



CITY OF REDMOND
Community Development Department

411 SW 9th Street
Redmond, OR 97756
541-923-7724

www.redmondoregon.gov

REDMOND URBAN AREA PLANNING COMMISSION

411 SW 9th Street-COUNCIL CHAMBERS Redmond, OR 97756

Wednesday, December 13, 2023 5:00 pm

Oral comments can be provided in-person or virtually. For those who plan to provide oral comments virtually during the hearing, pre-register at planredmond@redmondoregon.gov (must pre-register before 3:00 p.m. on December 13th)

Stream the meeting live at: <https://www.redmondoregon.gov/government/city-council/council-meeting-info/meeting-agendas-minutes-and-video>

Agenda

**UAPC
Members**

Norman
Schultz, Chair

Ben
Schimmoller,
Vice-Chair

Heather DeWolf

Joseph
Zampko

Mercedes
Cook-Bostick

Michael Rogers

Wanda
Humphrey

Ex-Officio
Vacancy

I. CALL TO ORDER / INTRODUCTIONS

II. CITIZEN COMMENTS FOR ITEMS NOT ON THE AGENDA

III. APPROVAL OF MINUTES

- a. November 15, 2023

IV. PUBLIC HEARING

- a. Spruce Northwest: Comprehensive Plan & Zone Map Amendment, Master Development Plan, and Tentative Subdivision (File Nos. 711-23-000215-PA1, 711-23-000216-MD, 711-23-000217-SUB)

V. Next Meeting – January 3, 2024

VI. COMMISSION MEMBER COMMENTS

VII. ADJOURN

Please note that these documents are also available on the City's website www.redmondoregon.gov; click on City Government, hover on Commissions and Committees, click on Urban Area Planning Commission. You may also request a copy from City Records Office 541-923-7751 or email kelly.morse@redmondoregon.gov

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CITY OF REDMOND
Community Development Department

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REDMOND URBAN AREA PLANNING COMMISSION

Council Chambers

MINUTES

November 15, 2023

Commissioners Present: Chair Norman Schultz, Vice Chair Ben Schimmoller, Mercedes Cook-Bostick, Heather DeWolf, Michael Rogers, Wanda Wai Lyian Toe, *Absent: Joseph Zampko*

Youth Ex Officio: **Vacant**

City Staff: Kyle Roberts, *Planning Director*; Jamie Buddenbohn, *Planning Permit Coordinator*

Visitors: None

Media: None

(The 3 digits after a motion title show the number of commissioners voting in favor/opposed/abstaining.)

I. CALL TO ORDER – INTRODUCTIONS

Chair Schultz called the meeting of the Redmond Urban Area Planning Commission to order at 5:00 pm, November 15, 2023, with a quorum present (6 of 7 commissioners).

II. CITIZEN COMMENTS FOR ITEMS NOT ON THE AGENDA

None.

III. PUBLIC HEARING

A. Redmond Development Code Text Amendments & Zoning Map Amendment (711-23-000222-TA & 711-23-000223-ZMA) – Continuance Request

Chair Schultz read the hearing protocol into the record.

He opened the public hearing.

Planning Director Kyle Roberts noted the hearing was noticed per City requirements which necessitated holding it today and requested the public hearing be continued to Wednesday, November 29th at 5:00 pm, primarily due to Staff still holding work sessions with City Council on a number of the Code amendment topics the first of which was held last night; the second would be held November 21st. Staff would like to incorporate Council feedback into the final public hearing package which would be presented to the Commission on Wednesday, November 29th.

Vice Chair Schimmoller stated he was present and apologized for arriving late.

Motion 1 (6/0/0): Commissioner DeWolf moved to continue the scheduled November 15th public hearing for the Redmond Development Code Text Amendments and Zoning Map Amendment to Wednesday, November 29th at 5:00 pm, seconded by Commissioner Wai Lyian Toe. The motion passed unanimously.

Chair Schultz left the public hearing open, continued until November 29th.

IV. Next Meeting – November 29, 2023

V. COMMISSION MEMBER COMMENTS

None.

VI. ADJOURN

With no further business, Chair Schultz adjourned the meeting at 5:06 pm.

APPROVED by the Redmond Urban Area Planning Commission and SIGNED by me this _____ day
of _____, 2023.

ATTEST:

_____/s/
Norman Schultz
Chair

_____/s/
Kyle Roberts
Planning Director

SPRUCE NORTHWEST MASTER DEVELOPMENT PLAN, COMPREHENSIVE PLAN & ZONE MAP AMENDMENT, AND TENTATIVE SUBDIVISION

HEARING DATE: December 13, 2023 at 5:00 PM in Redmond City Hall Council Chambers and via digital conference (GoTo Meeting)

HEARINGS BODY: Redmond Urban Area Planning Commission

FILE NUMBER: 711-23-000215-PA1, 711-23-000216-MD, 711-23-000217-SUB

FILE NAME: Spruce Northwest

REQUEST: Approval of a Master Development Plan, Comprehensive Plan & Zone Map Amendment, and an 11-phased Tentative Subdivision on 76.82 acres

LOCATION: 2515, 2917 Northwest Way and 2902 NW Spruce Avenue (taxlots: 1513050000800, 1513050000600, 1513050000804, and a portion of 1513050000902) in Redmond, OR 97756

APPLICANT: Megan Norris, Hayden Homes

PROPERTY OWNERS: Northwest Way Land JV, LLC, HLM Inc., Te Amo Despacio, LLC, Stephen & Amanda Klingman Trust

REVIEWING STAFF: Kyle Roberts, AICP, Planning Director

RECOMMENDATION: Approval with Conditions

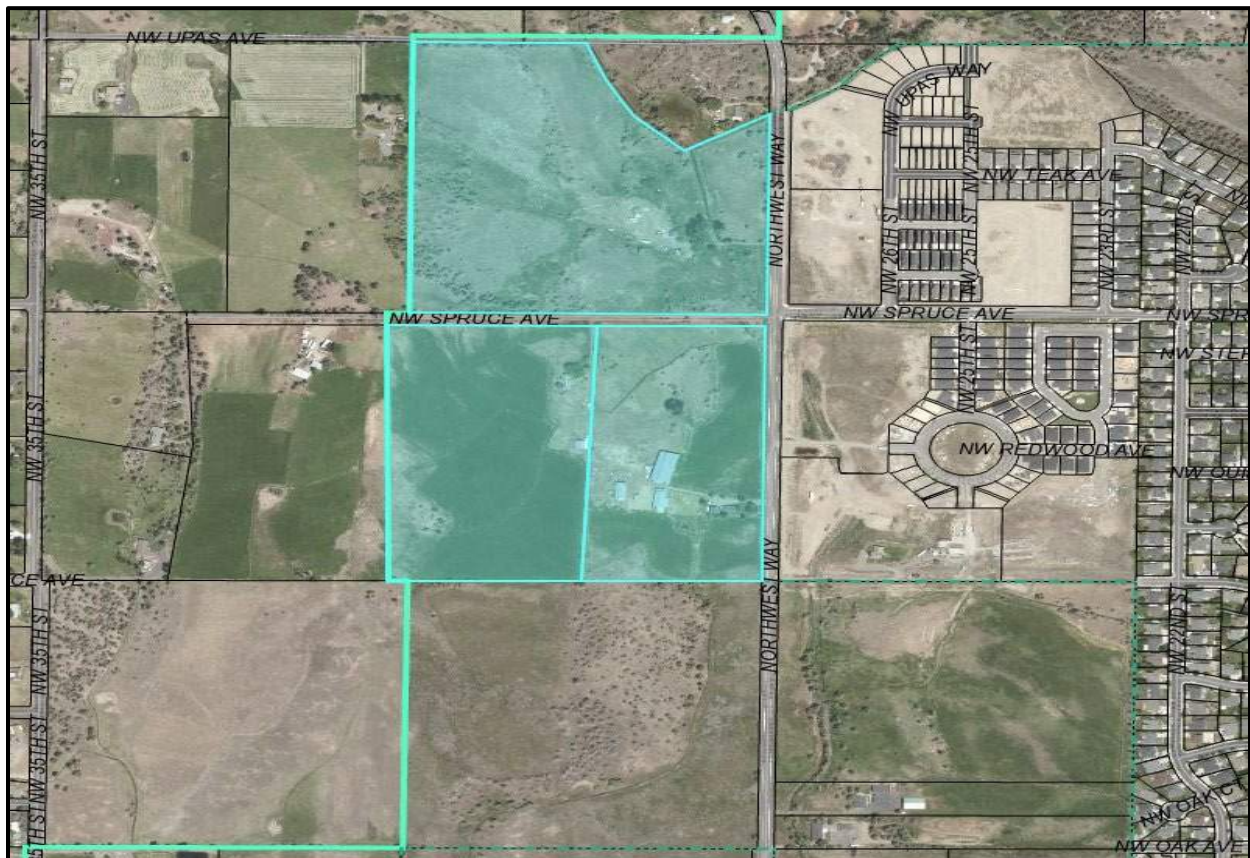


Figure 1 - Vicinity Map

I. BACKGROUND

Site Description:

The project area contains multiple properties that are located in the northwest corner of the Redmond Urban Growth Boundary (UGB), west of Northwest Way, north of the NW Quince Avenue extension, and south of NW Upas Avenue. Located directly east of the project area, across from Northwest Way, is the Dry Canyon Village development. Specifically, the project area involves four properties. They include the entirety of 2917 Northwest Way (a portion of Government Lot 3; taxlot 1513050000600), 2915 Northwest Way (Parcel 1 of Minor Partition 84-5; taxlot 1513050000800), 2902 NW Spruce Avenue (Parcel 1 of Minor Partition 85-12; taxlot 1513050000804), and a small strip of taxlot 1513050000902 (Parcel 2 of Partition Plat 1996-25). In total, the project area is comprised of nearly 78 acres.

The project area is largely undeveloped and consists of a few dwellings and a number of farm buildings. The properties are located outside Redmond city limits and are zoned Urban Holding-10. Being located within the UGB, the properties are located within the Northwest Area Plan (NAP) planning area. In alignment with the NAP, the Comprehensive Plan Map has designated the properties to be rezoned to urban residential zones at time of annexation.

Area Planning:

In 2006, Redmond added more than 2,300 acres of “urbanizable” land along the City’s western and northern boundaries to its Urban Growth Boundary (UGB), including the subject property. At the same time, a Framework Plan was adopted by the City as part of the expanded UGB to provide general guidance for future land uses, densities, neighborhood amenities and the necessary public facilities and services to serve the parcels. The Framework Plan envisioned a number of neighborhood centers distributed throughout the newly urbanized lands. These centers called for high density residential and mixed use, transitioning to lower residential density moving outward and to the periphery.

To provide more specificity to the future land uses, in 2007 the City adopted the Northwest Area Plan (NAP) that encompasses approximately 540 acres. The NAP set forth a land use concept, Comprehensive Plan map designations, and related public facilities for the northwest corner of the UGB. The NAP serves as a quasi-conceptual land use master plan that provides guidance for future urban land uses in the area. As such, the NAP has designated the subject project area as residential, more specifically, R-4 (General Residential) and R-5 (High Density Residential) zoning districts.

Proposal:

The applicant, Hayden Homes, submitted applications for: 1) annexation; 2) an amendment to the City’s Comprehensive Plan and Zone Map; 3) a master development plan; and 4) a tentative subdivision plan. The applicant is proposing to annex three properties and proposes a master development plan that includes an 11-phased subdivision.¹ Proposed are 174 detached single-family lots, 182 townhouse lots, and two development tracts for approximately 100 units of multi-family, totaling approximately 456 dwelling units. Also proposed are over nine acres of open space, inclusive of parks and trails.

A component of the applicant’s proposal is to modify the Comprehensive Plan and Zone Map’s designated zoning district boundaries that are applied to the subject properties once annexed. Specifically, the applicant is proposing to reconfigure 3.6 acres of R-4 and 3.6 acres of R-5 in such a way that both zoning districts will retain the same acreage as established by the Comprehensive Plan and Zone Map. See *Table 1* and *Figures 2* and *3* illustrations below.

¹ Annexation also includes a small strip of land (north 30 feet) being a portion of Parcel 2, Partition Plat No. 1996-25 (taxlot 1513050000902) for the sole purpose of dedicating right-of-way for the southern half of NW Quince Avenue. This will result in a full right-of-way dedication of NW Quince Avenue as part of the proposed Spruce Northwest development.

Table 1 – Proposed Zone Changes			
Zone	Comprehensive Plan Designation	Applicant Proposal	Difference
R-4	~60.6 acres	~60.6 acres	0.00 acres
R-5	~16.9 acres	~16.9 acres	0.00 acres
Comprehensive Plan Designation			
	Taxlot	R-4	R-5
	-00600	28.5 acres	7.7 acres
	-00800	10.4 acres	9.1 acres
	-00804	21.7 acres	0.00 acres
		~60.6 acres	~16.9 acres
Applicant Proposal			
	Taxlot	R-4	R-5
	-00600	26.8 acres	9.4 acres
	-00800	12.6 acres	7.0 acres
	-00804	<u>21.2 acres</u>	<u>0.5 acres</u>
		~60.6 acres	~16.9 acres
Zone Change Summary			
~3.6 acres from R-4 to R-5; ~3.6 acres from R-5 to R-4			

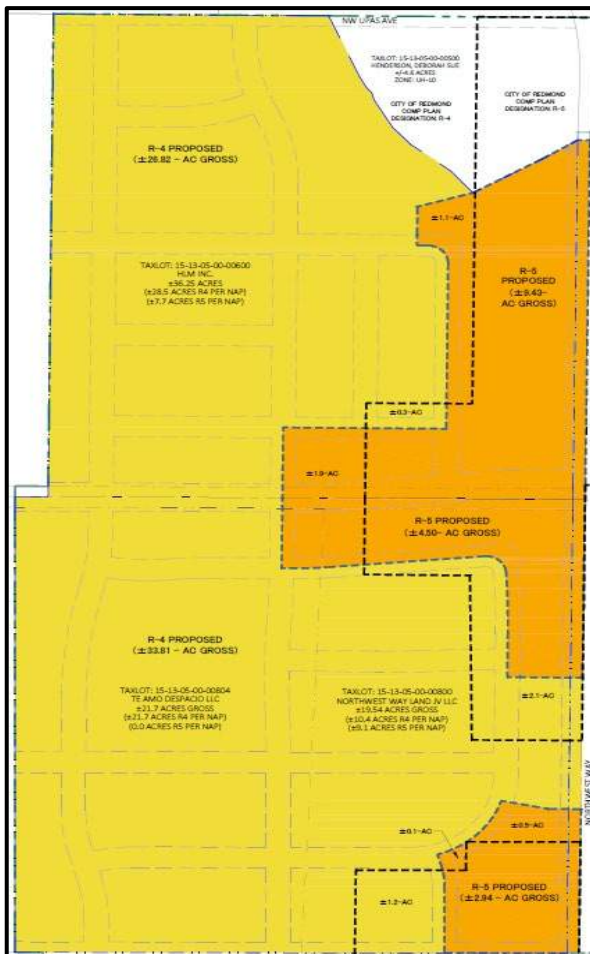


Figure 2 – Proposed Modification to R-4 & R-5 Zones;
Know Ledge Engineering, LLC

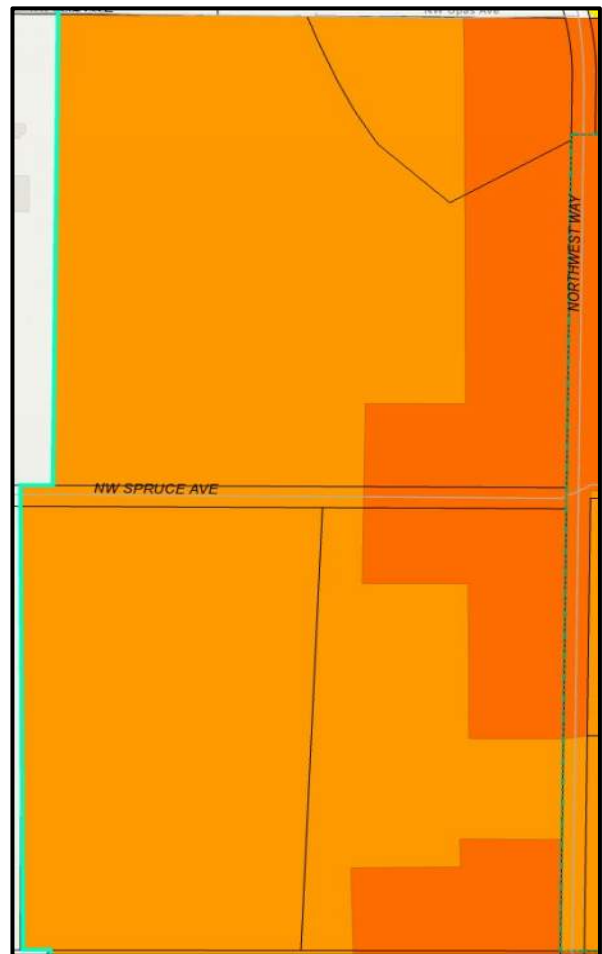


Figure 3 – Comprehensive Plan Designation

Adjacent Zoning & Land Uses:

	Zoning	Land Use
North	Urban Holding (UH-10) & Exclusive Farm Use Tumalo/Redmond/Bend (EFUTRB)	Rural development and farm use on large lots
East	General Residential Zone (R-4) & High Density Residential Zone (R-5)	Residential development and residential development under construction
South	Urban Holding (UH-10)	Rural, undeveloped parcel
West	Exclusive Farm Use Tumalo/Redmond/Bend (EFUTRB)	Rural development and farm use on large lots

Comments:

At the time of the completion of this staff report no written comments were received from the public by the Planning Division concerning this application.

Attachments:

Attachment A – Project Plans (rev. December 1, 2023)²
Attachment B – Applicant Burden of Proof
Attachment C – City Department and Related Agency Comments
Attachment D – Letters Received from the Public
Attachment E – Transportation Impact Analysis
Attachment F – Annexation Agreement

Application Timeline:

The following items are included herein by reference in this land use decision and are located in the record for this matter and are on-file with the Community Development Department, Planning Division:

- Comprehensive Plan Map & Zoning Map Amendment, Master Development Plan, and Tentative Subdivision applications, materials, and all required elements submitted by the applicant on October 2, 2023
- Adjacent property owner notices of received land use applications mailed on October 10, 2023
- Application deemed complete for review on October 12, 2023
- City department and related agency request for comments routed on October 17, 2023
- Notice to Department of Land Conservation and Development (DLCD) posted November 6, 2023
- Adjacent property owner notices of public hearing mailed on November 20, 2023
- Public Hearing Notice published in the *Bend Bulletin* on November 30, 2023
- Final action 120-day deadline (ORS 227.178) is January 30, 2024³

Applicable Criteria:

The following are the applicable sections from the Oregon Revised Statutes, Oregon Administrative Rules, the City of Redmond Urban Area Comprehensive Plan, and the Redmond Development Code:

- City of Redmond Comprehensive Plan 2040
- City of Redmond Framework Plan
- City of Redmond Northwest Area Plan (NAP)
- City of Redmond Transportation System Plan
- City of Redmond Public Facility Master Plans

² Updated plans were submitted to demonstrate compliance with the Zone Boundaries standard (Sec. 8.0080, RDC). See finding on page 6 of this staff report.

