			
Actuated Green, G (s)	32.9	23.3	23.3	27.7	20.7	91.0	2.3	27.1	27.1	17.6	42.4	
Effective Green, g (s)	32.9	23.3	23.3	27.7	20.7	91.0	2.3	27.1	27.1	17.6	42.4	
Actuated g/C Ratio	0.36	0.26	0.26	0.30	0.23	1.00	0.03	0.30	0.30	0.19	0.47	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	247	439	373	268	390	1316	41	511	434	547	1505	
v/s Ratio Prot	c0.10	0.18		0.05	0.22		0.02	c0.26		c0.18	0.17	
v/s Ratio Perm	c0.23		0.01	0.14		0.38			0.02			
v/c Ratio	0.91	0.70	0.04	0.60	0.97	0.38	0.61	0.87	0.07	0.95	0.37	
Uniform Delay, d1	23.5	30.7	25.5	24.8	34.8	0.0	43.9	30.2	22.9	36.3	15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.2	5.1	0.0	3.8	36.5	0.8	23.0	14.4	0.1	27.2	0.2	
Delay (s)	56.8	35.8	25.5	28.6	71.3	0.8	66.9	44.6	23.0	63.5	15.8	
Level of Service	E	D	C	C	E	A	E	D	C	E	B	
Approach Delay (s)		42.5			30.6			41.9			38.8	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	107	364	120	77	515	85	0	0	118	0	0	145
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	116	396	130	84	560	92	0	0	128	0	0	158
Pedestrians		50			50							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		4			4							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	652			526			1628	1513	511	1580	1532	656
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	652			526			1628	1513	511	1580	1532	656
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			92			100	100	76	100	100	65
cM capacity (veh/h)	934			1041			43	96	539	55	94	446

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	116	526	84	652	128	158
Volume Left	116	0	84	0	0	0
Volume Right	0	130	0	92	128	158
cSH	934	1700	1041	1700	539	446
Volume to Capacity	0.12	0.31	0.08	0.38	0.24	0.35
Queue Length 95th (ft)	11	0	7	0	23	39
Control Delay (s)	9.4	0.0	8.8	0.0	13.7	17.4
Lane LOS	A		A		B	C
Approach Delay (s)	1.7		1.0		13.7	17.4
Approach LOS					B	C

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	4	136	56	4	51	92	93	68	43	201	86	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	148	61	4	55	100	101	74	47	218	93	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	960	855	96	967	834	97	98			121		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	960	855	96	967	834	97	98			121		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	37	94	95	77	90	93			85		
cM capacity (veh/h)	148	234	961	93	241	959	1495			1467		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	213	160	222	316
Volume Left	4	4	101	218
Volume Right	61	100	47	4
cSH	294	420	1495	1467
Volume to Capacity	0.72	0.38	0.07	0.15
Queue Length 95th (ft)	130	44	5	13
Control Delay (s)	43.6	18.8	3.8	5.8
Lane LOS	E	C	A	A
Approach Delay (s)	43.6	18.8	3.8	5.8
Approach LOS	E	C		

Intersection Summary			
Average Delay	16.4		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	7	0	25	1	5	0	12	67	10	140	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	8	0	27	1	5	0	13	73	11	152	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	230	261	153	228	226	49	154			86		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	230	261	153	228	226	49	154			86		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	96	100	99	100			99		
cM capacity (veh/h)	716	639	893	716	669	1019	1426			1510		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	34	86	165
Volume Left	0	27	0	11
Volume Right	0	5	73	2
cSH	639	751	1426	1510
Volume to Capacity	0.01	0.04	0.00	0.01
Queue Length 95th (ft)	1	4	0	1
Control Delay (s)	10.7	10.0	0.0	0.5
Lane LOS	B	B		A
Approach Delay (s)	10.7	10.0	0.0	0.5
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	46	658	56	33	812	7	47	5	17	5	19	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	715	61	36	883	8	51	5	18	5	21	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	890			776			1859	1808	746	1795	1834	886
vC1, stage 1 conf vol							846	846		958	958	
vC2, stage 2 conf vol							1014	962		836	876	
vCu, unblocked vol	890			776			1859	1808	746	1795	1834	886
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			96			57	97	96	97	88	86
cM capacity (veh/h)	761			840			119	171	414	156	174	343

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	50	776	36	890	75	75
Volume Left	50	0	36	0	51	5
Volume Right	0	61	0	8	18	49
cSH	761	1700	840	1700	149	254
Volume to Capacity	0.07	0.46	0.04	0.52	0.50	0.30
Queue Length 95th (ft)	5	0	3	0	60	30
Control Delay (s)	10.1	0.0	9.5	0.0	51.6	25.1
Lane LOS	B		A		F	D
Approach Delay (s)	0.6		0.4		51.6	25.1
Approach LOS					F	D

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

Option A

Development Summary:

Commercial acreage is 25% of the total site

Retail/Commercial:

- Building: 80,000 sf total
- 4 off-street parking spaces/1,000 sf
- FAR commercial =25%
- 7 acres gross

HWY Commercial:

- Building: 60,000 sf total
- 4 off-street parking spaces/1,000 sf
- FAR commercial =25%
- 5 acres gross

Residential (Cluster Development):

- Duplex: 50 units
- Cottage: 10 units
- Total Housing: 60 units/10 ac gross = 6 dua

Empolyment/Light Industrial: 20 acres gross

Park: 6.3 acres gross

Potential to Integrate Existing Ponderosa Pine into Development

Potential Street or Pedestrian Connection

Required Streets

City Limits

Total: 54 ac

USFS Development Plan
Sisters Oregon

Option B

Development Summary:

Commercial acreage is 30% of the total site

Retail/Commercial:

- Building: 80,000 sf total
  - 3 off-street parking spaces/1,000 sf
  - FAR commercial =25%
  - 7 acres gross

Potential Resort Anchor:
(Commercial Zoning)

- Shown: 11,000 sf commercial total
  - 4 off-street parking spaces/1,000 sf
  - FAR commercial =9%
  - 10 acres gross
  - Additional Vacation Rental Housing
    (* Development is less intensive than commercial zoning would allow)
- Maximum Build Out: 108,000 sf
  - 4 off-street parking spaces/1,000 sf
  - FAR commercial =25%
  - 10 acres gross

Residential:

- Town Homes: 50 units
- Apartments: 110 units
- Total Housing: 160 units/10 ac =16 dua

Empolyment/Light Industrial: 15 acres gross

Park: 6.3 acres gross

Potential to Integrate Existing Ponderosa Pine into Development

Potential Street or Pedestrian Connection

Required Streets

City Limits

Total: 54 ac

USFS Development Plan
Sisters Oregon

0 100' 200'