³ Final action 120-day deadline does not apply to the Comprehensive Plan & Zone Map amendment request per ORS 227.178(7).

- City of Redmond Park Master Plan
- Oregon Revised Statutes (ORS), Chapters 92 and 197
- Oregon Administrative Rules (OAR), Chapter 660:
 - Division 12, Transportation Planning Rule
 - Division 15, Statewide Planning Goals and Guidelines
- City of Redmond Development Code, Ordinance 2022-09 (City Code, Chapter 8)
 - Article I – Zoning Standards
 - Section 8.0065: Establishment of Zones and Districts
 - Section 8.0080: Zone Boundaries
 - Section 8.0135: Table A, (Residential Zones), Uses Permitted
 - Section 8.0140: Table B, Minimum Standards
 - Section 8.0270: Master Development Plans
 - Section 8.0385: Neighborhood Meeting Requirements
 - Section 8.0760: Criteria for Amendments
 - Article II – Land Use Procedures
 - Article III – Land Division Standards
 - Section 8.2200: Pre-application Meeting
 - Section 8.2202: Neighborhood Meeting
 - Section 8.2220: Phased Development Plan
 - Section 8.2225: Approval of Phased Development Plan
 - Section 8.2230: Development Following Approval
 - Sections 8.2235 & 8.2236: Required Findings for Tentative Subdivision Approval
 - Section 8.2240: Improvement Requirements
 - Section 8.2700: Compliance Required
 - Section 8.2705: Blocks, Lots and Parcels
 - Section 8.2710: Streets
 - Section 8.2715: Fundamental Design Elements
 - Section 8.2720: Grading of Building Sites
 - Section 8.2815: Transportation System Analysis
 - Section 8.2820: Access Management Standards
 - Section 8.2825: Street Dedications

II. FINDINGS & CONCLUSIONS

Findings:

Redmond Development Code (Ordinance 2022-09), Article I – Zoning Standards: Sections 8.0065, 8.0080, 8.0135, 8.0140, 8.0270, 8.0385, and 8.0760; and Article III – Land Division Standards: Sections 8.2200, 8.2202, 8.2220-8.2240, 8.2700-8.2720, and 8.2815-8.2825 set forth the procedure and standards for approval. Staff findings for all applicable standards are presented below.

ARTICLE I – ZONING STANDARDS > INTRODUCTORY PROVISIONS

RDC Sections 8.0065 and 8.0080

8.0065 Establishment of Zones and Districts.

...

R-4 General Residential Zone. To provide medium density residential neighborhoods with a mix of single-family detached residences, middle housing, and a mix of other housing types including multi-family residential development. Limited commercial uses such as offices are also conditionally permitted where compatible with surrounding development.

FINDING: The applicant is proposing to create 174 single-family dwelling lots and 152 townhouse lots in the R-4 zone, which allow for a variety of residential uses.

R-5 High Density Residential Zone. To provide high density residential neighborhoods with an emphasis on multi-family development, middle housing, and smaller lot single family developments. Limited commercial uses such as offices are also conditionally permitted where compatible with surrounding development.

FINDING: The applicant is proposing to create 30 townhouse lots and two development tracts for multi-family complexes totaling approximately 100 units in the R-5 zone, which allow for a variety of residential uses.

8.0080 Zone Boundaries. Unless otherwise specified, Zone Boundaries are section lines, subdivision lines, lot lines, center lines of streets, alleys, canal, or rights-of-way, water courses, ridges or rimrocks, other readily recognizable or identifiable natural features, or such lines extended. Whenever any uncertainty exists as to the boundary of a zone as shown on the Zoning Map or amendment thereto, the following regulations shall control:

- 1. Where a boundary line is indicated as following a street, alley, canal, or right-of-way, it shall be construed as following the center line of such right-of-way.
- 2. Where a boundary line follows or approximately coincides with a section, lot, or property ownership line, it shall be construed as following such line.
- 3. When a lot is divided by a zone boundary and the property owner disputes the location of the boundary, the owner may file a declaratory ruling to determine the exact location of the zone boundary. In this case, the determination shall be made by the Hearings Body, subject to appeal by the City Council.
- 4. Where a public street, alley, canal, or railroad right-of-way is officially vacated, the zoning regulations applicable to abutting property on each side of the center line of such right-of-way is officially vacated, the zoning regulations applicable to abutting property on each side of the center line of such right-of-way on each respective side thereof. If the right-of-way is vacated in total to one property owner, the zoning of that abutting property shall apply to the total vacated property.

FINDING: The applicant is proposing a shift to the subject properties’ Comprehensive Plan-designated zoning district boundaries as well as the creation of lots through subdivision. As such, zoning district boundaries must comply with the above standard. The project’s proposed zoning district boundary lines are either center lines of streets or lot lines.⁴

ARTICLE I – ZONING STANDARDS > RESIDENTIAL USE ZONES
RDC Sections 8.0135 and 8.0140

8.0135 Table A, Residential Zones, Uses Permitted. The following uses are allowed outright or conditionally in each of the Residential zones as follows:

“O” means Permitted Outright
“C” means Permitted Conditionally
“N” means Not Allowed

Residential Uses:	R-1	R-2	R-3	R-4	R-5	RESTRICTIONS AND REQUIREMENTS
Accessory Building:						

⁴ To ensure compliance with this standard, an updated plan set was provided that resulted in a ~0.2-acre increase to the area originally proposed as part of the applicant’s proposed amendment to the Comprehensive Plan and Zone Map. This change has been reflected and accounted for in staff findings herein.

Detached sheds, shops, and garages	O	O	O	O	O	Must be located within the property and not in the yard setback areas. Moveable shipping containers, or similar, are not allowed.
Guest House	O	O	O	O	O	No kitchen; uses main houses' sewer & water
Accessory Dwelling Unit / Accessory Suite	O	O	O	O	O	Uses main houses' sewer & water or individual City Services; may have kitchen
Accessory Use	O	O	O	O	O	Includes Home Occupations
Apartments						See Multi-Family Complex / Dwelling
Bed and Breakfast	C	C	C	C	C	
Boarding or Rooming House	N	N	C	O	O	
Cottage Development	O	O	O	O	O	
Manufactured Home	O	O	O	O	O	See Single Family Detached Dwelling
Manufactured Home Park	N	N	N	O	O	See Section 8.0375
Manufactured Home Subdivision	N	N	O	O	O	Subject to compliance w/ applicable ORS
Multi Family Complex (5 + units)	C	C	C	O	O	
Single Family Detached Dwelling, Duplex, Triplex, Quadplex, Townhouse, Cottage Cluster	O	O	O	O	O	
Nursing, Convalescent, and Assisted Living Facility	N	N	C	C	C	More than 15 people
Planned Unit Development	C	C	C	C	C	
Residential Care Facility	N	N	C	C	O	Defined in and regulated by ORS
Residential Care Home	O	O	O	O	O	Defined in and regulated by ORS
Non Residential Uses:	R-1	R-2	R-3	R-4	R-5	RESTRICTIONS AND REQUIREMENTS
Child Care Facility:						
Child Care Center	C	C	C	C	C	
Child Care Home	O	O	O	O	O	
Church, Religious Institution	C	C	C	C	C	
Community Center (private)	C	C	C	C	C	
Community Pool (private)	C	C	C	C	C	
Farm Use, Farming	O	O	O	O	O	
Mini Storage	N	N	N	N	N	
Multi-Use Trail	O	O	O	O	O	
Park	O	O	O	O	O	
Livestock	O	O	O	O	O	Subject to livestock provisions, section 8.0365
Office	N	N	C	C	C	Conditional in conjunction with a master plan or PUD
Retail	N	N	C	C	C	Conditional in conjunction with a master plan or PUD
School (private)	C	C	C	C	C	
Tennis Court (private)	O	O	O	O	O	Non-commercial use only
Public Facility or Emergency Management Services	C	C	C	C	C	
City Owned Utility Facility	O	O	O	O	O	
Private Utility Facilities	C	C	C	C	C	

All "R" zones are subject to density transfer provisions. See 8.0020, "Definitions," *Density Transfer*, and 8.0367, "OSPR / 'R' Zone Density Transfer Provision

FINDING: The applicant is proposing to create 174 single-family dwelling lots, 182 townhome lots, and two multi-family complex development tracts. These are outright permitted uses in the R-4 and R-5 zones.

8.0140 Table B, Minimum Standards. The following minimum standards apply in each of the Residential zones:

Standard:	R-1	R-2	R-3, R-3A	R-4	R-5
Minimum Lot size - Square Feet					
Single Family, Duplex, Triplex	9,000	9,000	7,500	5,500	5,500
Quadplex, Cottage Clusters	9,000	9,000	7,500	7,000	7,000
Townhouse	1,500	1,500	1,500	1,500	1,500
Multi-family Complex: 5+ units	No Minimum Lot Size Must Meet Density Standards				
Density - Units/Net Acres					
Minimum Density: All	4	4	5	5	8
Maximum Density: Single Family	5	5	5.8	8	8
Maximum Density: Duplex, Triplex, Quadplex, Cottage Cluster	No Maximum Density Must Meet Minimum Lot Size				
Maximum Density: Townhouses	20	20	23.2	25	25
Maximum Density: Multi-family Complex 5+ units	N/A	N/A	N/A	14.5	17.4
Standard:	R-1	R-2	R-3, R-3A	R-4	R-5
Planned Unit Developments (PUDs) and Cottage Developments (COD) densities in Section 8.0275 et seq.					
Minimum Setback Distance - Feet					
Front Façade, excluding garage	10	10	10	10	10
Interior Side	5/10	5/10	5	5	5
Interior side yards must be a minimum of 5 feet on one side and 10 feet on the other side for single family, duplex, triplex, and quadplex residences. Where alley access is provided, both interior side yards may be reduced to 5 feet. Exceptions to the 10-foot setback are allowed (1) when the residential lot was created prior to the adoption of this standard (November 9, 2006); (2) on cul-de-sac lots; or (3) on flag lots.					
Street Side	10	10	10	10	10
Rear	20	20	20	15	5
Attached Garage, access from alley or street	20	20	20	20	20

Setbacks:					
ADUs: Specified in Section 8.0325					
Detached Accessory Structures: Specified in Section 8.0323					
Cottage Clusters: Specified in Section 8.0143					
Cottage Developments: Specified in Section 8.0285 et seq.					
Multi-family Complexes: Specified in Section 8.3035.4E. Table A.					
Townhouses: Specified in Section 8.0142					
Maximum Building Height - Feet	32	32	32	45	45
Minimum Street Frontage - Feet					
Standard Street	50	50	50	50	40
Cul-de-sac	30	30	30	30	30
Flag Lot	20	20	20	20	20
Townhouse	20	20	20	20	20

FINDING: This section presents minimum dimensional and siting specification standards for residential zoning districts. Each applicable standard is addressed below:

Minimum lot size: The applicant is proposing detached single-family lots in the R-4 zone. These lots have a minimum lot size of 5,500 square feet. All proposed detached single-family lots meet the minimum lot size. Also proposed are townhouse lots in the R-4 and R-5 zones. In both zones, the townhouse minimum lot size is 1,500 square feet. All proposed townhouse lots meet the minimum lot size. Lastly, the applicant is proposing two development tracts for multi-family complexes in R-5. While there is no minimum lot size for multi-family complexes, the development must meet density standards.

Density: The applicant is proposing 174 single-family units over 24 net acres, which equates to 7.2 dwelling units per net acre, falling within the minimum and maximum density standard for single-family in R-4. The applicant is proposing 152 townhouse units over 11.42 net acres in R-4, which equates to 13.3 dwelling units per net acre and does not exceed the maximum density standard for townhouses in R-4. The applicant is also proposing 30 townhouse units over two net acres in R-5, which equates to 15 dwelling units per net acre and does not exceed the maximum density standard for townhouses in R-5. Lastly, proposed are approximately 100 multi-family units over 6.12 net acres in R-5, which equates to 16.3 dwelling units per net acre and does not exceed the maximum density standard for multi-family complexes in R-5.

Setbacks and building heights: All proposed lots and development tracts are adequate in size to ensure compliance with applicable setbacks for each residential unit type. Setbacks and building heights will be evaluated on a lot-by-lot basis at time of building permit review.

Minium street frontage: All proposed single-family lots in R-4 meet the minimum street frontage requirement of 50 feet (no cul-de-sac or flag lots are proposed). All proposed townhouse lots in R-4 and R-5 meet the minimum street frontage requirement of 20 feet. Finally, the two development tracts for multi-family complexes meet the minimum street frontage requirement of 40 feet in R-5.

Staff finds that the proposed lots and development tracts comply with the applicable standards of Section 8.0140.

ARTICLE I – ZONING STANDARDS > MASTER DEVELOPMENT PLANS & PLANNED UNIT DEVELOPMENTS
RDC Section 8.0270

8.0270 Master Development Plans. A Master Development Plan is required as a condition of annexation, or after annexation, but prior to or concurrent with rezoning from Urban Holding-10 to other City zoning districts. The specific requirements for a Master Development Plan are:

Section 8.0270(3)(B)(1) provides the review and approval criteria for Master Development Plans:

- A. Whether the proposed Plan is generally consistent with the Framework Plan and is consistent with an adopted Area Plan and Comprehensive Plan in terms of land use, density, transportation systems and networks, adequacy of infrastructure and open space.

FINDING: Staff has examined the applicant's response to this criterion and concurs that the proposed Spruce Northwest master development plan is generally consistent with the Framework Plan, Northwest Area Plan, and Comprehensive Plan in terms of land use, density, transportation systems and networks, adequacy of infrastructure and open space. Each element is addressed below.

Land use: In 2006, Redmond added more than 2,300 acres of "urbanizable" land along the City's western and northern boundaries to its Urban Growth Boundary (UGB), including the subject property. At the same time, a Framework Plan was adopted by the City as part of the expanded UGB to provide general guidance for future land uses. The plan identified much of northwest Redmond to become residential. In 2007, future land uses were further fleshed out for northwest Redmond with the adoption of the Northwest Area Plan. This plan identified the applicant's properties as medium-high and high density residential. These were then formalized with the adoption of the Comprehensive Plan and Zone Map which have designated the subject properties as both R-4 and R-5 zoning. As shown on the applicant's plan set for the proposed master development plan and inclusive of the Comprehensive Plan and Zone Map amendment request, the proposed master development plan retains the R-4 and R-5 zone designations. Furthermore, the mix of housing types the applicant is proposing in each zone is identical to the mix identified in the Northwest Area Plan.

Density: The Framework Plan was intended to be very conceptual and as such did not identify densities for future urban lands. However, the Northwest Area Plan called for a density range of 5.6 to 14 dwelling units per net acre in the R-4 zone and 10 to 24 dwelling units per net acre in the R-5 zone for northwest Redmond. The proposed master development plan will provide 326 units on 35.42 net developable acres in R-4, which calculates to a density of 9.2 units per acre. Approximately 130 units will be provided on 8.12 net developable acres, which calculates to a density of 16 units per acre. Therefore, the proposed master development plan's overall densities per zone conform to the Northwest Area Plan.

Transportation systems and networks: The high-level conceptual Framework Plan identified Northwest Way as a boulevard with east-west "community connections" at NW Spruce Avenue and NW Quince Avenue. The Northwest Area Plan further identified Northwest Way as a primary north-south connection in the area and east-west connections of NW Upas, NW Spruce, and NW Quince avenues to provide connections to existing urban areas to the east. The Transportation System Plan identifies Northwest Way as a minor arterial street and NW Spruce Avenue as a major collector street. The proposed Spruce Northwest development will improve Northwest Way and NW Spruce Avenue to City standards, in conformance with the Transportation System Plan. Additionally, the Transportation System Plan identifies priority multi-use pathways along Northwest Way and NW Spruce Avenue, which are proposed as part of the Spruce Northwest development. Lastly, the proposed master

development plan's proposed transportation system is found to comply with the Comprehensive Plan. As shown on the plan set and as detailed in the land division standards findings in this staff report, the development's transportation network complies with all applicable transportation standards of the Redmond Development Code – the implementing mechanism of the Comprehensive Plan.

Adequacy of infrastructure and open space: The proposed Spruce Northwest master development plan's provision of infrastructure must be consistent with the City's supporting infrastructure master plans of the Comprehensive Plan. The City's Water Master Plan has planned for water needs based upon assumed density in the area for which the proposed development's density is consistent with the Comprehensive Plan. As required and shown on the applicant's plan set, the proposed development will extend the existing water main south within the Northwest Way right-of-way and additional water mains are proposed to be extended throughout the development to serve each lot as well as extending mains to the development's periphery. The City's Wastewater System Master Plan has planned for wastewater needs based upon assumed density in the area for which the proposed development's density is consistent with the Comprehensive Plan. As shown on the applicant's plan set, the sewer main is proposed to be extended in NW Spruce Avenue to Northwest Way. Additionally shown are sewer mains and laterals proposed to be extended throughout the development to serve each lot as well as extending mains to adjacent properties. The proposed public gravity/pressure sewer system and FWSI extension complies with the City's "to and through" Public Facility Requirement and the City's Wastewater System Master Plan standards for complete gravity service to each new lot and adjacent property.

As identified in both the City's Parks Master Plan and Northwest Area Plan, the northwest corner of Redmond had been identified as needing a 3-5-acre neighborhood park. This need was fulfilled with the construction and acquisition of the Spruce Park, located in the Dry Canyon development, east of the proposed Spruce Northwest master development plan. That said, no community or neighborhood parks are identified for the subject properties. However, the applicant has proposed nine acres of open space, inclusive of trails and two parks/open space in the northern and southern portions of the master development plan, which exceed the open space requirements of the Comprehensive Plan's open space Great Neighborhood Principles.

- B. Whether the proposed Plan is generally suitable for the area in which it is proposed, considering existing and planned neighborhoods, shopping and employment areas; and natural resources and hazards.

FINDING: The proposed Spruce Northwest master development plan is generally suitable for the area as it will provide medium-high density residential in the northwest corner of Redmond, as envisioned with both the Framework Plan and Northwest Area Plan. Specifically, the Northwest Area Plan established the desired zones, land uses, and overall suitability for approximately 540 acres of the northwest Redmond area. Elements of the Northwest Area Plan were adopted and incorporated into the Comprehensive Plan and its supporting plans (e.g., Transportation System Plan, Public Facility Plan, Parks Master Plan). Because the proposed master development plan is consistent with the Framework Plan, Northwest Area Plan, and Comprehensive Plan, staff finds the proposal is suitable for the area, and therefore, meets this criterion.

- C. Whether the proposed Plan is functionally integrated with developed or planned areas.

FINDING: The proposed Spruce Northwest master development plan functionally integrates into the vicinity of northwest Redmond. This is demonstrated by the fact that elements of the proposed master development plan such as zoning, land uses, public facilities, and amenities align with the Framework Plan, Northwest Area Plan, and Comprehensive Plan (inclusive of supporting plans such as the Public

Facility Plan, Transportation System Plan, Parks Master Plan) for the area. Said plans are the long-range planning documents that established the vision for how the area would develop.

The proposed master development plan will extend water and sewer and all franchise utilities to and throughout the development. A complete transportation network, inclusive of pedestrian and bicycles, will be provided to and throughout the development. In addition to dedicating required right-of-way for existing streets within and adjacent to the development, the applicant is proposing to annex a strip of land in the northern portion of adjacent taxlot 1513050000902 (Parcel 2 of Partition Plat 1996-25) for the sole purpose of dedicating right-of-way for the southern half of NW Quince Avenue.⁵ This will allow for a full right-of-way dedication of NW Quince Avenue along the proposed development.

D. The proposed Plan meets the applicable Great Neighborhood Principles.

FINDING: Staff has examined the applicant's response for this criterion. Staff concurs with the applicant's responses and believes this criterion can be met through conditions of approval as detailed at the end of this staff report. Compliance with each Great Neighborhood Principle is addressed below.

- a. **Transportation.** Connect people and places through a complete grid street network and trail system that invites walking and bicycling and provides convenient access to parks, schools, neighborhood service centers, and possible future transit stops. Traffic calming techniques and devices may be required to slow vehicles. Curved streets are encouraged to provide interest and variety in neighborhood design. Trails shall be provided to link with existing or planned pedestrian facilities.

FINDING: As shown on the applicant's plan set, the proposed Spruce Northwest master development plan provides for a transportation system that is well connected. In compliance with the Redmond Transportation System Plan and Northwest Area Plan, the proposed master development plan will include right-of-way dedications for NW Upas Avenue, NW Spruce Avenue, NW Quince Avenue, and Northwest Way. Additionally, required improvements will be made to said streets. The east-west avenues of Spruce and Quince will provide for vehicular connectivity to Northwest Way, a minor arterial. Additionally, proposed are local grid and non-grid streets throughout the development that provide for adequate circulation and connectivity. The proposed development also provides for multi-modal transportation by proposing multi-use pathways adjacent to Northwest Way and NW Spruce Avenue, as identified in the Transportation System Plan. As required in the subject properties' annexation agreement, the multi-use pathway paralleling Northwest Way will be meandering within a 30-foot-wide landscaped tract. Lastly, the proposal also provides a multi-use pathway running north-south through the development.

- b. **Housing.** A mix of housing unit types and densities shall be integrated into the design of new neighborhoods consistent with zone requirements unless a variance or other planning permit is approved. Housing developments containing more than five attached units must be designed to be consistent with the Higher Density Multifamily Design Guidelines.

FINDING: The proposed master development plan consists of a mix of housing including 174 detached single-family dwellings, 182 townhouse dwellings, and approximately 100 units of multi-family. As addressed in Section 8.0140 above, the proposed lots and development tracts comply with the zoning requirements of R-4 and R-5. A mix of single-family and townhouses in R-4 and townhouses and multi-family in R-5 is precisely the mix of housing for these two zones the Northwest Area Plan had envisioned. Additionally, with an overall density of 10.47 dwelling units per net acre, the master

⁵ This action is supported by Section 8.0270(3)(A)(2), RDC and Comprehensive Plan Policy 14-1-10.

development plan provides for housing density that is consistent with what the Northwest Area Plan had envisioned.

- c. **Open spaces, greenways, recreation.** All new neighborhoods shall provide useable open spaces with recreation amenities that are integrated to the larger community. Central parks and plazas shall be used to create public gathering places and should be located in or near the center of the project to the extent practicable. New neighborhoods should retain and incorporate significant geological features such as rock outcroppings or stands of clustered native trees into the design and lot layout. Neighborhood and community parks shall be developed in locations consistent with the Redmond's Parks Master Plan.

FINDING: As identified in both the City's Parks Master Plan and Northwest Area Plan, the northwest corner of Redmond had been identified as needing a 3-5-acre neighborhood park. This need was fulfilled with the construction and acquisition of the Spruce Park, located in the Dry Canyon development, east of the proposed Spruce Northwest master development plan. That said, no community or neighborhood parks are identified for the subject properties. However, the applicant has proposed nine acres of open space, inclusive of trails and two parks/open space in the northern and southern portions of the master development plan.

- d. **Integrated design elements.** Streets, civic spaces, signage, and architecture shall be coordinated to establish a coherent and distinct character for the MDP. MDPs may integrate design themes with adjacent developed or planned areas.

FINDING: The applicant has stated that "[...] *Contemporary and Northwest Craftsman architectural styles will be used throughout the development. Colors are planned to be earth tones and sustainable designs will be encouraged. Furthermore, development will encourage the preservation and integration of significant vegetation where practical (to be reviewed with subsequent Subdivision and/or Site Plan review), to maintain views, resources, and sufficient interface to a reasonable extent. The design will coordinate signage, correlating to the architectural theme, and encourage the enhancement of usable areas by extending parks and open spaces and/or providing art. The planned design features will be incorporated into CC&Rs and will be recorded with Subdivisions and/or Site Plan applications, prior to development, which will provide a distinct and coherent character, as required by this section.*"

Compliance with this Great Neighborhood Principle will be evaluated through subsequent review of development (i.e., site & design and building permits) of the proposed master development plan.

- e. **Diverse mix of activities.** A variety of uses are encouraged in order to create vitality and bring many activities of daily living within walking and biking distance or a short drive of homes. Amenities including, but not limited to, trails, recreation areas, and open spaces, shall be constructed before occupancy of any residential unit, unless a phasing plan is approved. Commercial service areas must be supported by a market analysis and phasing program which will be used by the City to determine construction timing.

FINDING: In terms of providing for a diverse mix of activities, the proposed master development plan has been designed such a way to ensure compliance with the Northwest Area Plan. Said plan identified the subject properties as providing medium and high-density residential uses as is proposed. While the NAP did identify the general area for a 3-5-acre neighborhood park, this was fulfilled with the construction and acquisition of Spruce Park in the adjacent Dry Canyon development. However, the proposed master development plan does provide for nine acres of park and open space, which also include multi-use pathways adjacent to and throughout the development. The parks and open space

will provide for recreational opportunities and the multi-use pathways will also provide connectivity directly east into the Dry Canyon development and the Dry Canyon.

- f. **Public art or artistic feature.** Places for the installation of public art or artistic feature is required to provide focal points, preferably, at the gateways to neighborhoods, in and around the center of neighborhoods, or trailheads.

FINDING: The applicant has stated that the proposed master planned development will include entry signage and that park/open space areas could accommodate public artwork if needed. Although potential locations for public art are not shown on the applicant's plan set, the locations and sizes of open space tracts make the incorporation of public art and signage feasible. Public art will be addressed and incorporated into the development during subsequent development review. Finally, as required in the subject properties' annexation agreement, the owner agrees to donate funds to the Redmond Committee for Art in Public Places or install an artistic feature. Public art fee of \$100 per housing unit will be charged and paid in lump sum at the time of any plat approval for the property. Installation of an artistic feature is required to provide focal points, preferably at the gateways to neighborhoods, in and around the center of neighborhoods, or trailheads.

- g. **Scenic views.** Identify and preserve scenic views and corridors of the Cascade Range, Ochoco Mountains, and Smith Rock, such as in street view sheds or park areas. Streets and common, or public, open spaces should be located and oriented to capture and preserve scenic views for the public. Minimize visual clutter from signs and utilities within scenic corridors.

FINDING: The proposed master development plan is designed in such a way that provides for the preservation of views of the Cascade Mountains to the greatest extent possible. The majority of the proposed streets within the development are oriented east-west, thereby providing a view corridor to the west. Additionally, as shown on the plan set, the park in the northern portion of the development is oriented in an east-west manner and thus provides for an additional view corridor to the west.

- h. **Urban – rural interface.** Urban development shall interface with rural areas through landscaped open space buffers at least 100 feet wide and the length of the urban development, excluding public streets, or shall be transitioned from higher density development to lower density development at the urban - rural interface.

FINDING: The proposed master development plan's northern and western boundaries include the UGB boundary. As such, the proposed master development plan must comply with the urban-rural interface Principle. The proposal includes transitioning from the higher density townhouses and multi-family to lower density detached single-family housing on the development's western edge. Specifically, the development's largest lot sizes are located along the western boundary. Along the development's northern border is NW Upas Avenue, in which the right-of-way and future street improvements will have street trees and as shown on the plan set, the proposed lots adjacent to NW Upas Avenue will have a common area tract, acting as a buffer.

- i. **Pocket parks/tot lots.** Fully developed "pocket parks" or "tot lots" shall be incorporated into medium and high density zoned residential subdivisions and site plans. These areas shall be developed for every twenty-five lots/units, a minimum of 3,000 square feet and privately maintained. Examples of amenities include: turf areas, benches, deciduous shade trees, irrigation, shrubs, natural or decorative features, and adequate trash receptable(s) and lighting.

FINDING: The proposed development includes approximately 456 dwelling units, which will require 54,720 square feet (1.26 acres) of pocket parks/tot lots to comply with this Great Neighborhood Principle. The proposed master development plan exceeds this requirement as a 2.3-acre park south of NW Spruce Avenue and approximately 2.7 acres of park space north of NW Spruce Avenue are proposed. Additionally, proposed are non-park open spaces and trails throughout the development.

- j. **Canal trails.** If canals or laterals are present, multi-use trails at least 10 feet wide shall be provided, subject to the Central Oregon Irrigation District's review and approval. Pedestrian amenities such as benches and trash receptacles shall be provided at appropriate locations (e.g., every 500 feet, at trailheads or intersections with public streets).

FINDING: In coordination with the Central Oregon Irrigation District, as part of the proposed Spruce Northwest master development plan, the applicant is proposing to relocate and pipe the existing canals that cross the subject property. As shown on the plan set, along the relocated and piped canals will be multi-use pathways. These connector trails will be at least 10 feet in width. This proposal is consistent with the Northwest Area Plan.

- k. **Green Design.** Energy-efficient design through solar access setbacks, xeriscaping, and planting of drought-resistant trees to minimize water usage and provide shade.

FINDING: Future building and site designs and landscaping plans for the proposed open space tracts will be reviewed for green design elements in subsequent development review.

ARTICLE I – ZONING STANDARDS > SUPPLEMENTARY PROVISIONS

RDC Section 8.0385

8.0385 Neighborhood Meeting.

1. **Purpose and Intent.** The purpose of the neighborhood meeting is to provide a forum for the applicant, surrounding neighbors, and interested members of the community to meet and consider a proposed land use application, and to discuss issues/concerns regarding the proposal prior to application submittal. Neighborhood meetings encourage citizen participation early in the development process, and an opportunity to revise the land use application to address the issues prior to application submittal.
2. **Applicability.** Neighborhood meetings are encouraged prior to submitting any land use application. The following application types or development proposals shall be subject to the neighborhood meeting requirements:
 - A. Master Development Plans.
 - B. Residential or mixed use development proposals that generate 200 or more daily trip ends, or 20 or more p.m. peak hour trip ends, where a Transportation Impact Analysis (TIA) is required.
 - C. Wireless and Broadcast Communications Facilities.
3. **Requirements and Procedures.** The neighborhood meeting must be held after a pre-development meeting with City Staff, but before submittal of a land use application. The applicant shall be required to hold only one meeting prior to submitting an application for a specific site but may hold more if desired. If the development proposal is revised after the neighborhood meeting, and a major modification is requested, a second neighborhood meeting with a new notice shall be required before the revised application is submitted.
 - A. **Location and Time.** Neighborhood meetings shall be held in person at a location in reasonable proximity to the subject site. The meeting shall be held at a location open to the public., City Staff, and at a facility that is ADA accessible. The meeting shall be held

on a weekday evening, or weekends at any reasonable time. Applicants may provide a virtual component for participants to join in the meeting. The virtual component shall not be done in lieu of the in-person requirements. ADA accommodations when requested by attendee must be provided.

- B. **Notice – Mail.** Mailed notice of the meeting shall be provided by the applicant to the neighboring property owners (within 750 feet outside city limits and 250 feet within city limits) and the Community Development Department between ten and 30 calendar days prior to the meeting. Notices must be sent first class and shall include the date, time, and location of the meeting, as well as a brief description of the development proposal and property location. The description shall take into consideration information provided by City staff at the pre-development meeting, include project contact information, a copy of the tax map or a GIS map that clearly identifies the location of the proposed development, and a conceptual site plan.
- C. **Notice – Signage.** The applicant shall also post notice of the neighborhood meeting on the subject site or on an access easement to the site within clear view of a public street at least seven days in advance of the meeting. The sign must display the meeting date, time, and address as well as project contact information.
- D. **Meeting Requirements.** The developer must provide a sign-in sheet for attendees to provide their name, address, telephone number, and email address. At the meeting, the applicant shall provide a conceptual site plan and describe the major elements of the proposal. Depending on the type and scale of the particular application, the applicant should be prepared to discuss proposed land uses and densities; traffic impacts; proposed building size and height; proposed access and parking; and proposed landscaping, buffering and/or protection of natural resources as applicable. Attendees will have an opportunity to speak at the meeting and may identify any issues that they believe should be addressed. If no one arrives within 30 minutes of the scheduled start time for the meeting, the applicant may close the meeting and this requirement will be considered met upon the applicant's submittal of the documentation to that effect.
- E. **Materials Submitted with Application.** The neighborhood meeting notes that identify the major points discussed about the development, list of parties notified, signed affidavits of mailing and posting notices, copies of all materials provided by the applicant, and a signature sheet of attendees shall be included with the development application upon submittal.
- F. **Validity Period.** The land use application shall be submitted to the City within 180 days of the neighborhood meeting. If an application is not submitted in this timeframe, the applicant shall be required to hold a new neighborhood meeting.
- G. **Denial.** Failure of the applicant to hold a neighborhood meeting in accordance with these provisions prior to submittal of a land use application shall result in an incomplete application and the application may be rejected.

FINDING: As this land use proposal includes both a Master Development Plan and development that will generate more than 200 daily trip ends, a neighborhood meeting is required. The applicant held two neighborhood meetings on June 20th and 29th and submitted this land use application package within 180 days of the neighborhood meeting. The applicant has submitted documentation that demonstrates compliance with this standard.

ARTICLE I – ZONING STANDARDS > AMENDMENTS
RDC Sections 8.0750 and 8.0760

8.0750 Authorization to Initiate Amendments. An amendment to the text of this chapter (Redmond Development Code), to the Comprehensive Plan, or an amendment to the Comprehensive Plan Map may be initiated by City Council, Planning Commission, or Community Development Director. A property owner may initiate a request for a map or text amendment by filing an application with the Community Development Department.

FINDING: The applicant has submitted a Comprehensive Plan and Zoning map amendment application with the Community Development Department, requesting an amendment to reconfigure the Comprehensive Plan Map's layout of the R-4 and R-5 zoning districts on the subject properties.

8.0760 Criteria for Amendments. The burden of proof is upon the applicant. The applicant shall show the proposed change is:

1. In conformity with all applicable State statutes;

FINDING: Staff has determined the following State statutes that directly apply to this application include:

ORS 197.610: *Submission of proposed comprehensive plan or land use regulation changes to Department of Land Conservation and Development* – with regard to this statutory noticing requirement, notice of the applicant's proposed amendment to the Comprehensive Plan Map has been provided to the Department of Land Conservation and Development; the public hearings advertised in the local newspaper; and notice mailed to adjoining landowners, as required by the Redmond Development Code and State Statute.

ORS 197.250: *Compliance with Goals Required* – compliance with all applicable Statewide Planning Goals is addressed in criterion #2 below.

ORS 197.797: *Local Quasi-Judicial Land Use Hearings* - the applicable Redmond Development Code standards (sections 8.0750 to 8.0775, *Amendments*, and sections 8.1010 through 8.1035, and 8.1300 through 8.1380, *Land Use Procedures*) were developed in compliance with this statute regarding noticing and public hearings. This proposed amendment is subject to Sections 8.1300 through 8.1380 of the Redmond Development Code, which implement the quasi-judicial Statutory requirements. The Planning Commission and City Council's public hearings and review processes meet the statutory requirements for the purpose of the review.

Based on the above discussion and finding, the applicant's proposed amendment to the Comprehensive Plan Map is determined to comply with the applicable State statutes and therefore complies with criterion #1.

2. In conformity with the State-wide planning goals whenever they are determined to be applicable;

FINDING: Conformance with each State-wide planning goal are addressed below:

Goal 1 – Citizen Involvement - calls for the opportunity for citizens to be involved in all phases of the planning process. The Redmond Urban Area Planning Commission serves as the City's formal citizen advisory commission to fulfill Goal 1 and is made up of Redmond area residents. The applicant's proposed amendment to the Comprehensive Plan Map will be reviewed in public hearings with both the Planning Commission as well as City Council in accordance with the Redmond Development Code

(RDC). Additionally, the RDC required the applicant to conduct a neighborhood meeting prior to submitting their land use application package, which allowed for citizen input very early in the planning process.

Public notices and agendas for Planning Commission and City Council public hearings are provided in accordance with the RDC. All documents are available for public review. The public notice advertising the December 13th public hearing with the Planning Commission was published in the *Bend Bulletin*.

Goal 2 – Land Use Planning – requires establishing a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions. The applicant's proposed amendment to the Comprehensive Plan Map will be reviewed in accordance with the planning processes and policy framework that have been established in the adopted Redmond Development Code.

Goal 3 – Agricultural Lands – is not applicable because there are no agricultural lands in the city limits.

Goal 4 – Forest Lands – is not applicable because there are no forest lands in the city limits.

Goal 5 – Natural Resources, Scenic and Historic Areas, and Open Spaces – is not applicable because the subject properties do not contain any inventoried open spaces, scenic areas, historic resources, or natural resources.

Goal 6 – Air, Water, and Land Resources Quality – is not applicable because the proposed amendment to the Comprehensive Plan and Zone Map has no impact on air, water, or land resources.

Goal 7 – Areas Subject to Natural Hazards – is not applicable because the subject properties are not located within an area of identified natural hazards.

Goal 8 – Recreational Needs – is not applicable because the subject properties are not located within an area identified for recreational use.

Goal 9 – Economic Development – requires the City to plan and zone enough land to meet the community's projected commercial and industrial needs. The City adopted an Economic Opportunities Analysis (EOA) in 2020. This document serves as the City's compliance document under Goal 9, OAR 660-009-0015, and ORS 197.712. Strategies identified in the EOA carried over as economic development goals and policies outlined in Chapter 9 of the City's Comprehensive Plan. The goal is not relevant to the proposed Comprehensive Plan Map amendment because the subject properties do not contain any lands designated for economic or employment purposes.

Goal 10 – Housing – provides for the housing needs of citizens of the state. The City adopted a Housing Needs Analysis (HNA) in 2019. This document serves as the City's compliance document under Goal 10, OAR Chapter 660, Division 008, and ORS 197.296(3). This report concludes that Redmond should plan to accommodate development of 6,963 new dwelling units over the next 20 years in order to house the projected population growth.

The applicant's proposal to reconfigure the subject properties' zoning districts by swapping 3.6 acres of R-4 for R-5 and vice versa does not reduce acreage of either zone or drastically alters zone locations. As such, there will be no impact to housing as the proposed master development plan calls for the precise mix of housing types per zone envisioned in the Northwest Area Plan. Furthermore, the housing types proposed in each zone align well with the HNA's allocation of needed housing by housing type and zone.

Goal 11 – Public Facilities and Services – requires the City to plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development. As growth occurs, frequent updates are made to public facility master plans, pertinent reports, and documents. The applicant's proposed Comprehensive Plan Map amendment does not alter acreages of the subject properties two zoning districts and therefore has no impact on the public facilities and services that have already been planned for in the area with the City's Public Facility Plan.

Goal 12 – Transportation – requires the City to provide and encourage a safe and convenient and economic transportation system. This goal is implemented through the Transportation Planning Rule (TPR) and OAR 660-012-0060 as well as local regulations (i.e., the City's Transportation System Analysis requirement). The applicant's proposed amendment to the Comprehensive Plan Map triggered the TPR and required the applicant's traffic impact analysis determine whether the modification to the subject properties' zoning districts would significantly affect an existing or planned transportation facility. As detailed in the applicant's traffic impact analysis, the zoning modification will not significantly affect any transportation facility and as such, the proposal is consistent with the TPR.

Goal 13 – Energy Conservation – is not applicable because the applicant's proposed amendment to the Comprehensive Plan Map will not have any direct impacts on energy. As the applicant has stated, through the Framework Plan and the Northwest Area Plan, the City has determined how land will be most efficiently used with the R-4 and R-5 residential uses.

Goal 14 – Urbanization – requires the City to provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities. The applicant's proposed amendment slightly modifies the location of the Comprehensive Plan Map's zoning designation, but not the acreage. Additionally, the proposed amendment will not alter the area of the UGB and conforms with the Northwest Area Plan.

Goal 15 – Willamette River Greenway – is not applicable to lands within the city of Redmond.

Goal 16 – Estuarine Resources – is not applicable to lands within the city of Redmond.

Goal 17 – Coastal Shorelands – is not applicable to lands within the city of Redmond.

Goal 18 – Beaches and Dunes – is not applicable to lands within the city of Redmond.

Goal 19 – Ocean Resources – is not applicable to lands within the city of Redmond.

Based on the above discussion and finding, the applicant's proposed amendment to the Comprehensive Plan Map is determined to comply with the statewide planning goals and therefore complies with criterion #2.

3. In conformity with the Redmond Comprehensive Plan, land use requirements and policies; and

FINDING: Staff has examined the applicant's response to this criterion and concurs that the applicant-selected Comprehensive Plan policies are applicable and that the response to each respective policy is sufficient. Staff, therefore, finds that the applicant's proposed amendment to the Comprehensive Plan and Zone Map conforms to the Comprehensive Plan.

4. That there is a change of circumstances, further studies justifying the amendment or mistake in the original zoning.

FINDING: The applicant has provided the following statement explaining the reasoning for the proposed amendment to the Comprehensive Plan Map's zoning designations of the subject properties: *"The reason for the minor 7 acre swap of R-4 and R-5 zoned lands is because Hayden Homes has acquired the land and developed a comprehensive set of plans to implement the NAP, with an established suite of housing products. Given the topography of the site, the necessary street and walkway layouts, the water and sewer design, desired project types, and intent to bring some of the higher density closer to the interior of the site, the proposed design is the best fit for the owner. While the original design (in the Framework Plan and the NAP) was a high level assessment, the current project is more granular and detailed. The process of thoroughly assessing a property and developing it with product types of a particular developer, constitutes a change of circumstances, which is sufficient for compliance with this approval criterion."*

While the proposal relocates some of the higher density closer to the interior of the site, the higher density is largely located in blocks adjacent to NW Spruce Avenue, a major collector street. Staff supports the applicant's rationale for the proposed amendment and believes the change of circumstances is sufficient for compliance with this criterion.

ARTICLE III – LAND DIVISION STANDARDS > SUBDIVISION APPLICATION PROCEDURE *RDC Sections 8.2200, 8.2202, and 8.2220 – 8.2240*

8.2200 Pre-Application Meeting. Prior to submitting a tentative subdivision plat each applicant or their representative is required to meet with the Community Development Director or a designated staff member(s) to review the proposal.

FINDING: A pre-development meeting on the proposed project and numerous subsequent communications with staff have occurred prior to submittal of this land use application package.

8.2202 Neighborhood Meeting. Proof of a neighborhood meeting was conducted for residential or mixed use development proposals that generate 200 or more daily trip ends, or 20 or more p.m. peak hour trip ends, where a Transportation Impact Analysis (TIA) is required. See Section 8.0385 for meeting requirements.

FINDING: See finding for Section 8.0385, Neighborhood Meetings, above.

8.2220 Phased Development Plan. An overall phased development plan shall be submitted for all developments for which phased development is contemplated. The phased development plan shall include but not be limited to, the following elements:

1. Overall development plan, including phase or unit sequence.
 - A. For development that includes a commercial component, a surety may be required when the commercial component is not sequenced in the initial phases.
2. Show compliance with all applicable land division standards and policies as described in this Article.
3. Schedule of improvements initiation and completion.
4. Overall transportation and traffic pattern plan showing compliance with grid street standards, and for land within the North Redmond US 97 Interchange Area Management Plan (IAMP), compliance with the Local Street Connectivity Plan (Comprehensive Plan Addendum Chapter 9 Transportation Element figure 1).
5. General program for phasing timetable projection.
6. Development plans for any common elements or facilities.

7. If the proposed subdivision is believed to have an additional impact upon adjacent lands or lands within the general vicinity, the Hearings Body may require an additional impact analysis for various aspects of the development thought to cause such impacts.
8. Street tree plan.
9. Program for addressing applicable Great Neighborhood Principles in Section 8.0330(3)(C)(13) and adopted Area Plans.

FINDING: The applicant is proposing an 11-phased master development planned subdivision and is entitling the entire project at this time. Shown on the proposed tentative subdivision plan is a phasing summary and timelines in addition to depicting phases on the tentative plan. The first seven phases, scheduled to be final platted by 2028, comprise the eastern half of the proposed development and include gravity sewer to the northwest interceptor. Phases 8-11, projected to be final platted by 2030, will require operation of a sanitary sewer lift station, which is planned to be constructed on the proposed City utility tract, adjacent to NW Spruce Avenue on the far west end of the development.

As stated by the applicant, a concerted effort will be made to record final plats within the allowed durations but with a development of this size, phases could be combined, or the phasing order could be revised. Moreover, the applicant has stated *“The applicant would like to ensure that phasing can change without review by the Planning Commission and/or City Council.”* Any modifications made to an approved land use action will be subject to the Modifications provision of the Redmond Development Code (RDC). Per Section 8.1400(2)(A)(6) of the RDC, any minor alteration to an approved preliminary plat that includes minor amendments to phasing so as long as there would be no adverse effect on the phasing of public improvements, would be processed as a Development Action (i.e., would not entail review by Planning Commission and/or City Council).

8.2225 Approval of Phased Development Plan. The Hearings Body shall review a phased development plan at the same time a tentative plat for the first phase is reviewed. A phased development plan may be approved before the tentative plat for the first phase is submitted. The Hearings Body may approve, modify, or disapprove the phased development plan and shall set forth findings for such decision. The Hearings Body may also attach conditions necessary to bring the plan into compliance with all applicable land use standards and policies. Any tentative plat submitted for the plan area shall conform to the phased development plan unless approved otherwise by the City.

FINDING: The applicant has submitted a tentative plan for a multiple-phased subdivision. As stated in this standard, a phased development plan may be approved before the tentative plan for the first phase is submitted. Tentative plans submitted for each phase shall conform to the proposed tentative plan for the multiple-phased subdivision as included in this land use application package.

8.2230 Development Following Approval. Once a phased development plan is approved by the City, the plan shall be binding, upon both the City and the developer. The Hearings Body may attach conditions to any changes proposed that are deemed necessary to insure compliance with the Comprehensive Plan and implementing regulations. After five (5) years from the date of approval of the plan, the City may initiate a review of the plan for conformance with applicable City regulations. If necessary, the City may require changes in the plan to bring it into conformance with new applicable city regulations.

FINDING: This section is procedural.

8.2235 Required Findings for Tentative Subdivision Approval.

1. The Hearings Body shall approve no application for a subdivision unless the following requirements are met:
 - A. Proposal is in compliance with ORS Chapter 92, the Comprehensive Plan, the Transportation System Plan (TSP), applicable zoning and the applicable Track in Section 8.2236.

FINDING: The proposed master planned subdivision is found to be in compliance with ORS 92, the Comprehensive Plan, the Transportation System Plan, the applicable R-4 and R-5 zoning standards, and with the Track 2 tentative subdivision plan approval criteria (Section 8.2236). This finding is substantiated by way of findings addressing said ORS, plans, standards, and criteria throughout this staff report.

- B. Proposal does not conflict with acquired public access easements within or adjacent to the subdivision.

FINDING: All acquired public access easements (PAEs) are shown on the proposed tentative subdivision plan and do not conflict with the applicant's proposed master planned subdivision. As shown on the plan set for the master development plan and tentative subdivision plan, PAEs are proposed for the proposed multi-use pathway that runs alongside Northwest Way, the multi-use pathway paralleling both sides of NW Spruce Avenue, and for the multi-use pathway paralleling running north-south alongside 30th Street.

- C. Each lot is suited for the use intended or offered.

FINDING: All proposed 356 residential lots and two development tracts are suited for the uses intended. This is ensured by demonstrating by compliance with the residential lot dimensional and siting standards addressed in Section 8.0140 above.

- D. The subdivision will not exceed the operational capacity of public facilities and services as identified in the city's Water and Wastewater Master Plan and the Transportation System Plan, which are required to serve the development, or a determination that sufficient capacity can be provided.

FINDING: As part of this land use application submittal, the applicant was required to submit an Infrastructure Allocation Analysis application to the City to ensure adequate capacity would be available to serve the development. The overall development, inclusive of planned improvements, will provide needed improvements and will ensure that adequate capacity is available to serve the entire master development planned subdivision.

- E. A water rights division plan has been approved by the applicable irrigation district.

FINDING: No water rights division plan has been approved by the Central Oregon Irrigation District. The applicant has stated *"While not finalized at this time, the applicant has been in contact with the Central Oregon Irrigation District. Prior to final plat, the applicant plans to sell and/or transfer all water rights from the subject property, thus a water rights division plan is not applicable."* The applicant shall coordinate with COID – see COID comments in Attachment C for more detail.

- F. The subdivision contributes to orderly development and land use patterns in the area, and provides for the preservation of natural features and resources such as streams, lakes, natural vegetation, special terrain features.

FINDING: This standard is addressed in the Master Development Plan review criteria. The proposed

subdivision tentative plan carries out the proposed Spruce Northwest master development plan and as such is found to contribute to orderly development and land use patterns in the area. There are no unique natural features on the property. This standard is met.

2. Access Management proposals comply with the standards set forth in Section 8.2820 and all other applicable standards.

FINDING: Findings for these standards are presented in Section 8.2820 below.

8.2236 Subdivisions may be created following two tracks: Track 1 (General Criteria) and Track 2 (Clear and Objective Standards)

Track 2 – Subdivision, Tentative Plan Approval Criteria (‘Needed Housing’ & Clear and Objective Standards). The planning division shall approve, approve with conditions, or deny a proposed subdivision. Approval, or approval with conditions, shall be based on compliance with the following criteria:

- A. The applicant has demonstrated that the proposed housing is needed housing as defined by State statutes.

FINDING: The applicant is proposing detached single-family dwellings, townhouses, and multi-family housing. Per ORS 197.303, “needed housing” includes the housing types the applicant has proposed in this master planned subdivision.

- B. The proposed land uses and densities are consistent with the comprehensive plan, in this code, and as refined in any applicable area plan, master plan, or framework plan.

FINDING: The proposed tentative subdivision plan will carry out the proposed Spruce Northwest master development plan, which has demonstrated compliance, in terms of land uses and densities, with the Comprehensive Plan, Framework Plan, and Northwest Area Plan.

- C. The proposed subdivision complies with all of the following, unless specifically exempt from compliance through a code provision applicable to a special area zone or overlay zone. The proposed subdivision will:
 1. Not create risk of fire, flood, geological hazards, or other public health and safety concerns;
 2. Provide adequate transportation systems, water supply, sewage disposal, drainage, and other public utilities consistent with City Standards and Specifications.

FINDING: The proposed tentative subdivision plan will carry out the proposed Spruce Northwest master development plan, which has demonstrated it will provide adequate public utilities that will be consistent with City Standards and Specifications. Moreover, the proposed subdivision will not create risk of fire, flood, geological hazards, or other public health and safety concerns.

- D. The proposed subdivision provides direct bicycle and pedestrian access to any adjacent residential areas, transit stops, neighborhood activity centers, commercial areas, and employment areas.

FINDING: The proposed tentative subdivision plan will carry out the proposed Spruce Northwest master development plan, which has demonstrated compliance with these elements.

- E. The proposed subdivision is designed and sited such so roads, infrastructure, utilities, and future development of proposed lots will minimize impacts to the natural landscape by addressing the following:
1. Tree Preservation. The proposed project shall be designed and sited to preserve trees having the following characteristics:
 - a. Healthy trees that have a reasonable chance of survival considering the base zone or special area zone designation and other applicable approval criteria;
 - b. Trees located within vegetated corridors and stands rather than individual isolated trees subject to windthrow;
 - c. Trees that fulfill a screening function, provide relief from glare, or shade expansive areas of pavement;
 - d. Trees that provide a buffer between potentially incompatible land uses;
 - e. Trees located along the perimeter of the lot(s) and within building setback areas;
 - f. Trees and stands of trees located along ridgelines and within view corridors;
 - g. Trees with significant habitat value;
 - h. Trees adjacent to public parks, open space, and streets.
 - i. Trees along water features.
 - j. Heritage trees.

FINDING: The applicant has stated that the site is sparsely populated with juniper trees and has denoted existing trees on the Existing Conditions Map included in the plan set. The applicant has also stated that existing trees were taken into consideration when planning the design and layout of the proposed master planned subdivision. While existing trees located in right-of-way areas will necessitate removal, the applicant has proposed considering all other trees not located in right-of-way areas at a closer level once final structural designs are established on each lot.

2. Restoration or Replacement.
 - a. For areas not included on the City's acknowledged Goal 5 inventory, the proposal mitigates, to the greatest degree attainable or feasible, the loss of significant natural features described in criteria (a) above, through the restoration or replacement of natural features such as:
 - i. Planting of replacement trees within common areas; or
 - ii. Re-vegetation of slopes, ridgelines, and pedestrian corridors; or
 - iii. Restoration of native plant habitat.
 - b. For areas included on the City's acknowledged Goal 5 inventory, any loss of natural features shall be consistent with the acknowledged level of protection provided for the resource.

Street Trees. If the proposal includes removal of any street tree(s), removal of those street tree(s) has been approved or approved with conditions by the City.

FINDING: To ensure conformance with this standard and Section 8.2715(5), tree preservation shall be evaluated with each individual phase. The subject properties do not contain any City-acknowledged Goal 5 resources; therefore, subsection b. is not applicable.

- F. On any Residential zoned property, if the subdivision results in a lot greater than twice the minimum lot size in the underlying zone, the application shall indicate the location of lot lines and other details of layout that show future division of the lot may be made

without violating the requirements of this code and without interfering with the orderly extension of adjacent streets, bicycle paths, and accessways.

FINDING: Although proposed lots 21 and 41 are greater than twice the minimum lot size for detached single-family lots in R-4, the proposed subdivision carries out the Spruce Northwest Master Development Plan. As such, staff has determined that future land division plans are not needed for lots 21 and 41.

- G. Lot side lines shall run at right angles to the street upon which the lots face, except that on curved streets they shall be radial to the curve.

FINDING: As shown on the tentative subdivision plan, all side lot lines are at or near right angles except side lot lines along curved streets, which are radial to the curve.

- H. There shall be no proposed grading on portions of the development site that meet or exceed 15% slope.

FINDING: No portions of the development site have a slope that is 15% or greater.

- I. The proposed subdivision complies with the Transportation System Analysis review provisions per Section 8.2815.

FINDING: Findings for this standard is presented in Section 8.2815 below.

- J. The proposed subdivision street layout shall disperse motor vehicle traffic onto more than one public local street unless approved by the City Engineer.

FINDING: The proposed subdivision has been designed in such a way that complies with the Redmond Transportation System Plan and disperses motor vehicle traffic onto more than one public local street.

- K. Urban development shall interface with rural areas (rural areas are those that lie within areas outside of the UGB or UAR) through landscaped open space buffers at least 100 feet wide and the length of the urban development, excluding public streets, or shall be transitioned from higher density development to lower density development at the urban - rural interface, or utilize other appropriate and equivalent transitional elements.

FINDING: The proposed master development plan's northern and western boundaries include the UGB boundary. As such, the proposed master development plan must comply with the urban-rural interface Principle. The proposal includes transitioning from the higher density townhouses and multi-family to lower density detached single-family housing on the development's western edge. Specifically, the development's largest lot sizes are located along the western boundary. Along the development's northern border is NW Upas Avenue, in which the right-of-way and future street improvements will have street trees and as shown on the plan set, the proposed lots adjacent to NW Upas Avenue will have a common area tract, acting as a buffer.

- L. Fully developed "pocket parks" or "tot lots" shall be incorporated into medium and high density zoned residential subdivisions and site plans. These areas shall be developed for every twenty-five lots/units, a minimum of 3,000 square feet and privately maintained. Examples of amenities include: turf areas, benches, deciduous shade trees, irrigation, shrubs, natural or decorative features, and adequate trash receptable(s) and lighting.

FINDING: The proposed development includes approximately 456 dwelling units, which will require

54,720 square feet (1.26 acres) of pocket parks/tot lots to comply with this Great Neighborhood Principle. The proposed master development plan exceeds this requirement as a 2.3-acre park south of NW Spruce Avenue and approximately 2.7 acres of park space north of NW Spruce Avenue are proposed. Additionally, proposed are non-park open spaces and trails throughout the development..

- M. No site grading of the site shall occur until the City has approved the subdivision application.

FINDING: No grading has occurred to date and the applicant does not intend on conducting any grading activities until the Tentative Plan is approved.

- O. The proposed subdivision does not contain any Through/Double Frontage lots or parcels.

FINDING: The proposed subdivision does not contain any Through/Double Frontage lots.

8.2240 Improvement Requirements (For Track 1 and Track 2 Subdivisions).

- 1. In the approval of a subdivision, the Community Development Director or Hearings Body shall consider the need for street and other improvements. All streets in new subdivisions, except for private streets, shall be dedicated to the public without reservation or restriction.

FINDING: The proposed subdivision will carry out the transportation plan for the proposed Spruce Northwest master development plan in which all streets will be public and dedicated to the public without reservation or restriction. The proposed streets are proposed to be constructed to City standards and dedicated through the final platting process.

- 2. Private Alley Access. The Community Development Director or Hearings Body may require the applicant to improve a private alley access easement serving two or more lots according to the adopted City of Redmond Public Works Standards and Specifications, as amended.
 - A. Such access easements shall include provisions for permanent, long-term maintenance, including: maintenance measures to be employees; responsible parties; funding; design; timing; and, enforceability. These provisions shall be included as recorded Covenants, Conditions and Restrictions (CCR's) appurtenant to the affected properties.

FINDING: The proposed subdivision includes alleys that will provide access to the proposed townhouses. As outlined in condition of approval #7, these shall be privately owned and maintained and are recommended to be improved to City standards. The applicant intends to record the required CC&Rs with the final plats.

- 3. The subdivider shall record the required (including but not limited to) land division agreement, public improvement agreement, shared access agreement or shared well agreement, as may be applicable, with the Deschutes County Clerks office at the time of recording of the final subdivision plat.

FINDING: The proposed subdivision does not include shared access, shared wells, or other private agreements. Regarding public requirements, the applicant agrees to record a land division agreement and/or public improvement agreement, if required.

- 4. Paved access is guaranteed to each lot.

FINDING: Given that all lots meet minimum street frontage requirements, all lots will be required, and are guaranteed, to have paved access.

5. Each lot is to be connected to the City water and sewer system pursuant to Section 4.007 of the Code of the City of Redmond.

FINDING: As shown on the applicant's plan set, water and sewer mains are proposed to extend throughout the site, consistent with the proposed Spruce Northwest Master Development Plan. Additionally, water and sewer service laterals are proposed to be extended to serve each proposed lot and development tract.

6. All required public utilities are available.

FINDING: As shown on the applicant's plan set, public utilities are proposed to be extended to and throughout the site, serving each lot, consistent with the proposed Spruce Northwest Master Development Plan. As the design provides public utilities to each lot, the proposed subdivision complies with this standard.

ARTICLE III – LAND DIVISION STANDARDS > DESIGN STANDARDS & IMPROVEMENTS *RDC Sections 8.2700 – 8.2720*

8.2700 Compliance Required.

1. Any land division or development shall be in compliance with the design and improvement standards and requirements of this section, and all other applicable provisions, as set forth in this Chapter.

8.2705 Blocks, Lots and Parcels.

1. **Blocks.** The resulting or proposed length, width and shape of blocks shall take into account the requirements for adequate building lot sizes, street widths, access needs and topographical limitations.
 - A. No block shall be more than 660 feet in length between street center lines unless it is adjacent to an arterial street, or unless topography or the location of adjoining streets justifies an exception and is so approved by the reviewing authority. In MUN, MUE and MULW zones, block lengths shall be an average of 330 feet, except where required to meet grid street or access management requirements.

FINDING: No proposed blocks not adjacent to an arterial street are greater than 660 feet in length.

- B. The recommended minimum length of a block along an arterial street is 1,320 feet, except that along such blocks, a public right-of-way for pedestrian and bicycle access shall be dedicated at or nearest the mid-point of the block length as is practical. The right-of-way shall be a minimum of 10 feet wide, with an all weather surface a minimum of 5 feet wide, constructed and centered within the right-of-way.

FINDING: The proposed master planned subdivision abuts Northwest Way, an arterial street, to the east. Proposed along the development's eastern edge are two sizeable development tracts for multi-family housing and two blocks of townhouses. While the development tracts and townhouse blocks are each less than the recommended 1,320 feet in length, they are not adjacent to Northwest Way as they are buffered by common area tracts that provide for the proposed multi-use pathway that runs along the entire eastern edge of the master planned subdivision. Pedestrian and bicycle access will be provided

to the multi-use pathway running alongside Northwest Way via a multi-use pathway proposed along NW Spruce Avenue and a pedestrian corridor located between the two townhouse blocks.

- C. A block shall have sufficient width to provide for 2 tiers of lots unless topography, the location of adjoining streets, or adjacency to an arterial street justifies an exception.

FINDING: The proposed master planned subdivision was designed in such a way to accommodate a major collector street, NW Spruce Avenue, bisecting the development in addition to NW Upas Avenue at the northern boundary and NW Quince Avenue at the southern boundary. The proposed master planned subdivision has been designed to provide for two tiers of lots to a reasonable extent. A single tier of larger single-family lots and lower density on the development's western edge account for the required urban-rural interface standard. Additionally, no proposed single-tiered blocks result in double frontage lots.

- D. Where appropriate at approved cul-de-sacs, dead-end streets, or along blocks approved at more than the maximum block length standard, pedestrian and bicycle access corridors shall be required to be constructed between lots to minimize travel distance between subdivisions, parks, school, and collector or arterial streets. Access corridors shall be located to provide a reasonably direct connection between likely pedestrian destinations and shall be consistent with the City of Redmond Bicycle Refinement Plan where applicable. A reasonably direct connection is a route which minimizes out of direction travel for people likely to use the connection considering terrain, safety, and likely destination. The Community Development Director, or Hearings Body, may determine based on evidence in the record that construction of a separate access corridor is inappropriate or impractical. Such evidence may include but is not limited to:
 - 1. When the nature of abutting existing development makes construction of an access corridor impractical.
 - 2. When the access corridor would cross a natural area with significant natural habitat and construction would be incompatible with protection of natural values.
 - 3. When the access corridor would cross topography where slopes exceed 30% or where path grade would exceed 12% slope; or
 - 4. When a cul-de-sac or dead-end street abuts rural resource land at the urban growth boundary. In industrial zones, this standard may be waived at the discretion of the Community Development Director, or Hearings Body, when it is determined that the City's grid street standards should not be applied to the industrial development.

FINDING: The proposed master planned subdivision does not include any cul-de-sacs, dead-end streets, or blocks longer than the maximum block length standard. Therefore, this standard is not applicable.

- 2. **Lots and Parcels.** The size, width, and orientation of newly created lots and parcels shall be appropriate for the location of the land division and for the type of development and use contemplated. Lots and parcels shall be generally rectangular in shape and shall be consistent with the lot size provisions of the zoning standards and the density requirements as established in the City of Redmond Comprehensive Plan. Notwithstanding these requirements, the following exceptions may apply:
 - A. In areas beyond the City Limits where public sewer is not currently available, minimum lot and parcel sizes shall permit compliance with the requirements of the Department of Environmental Quality and shall be sufficient to permit adequate sewage disposal. Any problems posed by soil structure and water table as related to sewage disposal by septic tank shall be addressed and resolved in the applicant's initial plan.

- B. Where property is zoned and planned for business or industrial use, other widths and areas may be permitted by the Community Development Director, or Hearings Body. Depth and width of properties reserved or laid out for commercial and industrial purposes shall be adequate to provide for the off-street service and parking facilities required by the type of use and development contemplated.
- C. In steep terrain, increased lot or parcel sizes may be required to avoid excessive cuts, fills, and steep driveways.

FINDING: The proposed master planned subdivision includes 356 lots, two development tracts, multiple common open space tracts, and a utility tract. The 356 lots are planned for detached single-family dwellings and townhouses and comply with minimum lot size, density, and street frontage requirements. Additionally, the lots are generally rectangular in shape. The proposed master planned residential subdivision will be located in city limits and the site does not contain any steep terrain; therefore, subsections A., B., and C. of this standard do not apply.

- 3. **Frontage.** Each newly created lot and parcel shall abut upon a public street other than an alley for at least 50 feet (at least 25 feet in Mixed Use zones). Lots fronting on the bulb of a cul-de-sac the minimum frontage shall be 30 feet. Flag lots shall have no less than 20 feet of street frontage measured at the property line. Townhouse frontage shall be at least 20 feet. Vehicular access shall be provided as specified in Section 8.2820, Access Management Standards, of this Chapter, or as specified in Section 8.2705(6) below, for residential lots and parcels abutting collector and arterial streets. All lot and parcels shall be addressed from the primary public street frontage, not including alleys.

FINDING: All proposed single-family dwelling lots abut a public street for at least 50 feet. The proposed subdivision does not include any cul-de-sac lots or flag lots. All proposed townhouse lots have frontage at least 20 feet in length.

- 4. **Side Lot or Parcel Lines.** All side lot lines shall be at right angles to street lines or radial to curved streets wherever practical except as provided for in subsection (10) of this section.

FINDING: As shown on the tentative subdivision plan, all side lot lines are at or near right angles except side lot lines along curved streets, which are radial to the curve.

- 5. **Through/Double Frontage Lots and Parcels.** Through lots or parcels, and lots or parcels with double frontage shall be avoided whenever possible, including lots or parcels created adjacent to Collector and Arterial Streets, but not including alley frontage as described in Section 8.2705(6) below, except when they are necessary due to an irregular parent lot or parcel configuration, or are necessitated by topography or other unique circumstance.

FINDING: The proposed subdivision does not contain any Through/Double Frontage lots.

- 6. **Residential Lots and Parcels Abutting Collector and Arterial Streets.** Lots and parcels created adjacent to Collector and Arterial streets shall be oriented so that the front elevation of the residential development faces the Collector or Arterial Street. Vehicular access shall be provided pursuant to Section 8.2820, Access Management Standards, of this Chapter. In instances where direct vehicular driveway access to lot or parcel from the Collector or Arterial Street is not permissible, alley access shall be provided to the rear of the lot or parcel in accordance with the design standards included in Section 8.2710(3) of this Chapter.

FINDING: As shown on the tentative subdivision plan, the proposed subdivision includes open space buffers along Northwest Way (arterial street) and NW Spruce Avenue (collector street). Therefore, no lots abut an arterial or collector street and no lots will take access from an arterial or collector street.

7. **Corner Lots and Parcels.** Corner lots and parcels shall be 5 feet more in width than other lots and parcels and also shall have sufficient extra width to meet the additional side yard requirements of the zoning district in which they are located.

FINDING: After examining the proposed tentative subdivision plan, all corner lots planned for townhouses are at least 25 feet in width (five feet wider than the minimum 20-foot requirement), and all corner lots planned for detached single-family are at least 55 feet in width (five feet wider than the minimum 50-foot requirement) with exception of lots 148 and 168 where the frontages are less than 55 feet in width. This is due to the curvature of the street and as shown on the plan, the 55-foot width is met throughout the lots beginning at their front setbacks. This standard is met.

8. **Special Building Setback Lines.** If special building setback lines, in addition to those required by the applicable zoning, are to be established in a development, they shall be shown on the final plat of the development and included in the deed restrictions.

FINDING: No special building setback lines are needed or proposed as part of this proposed subdivision.

9. **Large Building Lots; Re-division.** In the case where lots or parcels are of a size and shape that future redivision is possible, the Community Development Director, or Hearings Body, may require that the blocks be of a size and shape so that they may be redivided into building sites, and the development approval and site restrictions may require provision for the extension and opening of streets at intervals which will permit a subsequent redivision of any tract of land into lots or parcels of smaller sizes than originally platted, and in conformance with the density provisions established in the City of Redmond Comprehensive Plan for the existing or intended Zone. A plan indicating the ability for re-division according to these standards may be required as part of the initial land division process.

FINDING: No proposed lots are of a size and shape that future redivision is possible. However, as noted by the applicant, the proposed master planned subdivision includes two large development tracts that are planned for the development of multi-family complexes as an incorporated housing type within the proposed Spruce Northwest master development plan. Therefore, no plan indicating the ability for re-division of the two proposed development tracts is needed.

10. **Solar Access.** As much solar access as feasible shall be provided each lot and parcel in every new subdivision or partition considering topography, development pattern, and existing vegetation. The boundary lines of lots and parcels, as far as feasible, shall be oriented to provide solar access at ground level at the southern building line of the adjoining lot to the north two hours before and after the solar zenith from September 22 to March 21. If it is not feasible to provide solar access to the southern building line the solar access, if feasible, shall be provided at 10 feet above ground level at the southern boundary line two hours before and after the solar zenith from September 22 to March 21, and three hours before and after the solar zenith from March 22 to September 21. This solar access shall be protected by solar height restrictions on burdened properties for the benefit of lots receiving the solar access pursuant to Section 8.0370, of the City of Redmond Development Code, Solar Access Standards. If the solar access for any lot, either at the southern building line or at 10 feet above the southern building line, is not feasible, supporting information may be required with the application.

FINDING: As shown on the plan set, the majority of the lots of the proposed subdivision have the longest dimension in a north-south orientation, which provides opportunities for as much solar access as possible.

11. **Curvilinear Street and Block Design.** Although a basic grid street design with minimum and maximum block lengths are requirements of this section, a curvilinear street/block design is encouraged for the purpose of adding interest to new subdivision development.

FINDING: This standard is not a requirement. However, as shown on the proposed tentative subdivision plan, the applicant has incorporated curvilinear streets throughout the development.

12. **Flag Lots.** A flag lot shall be considered as a “flag lot” if the pole of the flag lot is less than half the width of the average lot width. For flag lots, the following shall be required:
- A. Flag poles shall be no less than 20’ wide. Flag lot frontage can be reduced by approval from Redmond Fire & Rescue and City Engineer.
 - B. All zone regulations apply, including the minimum required lot size and setbacks unless setback reductions are allowed as described in (E).
 - C. Each flag lot shall contain a minimum 16’ wide paved driveway.
 - D. A flag lot is exempt from the 50-foot street frontage requirement; however, a minimum of 20 feet of street frontage is required.
 - E. Front and/or rear yard setbacks may be reduced to no less than 10’ subject to review and approval by the Community Development Director. The orientation of any structure (determination of front) may be suggested by the property owner and is subject to the review and approval of the Community Development Director, or designee. The location(s) of all structures immediately adjacent to any flag lot shall be shown on a site plan (1) during planning review and during the act of creating any new flag lot, and (2) during a building permit review for any structure built on a flag lot.
 - F. No flag lot shall be partitioned or further divided, except as provided for by middle housing.
 - G. The “pole” of the flag lot shall be no longer than 150’ measured from the street intersection to the beginning of the base of the flag.
 - H. The “pole” of the flag shall not be included in the minimum lot size calculation.
 - I. Flag lots shall be exempt from street tree requirements unless the street frontage portion of the flag lot is 30’ or greater.
 - J. Flag lots are prohibited along or abutting the Dry Canyon Rim.
 - K. Two off-street parking spaces shall be provided for single family detached dwellings; and one space per unit for middle housing on a flag lot.

FINDING: The proposed subdivision does not include any flag lots.

8.2710 Streets.

1. **General.** Streets shall be in conformance with the City of Redmond Transportation System Plan as specified herein.
- A. Except along Arterial Street, public streets shall be spaced a maximum of 660 feet between centerlines. The purpose is to provide a street grid pattern of through streets to facilitate traffic movement. Street designs shall conform to topography and other existing natural and man-made conditions. Illustrative examples of other conditions include the dry canyon, main COI canal, Highway 97, and the Burlington Northern Railroad tracks.

FINDING: As shown on the proposed tentative subdivision plan, all public streets are spaced no greater than 660 feet between centerlines. The only exceptions are the two connections to Northwest Way, an arterial street. This standard is met.

- B. All proposed streets, sidewalks, bike lanes and pedestrian pathways shall connect to other streets, sidewalks bike lanes and pedestrian pathways within a development and to existing and planned streets, sidewalks, bike lanes and pedestrian pathways outside the development. Such facilities shall serve existing and planned parks, schools, or other public lands within a neighborhood.

FINDING: The plan set for the proposed Spruce Northwest master development plan and tentative subdivision plan illustrate complete connectivity of streets, sidewalks, bicycle lanes, and pedestrian pathways throughout the development and provides connections to outside the development. The proposed development's multi-use pathways provide connectivity to parks within the development and will connect to existing trails to the east that provide connectivity to Spruce Park and the Dry Canyon. In summary, the proposed master planned subdivision's transportation network conforms with the transportation elements of the Transportation System Plan and Northwest Area Plan.

- C. To the maximum extent possible, new local streets shall align and connect with existing local streets and collectors, and in certain special cases arterial streets. Cul-de-sac streets shall be permitted only where no feasible connection with an adjacent street exists, or if the local street connection would be to an arterial street and the function of the arterial street may be diminished as determined through the land use review process, or the block length would be less than that which is permitted by Section 8.2705(1)(B).

FINDING: As shown on the proposed tentative subdivision plan, all planned local streets connect to the existing streets – NW Upas Avenue to the north, NW Spruce Avenue that bisects the development, and NW Quince Avenue to the south. Additionally, two east-west proposed local streets have been planned in locations that will allow for their extensions west into future adjacent development. Lastly, no cul-de-sac streets are proposed for Spruce Northwest.

- D. Consideration should be given to alternative street designs other than required herein in the City's non-residential land use zones to allow for more effective developments. Such designs may be considered and approved during the subdivision or partition process without need for variance.

FINDING: The applicant is has not proposed alternative street designs nor is the subject properties zoned non-residential. This standard is not applicable.

- E. All proposed or required streets and alleys shall comply with Section 8.2820 Access Management Standards, the Transportation System Plan, and with Local Street Connectivity Plans adopted as part of the transportation element of the Comprehensive Plan.

FINDING: Findings for these standards are presented in Section 8.2820 below.

- 2. **Existing Streets.** Whenever existing streets, adjacent to or within a tract, are of inadequate width per City of Redmond Standards and Specifications and the City's approved Transportation System Plan additional right-of-way shall be provided at the time of the land division by the applicant. During consideration of the tentative plat for the subdivision or partition, the Hearings Body shall determine whether the improvements to existing streets, adjacent to or within the tract,

are required. If so determined, such improvements shall be required as a condition of approval of the tentative plat. Improvements to adjacent streets shall be required where traffic on said streets shall be directly affected by the proposed subdivision. Notwithstanding these provisions, off-site improvements to streets not within or adjacent to the development may be required when impacts resulting from the development necessitate such improvements as demonstrated through a transportation impact analysis.

FINDING: Existing streets adjacent to or within the proposed development site include Northwest Way to the east, NW Upas Avenue to the north, and bisecting the site is NW Spruce Avenue. All three streets will require right-of-way dedications and improvements to bring the streets up to City standards to conform with the Redmond Transportation System Plan. Refer to condition of approval #7 for complete details on right-of-way dedication and improvements to existing streets.

3. **Minimum Right-of-Way and Roadway Width.** The street right-of-way and roadway surfacing widths shall be in conformance with the standards as specified in Table 1 below:

Table 1 - City of Redmond Right of Way and Roadway Design and Cross-Section Standards

Functional Class	Width (ft)			Travel Lanes	Sidewalks	Bike Lanes**	Parking**
	Pavement Standard	Pavement (minimum)	Right-of-Way				
Residential Alley	16 ft		20 ft	n/a	none	shared	none
Commercial Alley	20 ft		20 ft	n/a	none	shared	none
Local Residential *****	36 ft		60 ft	2***	5 ft	shared	both sides (unstriped)
Parking One Side	28 ft*		60 ft	2***	5 ft	shared	one side (unstriped)
No Parking	24 ft*		60 ft	2***	5 ft	shared	none
Local Industrial	40 ft	38 ft	60 ft	2***	5 ft	shared	optional (unstriped)
Industrial Collector	40 ft	38 ft	80 ft	2	5 ft	6 ft	none
Minor Collector	40 ft	36 ft****	60 ft	2	5 ft	shared	both sides (8 ft)
Major Collector	36-50 ft	36 ft****	80 ft	2	5 ft	6 ft	none
Minor Arterial (3-lane)	50 ft	48 ft	100 ft	3	7 ft	6 ft	none
Minor Arterial (5-lane)	74 ft	72 ft	100 ft	5	7 ft	6 ft	none
Notes:							
*May be constructed only in conjunction with the creation of covenants, conditions, and restrictions (CCR's) and the establishment of a homeowners association (HOA) for the development. The CCR's shall provide that the primary responsibility for parking enforcement shall be the HOA, with the City of Redmond also being acknowledged in the CCR's as a beneficiary for such parking enforcement as a violation of the land use decision and/or city code.							
**In certain cases, bike lanes may be reduced to 5 ft, parking may be reduced to 7 ft, and travel lanes to 11 ft at the discretion of the City Engineer.							
***Unstriped travel lanes							
****36 ft in existing built-out areas							
*****All streets less than 28 feet wide shall be no longer than 300 feet in length, unless such streets include at least one (1) parking bay per lot, located along each lot frontage for the entire length of such street, up to the maximum block length. Streets 300 feet or less in length shall not have any direct driveway access. In no case shall any street less than 28 feet wide intersect with any other street less than 28 feet wide.							

FINDING: The proposed master development planned subdivision includes improvements to existing streets and the development of multiple roadway types. Development and improvements include residential alleys, local non-grid streets, local grid streets, a major collector, and a minor arterial.

Improvements to and development of all streets must conform to this standard and condition of approval #7.

4. **Future Extension of Streets.** When necessary to give access to or permit a satisfactory future division of adjoining land, streets shall be extended to the boundary of the subdivision or partition and the resulting dead-end streets may be approved without a permanent turn around if they are 150 feet or less in length, although, an adequate temporary turn around to ensure emergency vehicle access must be provided if such streets are greater than 150 feet in length.

FINDING: When built-out, the proposed master development planned subdivision will extend three new streets to the development's western property line. As shown on the plan set, neither of these will result in dead-ends less than 150 feet in length; therefore, it is not anticipated that permanent turnarounds will be needed. As designed, the proposal allows for the street system to continue in a logical manner and it will also ensure fire trucks and safety vehicles can adequately and safely maneuver the site.

5. **Collector and Arterial Street Access.** Notwithstanding the provisions of Section 8.2705 of this Chapter, if a land division abuts or contains an existing or proposed collector or arterial street, the Community Development Director, or Hearings Body, may require other treatments, including but not limited to frontage roads, necessary for adequate protection of residential properties and to afford separation of through and local traffic. Provision may be made for emergency access. All frontage roads shall comply with the City of Redmond Transportation System Plan.

FINDING: Abutting the proposed development is Northwest Way, an arterial street, and bisecting the development is NW Spruce Avenue, a collector street. As shown on the plan set, the proposed master development planned subdivision has been designed in such a way that no lots or development tracts directly abut either Northwest Way or NW Spruce Avenue. Proposed residential development will be buffered by open space tracts, and such there will be no direct access to these streets. No frontage roads or other treatments are necessary.

6. **Streets Adjacent to Railroads, Freeways and Parkways.** When the area to be subdivided or partitioned is residentially zoned and abuts a railroad, freeway, or parkway, a provision may be required for a street approximately parallel to and on each side of such right-of-way at a distance suitable for use of the land between the street and railroad, freeway or parkway. In the case of a railroad, there shall be a land strip of not less than 25 feet in width adjacent and along the railroad right-of-way for screen planting between the railroad right-of-way and residential property. If the intervening property between such parallel streets and a freeway or a parkway is less than 80 feet in width, such intervening property shall be dedicated to park or thoroughfare use. The intersections of such parallel streets, where they intersect with streets that cross a railroad, shall be determined with due consideration as cross streets of a minimum distance required for approach grades to a future grade separation and right-of-way widths of the cross street.

FINDING: The subject properties are not adjacent to a railroad, freeway, or parkway; therefore, this standard is not applicable.

7. **Continuation of Streets.** Subdivision or partition streets which constitute the continuation of streets in contiguous territory shall be aligned so that their center lines coincide. Where straight line continuations are not possible, such center lines shall be continued as curves. These streets or the continuation of streets in contiguous territory may be required by the Community Development Director, or Hearings Body, where such continuation is necessary to maintain the function of the street or desirable in the surrounding area. Where solar orientation would not be possible if the street area continued, a new pattern may be started that is solar oriented.

FINDING: This standard is applicable to the continuation of existing NW Spruce Avenue and NW Upas Avenue. As shown on the plan set, NW Spruce Avenue is proposed to be aligned in such a way that its center line at the street's eastern terminus will align with the center line of NW Spruce Avenue directly across from Northwest Way (i.e., NW Spruce Avenue's western terminus in Dry Canyon Village development). Regarding NW Upas Avenue, the applicant is proposing a fee in lieu of required improvements to NW Upas Avenue given that the adjacent properties to the north are outside the UGB and thus it will be some time before those properties develop and provide the necessary right-of-way dedication and improvements to the northern half of NW Upas Avenue.

8. **Lot Layout.** Local residential streets should be oriented on an east/west axis to the greatest possible extent to insure solar access for lots within the subdivision or partition.

FINDING: As shown on the proposed Spruce Northwest master development plan, the majority of the planned local streets are oriented on an east-west axis and therefore allows for the greatest amount of solar access possible.

9. **Street Names.** Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street in a nearby city or in the county. Street names and numbers shall conform to the established pattern in the City, including the continuation of street names across intersecting streets, and shall be subject to the approval of the Fire Department or the responsible agency.

FINDING: As shown on the proposed tentative subdivision plan and as stated by the applicant, absent existing streets, all proposed streets are only generally referred to. Street names will be finalized prior to final platting of each phase and names will be subject to the approval of Redmond Fire and Rescue and Deschutes County.

10. **Sidewalks.** Sidewalks are required to be installed on both sides of a public street and in any special pedestrian way within the subdivision or partition except that in the case of collectors, arterials, special industrial districts or in steep terrain, the Hearings Body may approve a subdivision or partition without sidewalk if alternative pedestrian routes are available or provided by the developer. Sidewalks shall be required along routes to existing or future school and park sites.

FINDING: Consistent with the proposed Spruce Northwest master plan and as shown on the plan set, sidewalks are proposed along both sides of all new streets that are internal to the development. Perimeter streets are planned for improvements, including installation of sidewalks, on the side of the street abutting the Spruce Northwest development. The opposite side of perimeter streets will be improved with development on the neighboring properties.

11. **Bicycle Routes.** If appropriate to the extension of a system of bicycle routes, existing or planned pursuant to the City of Redmond Bicycle Refinement Plan, the Community Development Director or the Hearings Body may require the installation of separate bicycle lanes within streets and/or separate bicycle paths.

FINDING: Consistent with the Redmond Transportation System Plan and Northwest Area Plan, the plan set for the proposed Spruce Northwest master development plan identifies bicycle lanes planned along Northwest Way and NW Spruce Avenue.

12. **Intersection Angles.** Street intersections shall be as near right angles as possible except where topography or existing conditions requires a lesser angle, but in no case shall the acute angle be

less than as permitted by the adopted City of Redmond Public Works Standards and Specifications.

FINDING: As shown on the proposed tentative subdivision plan, all proposed intersections are at or near right angles.

13. **Alignment.** Staggered street alignment shall whenever possible, leave a minimum of 200 feet distance between the center line of the streets, but in no case be less than as permitted by Standards and Specifications.

FINDING: The proposal is consistent with the Spruce Northwest master development plan and all street intersections are separated by over 200 feet.

14. **Narrow Streets.** Local residential grid streets designed at widths less than 36 feet as described in Section 8.2710(3)(Table 1), shall be permitted when the subdivision design is found to be in compliance with the following:
 - A. Narrow streets may only be permitted for continuous full-length blocks internal to a Subdivision or Planned Unit Development with street connections at both ends.
 - B. Lots adjoining the narrow streets shall be a minimum of 5000 square feet and have a street minimum 50 feet of frontage.
 - C. Sidewalks shall be separated from the curb by a landscape strip with street trees conforming with Public Works Standards and Specifications.
 - D. Curb cuts along the narrow street shall not be less than the minimum width required within the adopted City of Redmond Public Works Standards and Specifications.

FINDING: As shown on the plan set for the Spruce Northwest master development plan, all proposed local residential grid streets will have surface widths of at least 36 feet and therefore are not considered narrow streets as defined in this standard. Shown on the plan set are local residential non-grid streets, which have surface widths of 36 feet or less. This standard is not applicable to the proposed development.

8.2715 Fundamental Design Elements.

1. **Lighting.** The subdivider or partitioner shall provide underground wiring to the City standards and a base for any proposed ornamental streetlights at locations approved by the affected utility company.

FINDING: The applicant will provide underground wiring to City standards.

2. **Multiple Access Points.** Whenever possible, a minimum of two points of access to the subdivision or partition shall be provided to provide assured access for emergency vehicles and ease resident evacuation.

FINDING: Consistent with the proposed Spruce Northwest master development plan and shown on the tentative subdivision plan, at full build-out, three access points to the development will be provided via NW Quince Avenue and two access points to Northwest Way. Although two access points to NW Upas Avenue are shown on the plans, these access points will be closed with an emergency fire gate until such time the adjacent properties to the north annex and right-of-way of the north half of NW Upas Avenue is dedicated and improved.

3. **Water/Sewer.** All subdivisions and partitions shall provide water and sewer lines constructed to City standards and specifications approved by the City Engineer. All lots or parcels shall be served from the City of Redmond water and sewer systems or by water and sewer systems acceptable to the City. Water and sewer mains and service lines shall be installed prior to the curbing and paving of new streets in all new subdivisions or partitions.

FINDING: As shown on the plan set for the proposed Spruce Northwest master development plan, water and sewer mainlines will be extended to serve the entire master planned subdivision. Additionally, water and sewer laterals will be extended to each of the proposed lots. Extensions will be constructed in conformance with City Standards and will be reviewed by the City Public Works Department prior to construction.

4. **Underground Utilities.** All permanent utility service, cell service, and minor power transmission lines that are within or immediately adjacent to lots in a subdivision or parcels in a partition shall be provided from underground facilities unless otherwise approved by the Community Development Director, or designee, or Hearings Body. The subdivider, partitioner, or developer shall be responsible for complying with requirements of this section and shall:
 - A. Obtain a permit from Public Works for placement for all underground utilities within the public right-of-way.
 - B. Make all necessary arrangements with the utility companies and other persons or corporations affected by the installation of such underground utilities and facilities in accordance with rules and regulations of the Public Utility Commission of the State of Oregon.
 - C. All underground utilities, water lines, sanitary sewer lines and storm drains installed in streets shall be constructed prior to the surfacing of such streets to the extent practicable, and water and sanitary sewer service lines shall be placed to such lengths as will negate the necessity for disturbing the street improvements when service connections are made.

FINDING: All new utility extensions are proposed to be located underground. The applicant has stated that coordination with all utility providers has occurred and providers have indicated willingness to serve the proposed development.

5. **Preservation of Natural Features.** Existing trees, vegetation, and natural features (i.e., rock outcrops) add character to the development and shall be preserved to the greatest extent practicable. All trees over 8 inches d.b.h. shall be noted and shown on the tentative plat.

FINDING: The applicant has provided an Existing Conditions Map that identifies existing trees but does not specify d.b.h. The applicant has stated *"Grading activities will occur with each phase and grading will only occur in areas that is need for roads, building locations, parking, pedestrian routes, and accessibility requirements, which will allow for preservation [sic] the existing trees to the greatest extent practical, given the need for housing. The need for removal of trees on individual lots will be considered when specific buildings are planned on the lots."* To ensure conformance with this standard and Section 8.2236(2)(E), tree preservation shall be evaluated with each individual phase.

6. **Scenic Views.** Significant views shall be taken into consideration during subdivision design. The establishment of view corridors, building envelopes, building height restrictions or similar methods shall be employed for the retention and protection of views from individual lots and from public spaces to the greatest degree practicable as determined through the land use review process. Such measures shall be shown on the final plat and included in the deed restrictions.

FINDING: The subject properties do not contain any adopted view corridors or view restrictions. However, the proposed master planned subdivision is designed in such a way that provides for the preservation of views of the Cascade Mountains to the greatest extent possible. The majority of the proposed streets within the development are oriented east-west, thereby providing a view corridor to the west. Additionally, as shown on the plan set, the park in the northern portion of the development is oriented in an east-west manner and thus provides for an additional view corridor to the west.

7. Land for Public Purposes.

- A. If the City has an interest in acquiring a portion of a proposed development for a public purpose, it shall notify the property owner as soon as the City Council authorizes the transaction to proceed.
- B. Within a development, or adjacent to a development in contiguous property owned by the developer, a parcel of land of not more than 5% of the gross area of the development may be required to be set aside and dedicated to the public for parks and recreation purposes by the developer. The parcel of land, if required, shall be determined to be suitable for the park and/or recreation purpose(s) intended, and the city may require the development of the land for the park or recreation use intended or identified as a need within the community.
- C. In the event no such area is available that is found to be suitable for parks and/or recreation uses, the developer may be required, in lieu of setting aside land to pay to the appropriate parks and recreation agency a sum of money equal to the market value of the area required for dedication, plus the additional funds necessary for the development thereof if so required; if such is required, the money may only be utilized for capital improvements by the appropriate parks and recreation agency.
- D. The foregoing land and development or money dedication (if require) may be provided for in lieu of an equal value of systems development charge assessment for parks if so, approved by the collecting agency in accordance with the applicable provisions of the system development charge ordinance. If the collecting agency will not permit the land or money dedication in lieu of an applicable systems development charge, then the land and development or money dedication shall not be required.
- E. If the nature and design, or approval, of a development is such that over 30% of the tract of land to be developed is dedicated to public uses such as streets, water or sewer system facilities and the like, then the requirements of this subsection shall be reduced so that the total obligation of the developer to the public does not exceed 30%.

FINDING: The City has not identified the subject properties for a public purpose; therefore, this standard is not applicable.

8. Easements.

- A. **Utility Easements.** Easements shall be provided along property lines when necessary for the placement of underground utilities and to provide the subdivision or partition with electric power, communication facilities, street lighting, sewer lines, water lines, gas lines, or drainage. Such easements shall be labeled "Public Utility Easement" on the tentative and final plat; they shall be at least 12 feet in width and centered on lot lines where possible, unless determined otherwise by the City Engineer or designate. Excepting utility pole guylines easements along the rear of lots adjacent to unsubdivided land may be reduced to 10 feet in width, unless determined otherwise by the City Engineer or designate.

FINDING: Required Public Utility Easements are not depicted on the applicant's proposed tentative subdivision plan. Refer to condition of approval #7.

- B. **Drainage.** If a tract is traversed by a water course, such as a drainage way, channel or stream, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of the water course or in such further width as will be adequate for the purpose. Streets or parkways parallel to major water courses and drainage ways may be required.

FINDING: One of the subject properties is traversed by Central Oregon Irrigation District (COID) canals and easements. In coordination with COID, the applicant is proposing to relocate and pipe the canals across the subject property and establish a required easement. The location of the proposed COID canal pipe is shown on the master development plan set. The applicant shall coordinate with COID – see COID comments in Attachment C for more detail.

9. Fully developed “pocket parks” or “tot lots” shall be incorporated into medium and high density zoned residential subdivisions and site plans. These areas shall be developed for every twenty-five lots/units, a minimum of 3,000 square feet and privately maintained. Park amenities shall, at a minimum, include: one half of the park dedicated to turf areas, benches, trees, shrubs, ground cover, irrigation, other landscape or decorative features, and acceptable trash receptable(s) and lighting.

FINDING: The proposed development includes approximately 456 dwelling units, which will require 54,720 square feet (1.26 acres) of pocket parks/tot lots to comply with this Great Neighborhood Principle. The proposed master development plan exceeds this requirement as a 2.3-acre park south of NW Spruce Avenue and approximately 2.7 acres of park space north of NW Spruce Avenue are proposed. Additionally, proposed are non-park open spaces and trails throughout the development.

8.2720 Grading of Building Sites. Grading of building sites shall conform to the following standards unless physical conditions demonstrate the propriety of other standards:

1. Slopes shall be less than or equal to 3 to 1 (horizontal to vertical) unless slope reinforcement and low maintenance surfaces are provided. Cut slopes as steep as 1 to 1 are permitted in native rock material if that material is suitable to stand at the slope without raveling. Toe of full slopes steeper than 3 to 1 and top of cut slope shall be no closer than 2 feet from the property line.
2. Structural engineering must be provided for retaining walls higher than four feet from the base of the footing to the top of the retaining portion of the wall and for retaining walls of any height that support a surcharge such as a structure, roadway or slope greater than 4 to 1.
3. Stormwater must be controlled in accordance with the City of Redmond Public Works Standards and Specifications to avoid erosion and impacts to adjacent property.
4. Cuts and fills greater than 5 feet from original ground to final grade should be avoided.
5. Foundations should be stepped or other measures used to minimize cuts and fills. Slopes steeper than 3:1 shall be landscaped, terraced, or receive other treatment to reduce the visual impact and minimize the need for maintenance.
6. Areas that require engineered fill to support structures, roadways or for other reasons shall be noted in the grading plan. Design and placement of engineered fill shall be under the direction of a licensed professional engineer. Fill material shall be tested and approved by the engineer prior to placement and tested with suitable methods after compaction. Fill in areas that do not support a structure shall be suitable with a minimum of voids and organic material.
7. The composition of soil for fill and the characteristics of lots and parcels made useable by fill shall be suitable for the purpose intended.
8. When filling or grading is contemplated by the subdivider or partitioner, they shall submit plans showing existing and finished grades for the approval of the City Engineer. In reviewing these plans, the City Engineer shall consider the need for drainage and effect of filling an adjacent property.

9. Grading shall be finished in such a manner as not to create steep banks or unsightly areas to adjacent property.
10. Any land that requires engineered fill shall be so noted on the plat. Design and placement of engineered fill shall be under the direction of a licensed professional engineer.

FINDING: The applicant has submitted a preliminary grading and drainage plan. Per condition of approval #10, a subdivision site grading and drainage plan with erosion/sediment control plan and drainage report shall be required upon development of each project phase.

ARTICLE III – LAND DIVISION STANDARDS > SUPPLEMENTARY PROVISIONS
RDC Sections 8.2815 – 8.2825

8.2815 Transportation System Analysis. It shall be the burden of the developer to evaluate transportation system impacts when a proposed development involves either a Subdivision, Site and Design Review, PUD, Master Plan, Comprehensive Plan Amendments, a change or expansion of use, or any other development that the City Engineer deems necessary. Transportation system analyses are not required for residential site plan review for up to four units or for partitions up to three lots.

1. The following vehicle trip generation thresholds shall determine the level and scope of transportation analysis required for a new or expanded development. Trip ends shall be calculated as per the Institute of Transportation Engineers manual, Trip Generation, current edition, or local trip generation studies prepared by a qualified registered professional engineer and approved by the City Engineer.
 - A. A development will be required to provide a Trip Generation Report per Section 8.2815(2) for developments which generate less than 200 daily or 20 p.m. peak hour vehicle trips. The Trip Generation Report shall be prepared by a professional engineer licensed in the state of Oregon. The Engineering Department will review and evaluate the Trip Generation Report to determine if a Transportation Impact Analysis (TIA) is required.

Projects that generate less than 200 daily or 20 p.m. peak hour trip ends may be required to provide a TIA when, in the opinion of the City Engineer or his/her designee, significant capacity and/or safety problem is caused, or adversely impacted by the development. The City Engineer, or designee, shall determine the scope of the analysis.
 - B. If a proposed development will generate 200 or more daily trip ends, or 20 or more p.m. peak hour trip ends, then a TIA shall be required per Section 8.2815(3).
 1. The applicant's engineer shall consult with the City Engineer, or designee, prior to preparing the TIA to verify the scope of the study. The City shall respond in writing within 30 days.
 - a. When applicable, the applicant's engineer shall concurrently consult with ODOT prior to preparing the TIA to verify the study area.
 2. The City Engineer shall determine when a TIA has satisfied the requirements of the development's impact analysis.
 3. The TIA shall bear the stamp and signature of a licensed professional engineer in the State of Oregon.
2. When a Trip Generation Report is required, it must demonstrate the existing use, proposed use, existing trips per the ITE, and proposed trips per the ITE. Local trip rates may also be considered if supported by traffic counts conducted according to ITE guidelines. The report must include a conceptual site plan that shows adjacent roadways, alleys, roadway classifications, and access points.

3. When a TIA is required, it must demonstrate that the following standards are met:
 - A. The standard of measurement that will determine the acceptability of traffic flow on City streets will be a delay-based level of service as defined by the Highway Capacity Manual, Special Report 209, third Edition (2000 update or subsequent document updates) published by the Transportation Research Board. The determination of LOS shall be calculated by a methodology that is approved by the City Engineer. The acceptable standard of LOS for City streets shall be LOS E during the peak 15 minutes of the peak hours of the average weekday. A lesser standard shall be acceptable at unsignalized intersections with low volume minor street approaches if the volume-to-capacity ratio is less than 0.90 and the 95th percentile vehicle queue is less than four vehicles during the peak hour.
 - B. The Average Daily Traffic (ADT) volume of Local Street roadways within the City shall be less than 1,200 vehicles per day (VPD). Developments which add vehicle trips to Local Streets with an ADT greater than 1,200 VPD may be asked to provide mitigation in the form of additional access to the site, when in the opinion of the City Engineer, the residential livability is degraded by excessive local street traffic volume.
 - C. New development that will cause degradation below those levels shall be required to provide mitigating transportation system improvements that will restore the LOS to the accepted standard, as is practical, as determined by the City Engineer and pursuant to the adopted City's Transportation System Plan. Where there are impacts to the State Highways, the City and ODOT shall work cooperatively to determine appropriate courses of action based on ODOT and City standards.
4. The TIA shall include at a minimum, the following intersections:
 - A. All site access intersections.
 - B. Nearest intersecting collector or arterial street upstream and downstream of the development.
 - C. Any other collector or arterial street intersection that would experience an increase of 25 additional peak hour trips.
 - D. Additional intersections requested by staff in the basis of anticipated impacts resulting from the development.
5. The TIA shall include the following study time frames addressing:
 - A. Existing conditions.
 - B. Completion year of each significant phase of development.
 - C. Five year forecast beyond final phase
6. The following Tables are required in the TIA:
 - A. Trip Generation (including phase breakdown if applicable).
 - B. LOS Table (LOS for every analysis scenario at every study area intersection. Report LOS, delay, V/C ratio, 95% vehicle queue, and any additional pertinent analysis results).
7. The following Figures are required in the TIA:
 - A. Vicinity/Locator Map.
 - B. Site or Tentative Plan Map.
 - C. Background Traffic Volumes (all study intersections and analysis years).
 - D. Trip Distribution and Assignment.
 - E. Background + Site Generated Traffic Volumes (all study intersections and analysis years).
8. Other Analysis Standards (as required by the study)
 - A. Signal Warrants shall be performed where applicable per the Manual on Uniform Traffic Control Devices, current edition.
 - B. Left Turn Lane Warrants shall be provided where applicable per ODOT criteria based on the Texas Transportation Institute (TTI) curves.
 - C. Right Turn Lane Warrants shall be provided where applicable per ODOT criteria.

- D. The acceptability of sight distance at all study area intersections shall be determined per AASHTO (current edition) standards.
- E. Traffic signal progression analysis may be required if a new signal is proposed. The City Engineer shall approve the method of traffic signal progression analysis.
- F. Roadway improvements are to be based on the City of Redmond Standards and Specifications and ODOT design standards.

FINDING: The applicant submitted a Transportation System Analysis Application (TSAA) in April 2023 and a Traffic Impact Analysis (TIA) conducted by Transight Consulting, LLC, dated July 2023. The TSAA and TIA have been reviewed and approved by City Engineering. Refer to condition of approval #7 for transportation mitigation requirements.

8.2820 Access Management Standards. All land use approvals shall be in compliance with the following standards.

1. Driveway spacing and corner clearance as follows:

<u>Roadway Classification</u>	<u>Minimum Access Driveway Spacing</u>	<u>Minimum Access Clearance to Corner</u>	<u>Intersection Spacing (Min.)</u>
Local Street	No Restrictions	30 ft	165 ft
Minor Collector	50 ft	80 ft	330 ft
Major Collector	165 ft	165 ft	330 ft
Minor Arterial	330 ft	330 ft	1/4 mile
Major Arterial	ODOT Stds	ODOT Stds	ODOT Stds

2. In all instances, access near an intersection shall be located beyond the influence of standing queues and opposing left turns sharing a continuous two-way left turn lane. This requirement may result in greater corner clearance or access spacing than the minimum distance indicated.
3. Every lot or parcel shall be permitted an access. In the event that the access management standards cannot be achieved, shared access with adjacent property shall be explored and provided where available.
4. Access shall be taken from the lower order street or alley unless otherwise approved by Public Works and/or ODOT through the land use review and approval process. Access to higher order streets may be allowed for emergency vehicles when restricted with a locked fire gate, bollards or similar, when approved or required by Redmond Fire and Rescue.
5. Unless adequate demonstration of site necessity, intersection safety and functionality are provided, through the land use review process, new lots and/or parcels will be limited to a single vehicular access. Existing lots may be permitted a secondary access when approved by the City Engineer.
6. The access management standards apply to new development, redevelopment, subdivision, and partitioning of land.
7. Corner clearance is measured from the edge of right-of-way to the nearest edge of access. Spacing is measured from centerline of access/intersection to centerline of access/intersection.
8. Adequate intersection sight distance and clear zone shall be maintained at all access/driveway locations per AASHTO standards (American Association of State Highway and Transportation Officials).
9. Public Works may require supporting information, including but not limited to traffic count data, trip generation, trip distribution, truck and trailer turning/backing templates and/or on-site circulation diagram. Transportation Impact Analysis study, etc., in order to make a proper determination of access/driveway location.

10. Access/driveway locations may require alignment with existing driveways on the opposite side of the roadway as determined by Public Works or through the land use review and approval process.
11. Access within the North Redmond US 97 Interchange Area Management Plan (IAMP) shall also conform to the 2007 "North Redmond US 97 Interchange Area Management Plan (IAMP)," as amended.

FINDING: Exact access locations will be determined at time of site and design review and/or building permit submittal. However, all proposed lots and development tracts have been designed in such a way that access can be provided in conformance with the Access Management Standards.

8.2825 Street Dedications. Any person desiring to create a street not part of a subdivision or partition shall make written application to the Community Development Department.

1. Application. Said application shall be accompanied by the required information and appropriate filing fee. In cases where such dedication would have the effect of creating a land division, the dedication shall be treated as a new subdivision or partition as applicable.
2. Minimum Design Standards. The minimum standards of design and improvements for the dedication of a street shall be in compliance with the City of Redmond Public Works Standards and Specifications and all other applicable street standards and regulations as specified in Section 8.2710.
3. Procedure.
 - A. Upon receipt of written application and appropriate filing fee for street dedication, the Community Development Director shall refer the proposal to the City Engineer or designee for review and recommendation.
 - B. The City Engineer shall report his findings and recommendations regarding the proposed dedication to the Community Development Director
 - C. Upon receipt by the Community Development Director of written findings and recommendations from the City Engineer, the proposal shall be submitted to the City Council for a public hearing, unless part of a proposed project undergoing Planning Commission review.
 - D. The only notice required for a hearing under this section shall be by publication.
 - E. Following the hearing, the Council may accept or reject the proposed dedication.

FINDING: All proposed streets are part of the proposed Spruce Northwest master planned subdivision; therefore, this standard does not apply.

Conclusion:

Based on the submitted plans, materials, and the proposed findings and conditions of approval included herein, staff believes that all requirements can be fulfilled to support the Comprehensive Plan and Zone Map amendment, Spruce Northwest master development plan, and tentative subdivision plan, consistent with all applicable City policies, rules, and regulations.

III. RECOMMENDATION & CONDITIONS OF APPROVAL

Recommendation:

Based on the submitted plans, staff findings and conclusions, staff recommends the Planning Commission make a recommendation to the City Council to approve the Spruce Northwest project (City Files: 711-23-000215-PA1, 711-23-000216-MD, 711-23-000217-SUB), subject to the conditions of approval below.

Conditions of Approval:

The following conditions of approval shall be required:

1. Any substantial alteration to the approved plans, except as modified by the following conditions of approval, shall be subject to the standards and procedures in Section 8.1400 (*Modifications of Approval*) of the Redmond Development Code.
2. To ensure alignment with the development terms in the subject properties' annexation agreement, prior to final platting phase 1 the applicant must submit to the City for review and approval CC&Rs that include standards for on-street parking, a prohibition on using residential units as short-term or vacation rentals, and per ORS 93.277, a prohibition on restricting development of ADUs on single-family lots.
3. Per the terms of development in the subject properties' annexation agreement, the owner agrees to donate funds to the Redmond Committee for Art in Public Places or install an artistic feature. Public art fee of \$100 per housing unit will be charged and paid in lump sum at the time of any plat approval for the property. Installation of an artistic feature is required to provide focal points, preferably at the gateways to neighborhoods, in and around the center of neighborhoods, or trailheads.
4. To ensure compliance with the Green Design Great Neighborhood Principle, future building, site designs, and landscaping plans for the proposed open space tracts will be reviewed for green design elements in subsequent development reviews.
5. Tree preservation and replacement criterion of Section 8.2236(2)(E)(1) and (2) will be evaluated with each individual phase.
6. The applicant shall submit for review and approval a landscaping and amenities plan for all proposed open space tracts.
7. Transportation: All public streets shall be designed, constructed and dedicated to current City of Redmond Standards & Specifications and Transportation System Plan (TSP) standards and extended to the limits of each project phase unless otherwise specified or approved. Five (5) ft. minimum width public utility easement (PUE) shall be dedicated along all street right-of-way per COR Standard Drawing 2-1. Street signage, lane striping, street lights and postal box installation shall be required. Barricades shall be required on all dead-end streets at phase/property boundaries and signed for future extension. All street names shall be approved by Redmond Fire and Rescue and/or Deschutes County. The proposed master plan and public street system complies with City grid street and TSP standards subject to the following: [COR Code 8.0270(2)(D), 3(B)(1)(a), 3(C)(11) & 3(C)(14)(a))] [COR Code 8.2240(1 & 4) 8.2320(2)(A) & 8.2710(1, 2, 3 & 10)] [CORPWSS Development Provisions 03]
A) **Northwest Way** - minor arterial street. A paved street and eighty (80) ft. right-of-way exist, no curb or sidewalk, north of Spruce Ave. and along property frontage of tax lot 15-13-05-600. A paved rural road and sixty (60) ft. right-of-way exist, no curb or sidewalk, south of Spruce Ave. and along property frontage of tax lot 15-13-05-800. Twenty (20) ft. public right-of-way dedication shall be required along property/project frontage for a total of fifty (50) ft. west of centerline per City minor arterial standards. Street and right-of-way centerline shall match existing. Street frontage improvements conforming to City minor arterial street standards per COR Standard Drawing 2-1 and 2-3 shall be required along project/property frontage as follows;
 - 1) North of Spruce Ave. (Phase 6) - Twenty-five (25) ft. half street improvements with pavement section widening, pavement grind/inlay to centerline, curb and 10 ft. wide multi-use path on the

west side, storm drainage, turn/bike lanes and striping unless otherwise approved by the City Engineer.

2) South of Spruce Ave. (Phase 1 & 4) - Fifty (50) ft. wide full street improvements with new/reconstructed pavement section, curb on both sides, 10 ft. wide multi-use path on the west side, storm drainage, turn/bike lanes and striping unless otherwise approved by the City Engineer. Partial street improvements may be considered by the City Engineer where adequate right-of-way is not available.

B) **NW Spruce Ave.** - major collector street. A gravel/dirt road and sixty (60) ft. right-of-way exist through subject properties west of Northwest Way. Street frontage improvements conforming to full width City major collector street standards shall be required per COR Standard Drawing 2-1 with 36 ft. minimum wide pavement, curb, 10 ft. multi-use path, storm drainage, bike lane/striping and turn lanes as warranted through subject properties from Northwest Way to the west boundary of tax lot 15-13-05-804. Forty (40) ft. width right-of-way north and south of centerline and/or eighty (80) ft. total width public right-of-way dedication shall be required through subject properties from Northwest Way to the west boundary of tax lot 15-13-05-804. Proposed re-alignment shall match existing street and right-of-way centerline east of Northwest Way and at west project/property boundary.

C) **NW Upas Ave.** - local grid street. A paved rural road exists with sixty (60) ft. Deschutes County Rural Public Road Easement, no curb or sidewalk, along project/property frontage. Street frontage improvements conforming to City partial local street standards shall be required per COR Standard Drawing 2-1 and 2-3 with new/reconstructed pavement section to centerline, curb and sidewalk/path on the south side, storm drainage and thirty (30) ft. minimum public right-of-way dedication along property frontage as proposed. At the discretion of the City Engineer, a cash contribution may be provided for the south half at local street standards in lieu of construction due to lack of available public right-of-way. Street and right-of-way/easement centerline shall match existing. The emergency/fire access gates at 30th St. and 31st St. shall be required as proposed to prevent public access onto Upas Ave. until such time public right-of-way on the north half is dedicated/annexed, City street improvements are extended east to and including the Northwest Way intersection or as otherwise approved by the City Engineer.

D) **NW Quince Ave.** - local grid street. Street frontage improvements conforming to City full width local street standards shall be required per COR Standard Drawing 2-1 with 36 ft. wide pavement, curb on both sides, sidewalk/path on the north side, storm drainage and sixty (60) ft. public right-of-way dedication along project/property frontage as proposed.

E) **NW 30th St. & 31st St.** - local grid streets. Street improvements conforming to City local grid street standards per COR Standard Drawing 2-1 shall be required with 36 ft. wide pavement, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication.

F) **Local Road B** - local/grid street. Street improvements conforming to City local/grid street standards per COR Standard Drawing 2-1 with 36 ft. wide pavement, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.

G) **Local Road G** - local grid street. Street improvements conforming to City local grid street standards per COR Standard Drawing 2-1 shall be required with 36 ft. wide pavement, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.

H) **NW 28th St.** - local street. Proposed right-angle elbow corner at Local Road B shall conform to City elbow/cul-de-sac standard per COR Std Dwg 2-4 and/or 2-5 unless otherwise approved by the City Engineer. Street improvements conforming to City local/cul-de-sac street standards shall be required per COR Standard Drawing 2-1 and 2-4 and/or 2-5 with 36 ft. wide pavement, curb, sidewalk, storm drainage, sixty (60) ft. right-of-way dedication, fifty (50) ft. cul-de-sac right-of-way radius dedication and/or fifty (50) ft. eyebrow corner right-of-way radius dedication measured from the centerline curve/arc midpoint of the tangent centerline projections.

I) **NW 29th St.** - local reduced width non-grid street. Street improvements conforming to City local street standards per COR Standard Drawing 2-1 and 2-2 shall be required with 28 ft. wide

pavement, parking on one side only with NO PARKING signs installed on one side of the roadway, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.

J) **NW 28th Pl. & Local Road H** - local reduced width non-grid street. Proposed right-angle elbow corner at Local Road E shall conform to City elbow/cul-de-sac standard per COR Std Dwg 2-4 and/or 2-5 unless otherwise approved by the City Engineer. Street improvements conforming to City local/cul-de-sac street standards shall be required per COR Standard Drawing 2-1 and 2-4 and/or 2-5 with 28 ft. wide pavement, parking on one side only with NO PARKING signs installed on one side of the roadway, curb, sidewalk, storm drainage, sixty (60) ft. right-of-way dedication, fifty (50) ft. cul-de-sac right-of-way radius dedication and/or fifty (50) ft. eyebrow corner right-of-way radius dedication measured from the centerline curve/arc midpoint of the tangent centerline projections.

K) **NW 29th Way & Local Road A, C, D, E & F** - local non-grid streets. Street improvements conforming to City local street standards shall be required per COR Standard Drawing 2-1 with 28 ft. wide pavement, parking on one side only with NO PARKING signs installed on one side of the roadway, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.

L) **Reduced (28 ft.) Width Local Non-Grid Streets** - Homeowner's Association (HOA) formation and creation of covenants, conditions and restrictions (CCR's) with HOA parking enforcement shall be required in conjunction with all 28 ft. reduced width local streets. Parking shall be restricted to one side only with "No Parking" signs and painted curb. Additionally, reduced width streets may be approved as proposed with an exception in certain cases to the standard for public utility and alley access at the rear of lots per COR Std Dwg 2-2. *[CORPWSS Design Standards II(A)(1)]*

M) **Private Drives and Alleys** - proposed drives and alleys shall be privately owned and maintained. Private alley improvements conforming to City alley standards per COR Standard Drawing 2-1 are recommended. Approved private drive and alley connections to public streets shall be constructed to City driveway standards.

N) **Public Paths/Trails** - all public paths and trails shall conform to City paved multi-use path standards per COR Standard Drawing 2-6.

O) **Pedestrian Connections & Crossings** - specific pedestrian connection and crossing improvements shall be required as follows;

- 1) Northwest Way - enhanced pedestrian crossings of Northwest Way shall be constructed on the north side of the Northwest Way/Spruce Ave. intersection prior to Phase 1 plat approval and near the northern project/property boundary prior to Phase 6 plat approval. These crossings shall include a Rectangular Rapid Flashing Beacon (RRFB), advance signing, striping, overhead illumination and median refuge island unless otherwise approved by the City Engineer. Provide an internal path route through Phase 6 connecting NW 28th St. to the Northwest Way pedestrian crossing prior to Phase 6 plat approval.

- 2) NW Spruce Ave. - the north-south crossing at Northwest Way/Spruce Avenue intersection shall be constructed accommodate a full 10 ft. wide pathway crossing and include a striped pedestrian crossing along the pathway alignment, illumination and advance stop bar prior to Phase 1 plat approval.

P) **Street Storm Drainage:**

- 1) Stormwater drainage systems in the public right-of-way shall be subject to current City design standards. *[COR Code 8.2825(2)] [CORPWSS Design Standards II(B)]*

- 2) New drywells shall comply with City/DEQ pretreatment and City testing requirements. Drywell drain rock shall not extend under any street pavement section. *[COR Code 8.2825(2)] [CORPWSS Design Standards II(B)]*

- 3) The location of drywells or other UIC's within City streets shall not conflict with existing active private water wells, community water wells or existing/future municipal drinking water wells. Identify all existing water wells that are within 500 ft. or the two-year time of travel zone of subject properties. *[COR Code 8.2825(2)] [CORPWSS Design Standards II(B)]*

Q) **Street Trees:**

- 1) No street trees within 50 ft. of a street intersection per COR Standard Drawing 2-27.

- 2) No trees within 10 ft. of domestic water service, fire service or public storm facilities.

- 3) Trees shall not conflict with street or stop sign/control device and pedestrian crossing/ADA ramp line of sight.
- 4) No trees within driveway clear vision areas or blocking public street lighting.
- 5) Street tree species shall be selected from Redmond Parks Division approved tree list.

R) Lot/Tract Access:

- 1) Vehicular access to each new lot shall conform to City access management, corner clearance, clear vision and driveway construction standards. *[COR Code 3.300, 8.0305 & 8.2820]*
- 2) Direct vehicular access to Northwest Way, a minor arterial street, and NW Spruce Ave., a major collector street, shall not be permitted from any lot, tract or alley except for gated and locked emergency/fire and permitted COID access connections unless otherwise approved by the City Engineer. *[COR Code 8.2820(4)]*
- 3) Corner lots and double fronting lots shall take vehicular access from the lower order street, alley or access easement. *[COR Code 8.2820(4)]*
- 4) Postal box installation shall be subject to US Postal Service standards and City Engineer approval. *[CORPWSS Design Standards II(A)(16)]*

S) Traffic Impacts: The Transportation System Analysis Application (TSAA) dated 4-21-23 and Transportation Impact Analysis (TIA) dated 7-5-23 submitted by Transight Consulting LLC have been reviewed and approved by City Engineering conditioned upon the transportation mitigation requirements identified by the Assistant City Engineer per City Approval Memo dated 10-2-23 unless otherwise specified. A notable required mitigation includes the total proportionate share of \$131,555 for impacts to OR126/SW 27th St. based on the cost of the parallel route improvements at OR126/SW 35th Street. The total payment (\$131,555) shall be due prior to Phase 1 final plat approval or partial payments may be provided prior to final plat approval of each individual phase (\$11,949.54 per each phase). The proportionate share will not be required if the City adopts a separate funding mechanism that addresses the impacts at OR126/27th St. in their entirety prior to plat of Phase 1. *[COR Code 8.0270(3)(C)(11), 8.1010(1)(C) & 8.2815]*

8. Water: A twelve (12) inch City water main exists in Northwest Way north of Spruce Ave. and along property frontage of tax lot 15-13-05-600 per current City Water System Master Plan (WSMP). A twelve (12) inch City water main exists in Spruce Ave. east of Northwest Way.

A) Connection to the City's public water system shall be required for each new lot. *[COR Code 8.2240(5) & 8.2715(3)]*

B) The proposed public water system complies with City "to & through" Public Facility Requirement and WSMP standards for service to each new lot and adjacent property subject to the following: *[COR Code 8.0270(2)(G), 3(B)(1)(a) & 3(C)(12)] [CORPWSS Development Provisions 03]*

- 1) The twelve (12) inch public water main shall be extended in Northwest Way south from existing at Spruce Ave. and along project/property frontage per current WSMP.
- 2) Design review of the public improvement construction plans for compliance to City standards.
- 3) Domestic and fire water systems located on-site and beyond public right-of-way shall be privately owned and maintained.

C) A separate domestic water service connection conforming to City standards shall be required for each new lot with meter located at the property/right-of-way line. A single water master meter shall be required for all multi-family lots. A City approved backflow prevention device shall be required for all multi-family and non-residential properties, water services larger than one (1) inch, fire sprinkler systems and irrigation systems. *[COR Code 4.200, 4.161, 8.2240(5) & 8.2715 (3 & 4(C))]*

D) Fire flow, fire hydrant locations and fire code requirements to be determined by Redmond Fire & Rescue (RFR).

- 1) A water system/fire flow analysis and mitigation plan prepared by a registered professional engineer shall be provided as required by the Redmond Fire Marshal. *[CORPWSS Development Provisions 04.2.00] [CORPWSS Design Standards II(D)(1(a) & 3(a))]*

2) Public water system improvements may be required as deemed necessary by the fire flow analysis mitigation plan to meet minimum fire code and fire flow requirements for the proposed development. *[COR Code 8.2235(1)(D)] [CORPWSS Design Standards II(D)(1(a) & 3(a))]*

E) New fire hydrants and fire/water lines located on-site shall be privately owned and maintained with City approved backflow prevention device located at the property/right-of-way line. *[COR Code 8.3035(7)(D)] [CORPWSS Design Standards II(D)(1)(d)]*

F) Abandonment of any existing water well, cistern or other private water facility located on subject properties shall be in accordance with Oregon Water Resource Department regulations. *[CORPWSS Development Provisions 04.7.00 & 22(13)]*

9. Wastewater: The thirty (30) inch Far West Sewer Interceptor (FWSI) City gravity sewer trunk main exists in Spruce Ave. at Northwest Way per current Redmond Wastewater System Master Plan (RWSMP).

A) Connection to the City's public sewer system shall be required for each new lot. *[COR Code 8.2240(5) & 8.2715(3)]*

B) Proposed public gravity/pressure sewer system and FWSI extension complies with City "to & through" Public Facility Requirement and RWSMP standards for complete gravity service to each new lot and adjacent property subject to the following: *[COR Code 8.0270(2)(G), 3(B)(1)(a) & 3(C)(12)] [CORPWSS Development Provisions 03]*

1) Proposed public gravity sewer main in Quince Ave. shall be extended and/or stubbed to the east side of Northwest Way.

2) All public gravity sewer mains shall be designed and constructed to provide a gravity service to each new lot and neighboring properties unless otherwise approved by the City Engineer.

4) Sewer services shall be located to provide complete gravity service.

5) Sewer manholes shall be located on street centerline whenever possible, at 400 ft. max spacing and at any main line terminus. Manholes shall be added or moved accordingly to match street alignments and to avoid conflicts with public water.

6) Public sanitary sewer facilities located beyond public right-of-way will require dedication of City sewer and/or public utility easements that provide unobstructed City access and turnarounds. *[COR Code 8.2215(2)(E) & 3(B)], 8.2320(2)(B) & 8.2715(8)(4)] [CORPWSS Development Provisions 07]*

7) Design review of the public improvement construction plans for compliance to City standards.

8) Sanitary sewer systems located on-site and beyond public right-of-way or easements shall be privately owned and maintained.

C) A separate sanitary sewer service conforming to City standards shall be required for each new lot with cleanout located at the property/right-of-way or easement line. All sewer services shall be connected at right angles to the sewer mainline, and not to manholes, unless otherwise approved by the City Engineer. *[COR Code 8.2240(5) & 8.2715(3 & 4(C))]*

D) Any existing sewage drill hole, septic tank or other private sewer facility located on subject property shall be permanently abandoned in accordance with Deschutes County and Oregon Dept. of Environmental Quality (DEQ) regulations. *[COR Code 4.304(3)] [CORPWSS Development Provisions 04.7.00 & 22(13)]*

10. Subdivision Grading and Drainage: A subdivision site grading and drainage plan with erosion/sediment control plan and drainage report shall be required upon development of each project phase per current City standards and the following: *[COR Code 8.0270(3)(C)(7 & 12) & 8.2720] [CORPWSS Development Provisions 23] [CORPWSS Design Standards II(B)]*

A) Lot and Tract grading shall conform to current COR Development Code 8.2720 and shall not create steep banks, extreme cut/fills or areas unsightly to adjacent properties or lots.

B) All storm water runoff and drainage shall be maintained on each lot or tract and shall not drain onto public streets, neighboring properties or irrigation canals/ditches except as provided for in City standards.

- C) Total contributing area to the public storm system shall include all right-of-way surface runoff and 100% of the future developed lots potential contributing areas unless otherwise approved by the City Engineer.
- D) The stormwater system shall be designed to pass up-gradient flow through the site without damage to the proposed development, public stormwater facilities or neighboring properties.
- E) Storm water runoff from private property shall not impact public right-of-way or easements unless otherwise approved by the Public Works Director or City Engineer.
- F) New on-site private drywells and other underground injection control (UIC) systems not part of the public drainage system must be registered and approved or permitted by the Oregon Department of Environmental Quality (DEQ) prior to construction or building permit issuance. Contact DEQ UIC Program Coordinator at 503-229-5945. Send copy of UIC Registration Packet to DEQ and City of Redmond, 3100 NW 19th Street, Redmond, OR, 97756.
- G) Private drywells serving paved areas may not be located within public or community wellhead protection areas or 500 ft. of existing irrigation or drinking water wells. Please note that this site may be located within 500 ft. of existing private water wells. Privately owned drywells within 500 ft. of any private water well will require a general permit from the Oregon DEQ prior to construction plan approval. Locate and identify existing water wells and wellhead protection zones that could affect the location of proposed drywells. *[CORPWSS Development Provisions 23] [OAR 340-044-0018]*
- H) Maintenance agreement required for any on-site private storm system.

11. Construction Plans: Upon land use approval, a separate set of construction drawings may be submitted directly to the Engineering Department for design review of all required and/or proposed public improvements, utilities and subdivision site grading. *[COR Code 8.2720 & 8.2800] [CORPWSS Development Provisions 04 & 23] [CORPWSS Design Standards]*

////////////////////////////////// **END OF CONDITIONS** //////////////////////////////////////

Prepared by:
Kyle Roberts, AICP
Planning Director



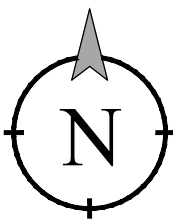
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A horizontal scale bar with tick marks at 0, 50', 100', and 200'. The bar is divided into four equal segments, each representing 50 feet.

SCALE: 1" = 100'

Spruce Northwest
Proposed Zoning Exhibit

Redmond, OR



LEGEND:

- EXISTING (E) URBAN GROWTH BOUNDARY (UGB)
- (E) CITY OF REDMOND LIMITS
- MASTER PLAN BOUNDARY
- PROPOSED ZONE LINE
- EXIST, ZONE LINE PER NAP/COR COMP PLAN
- PROPOSED R-4 ZONE (5.6-14 DU/NET ACRE)
- PROPOSED R-5 ZONE (10-24 DU/NET ACRE)
- PROPOSED R.O.W. LINE
- EXISTING R.O.W. LINE
- EXISTING R.O.W. LINE (TO BE VACATED/ADJUSTED WITH PROJECT)
- FUTURE R.O.W. LINE (BY OTHERS)

PROPERTY SUMMARY:

TAXLOT	GROSS AREA
-00600	36.25 - AC
-00800	19.54 - AC
-00804	21.71 - AC
	77.50 - AC

NAP/RED. COMP PLAN
ZONING SUMMARY

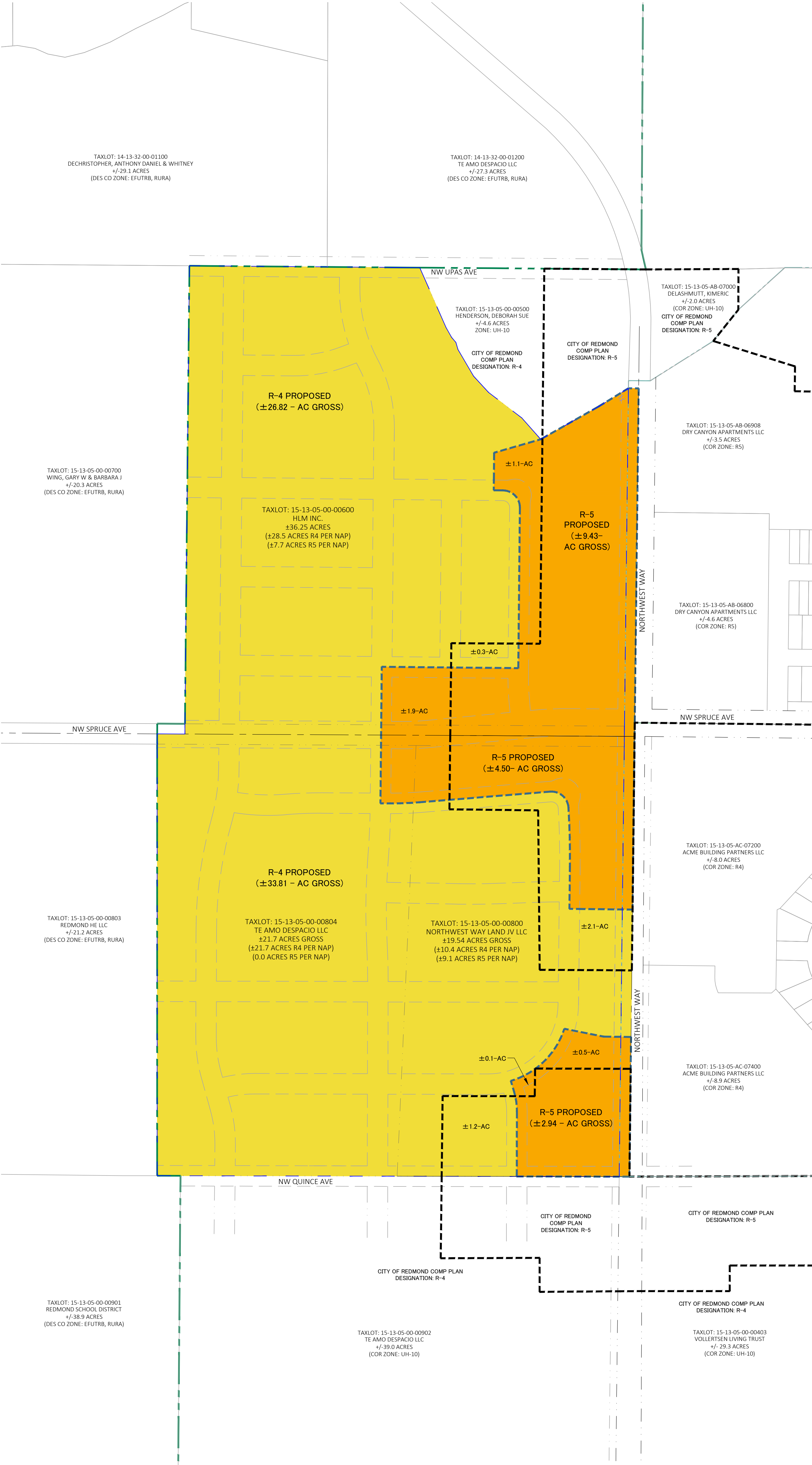
TAXLOT	R4	R-5
-00600	28.5-AC	7.7-AC
-00800	10.4-AC	9.1-AC
-00804	21.7-AC	0.0-AC
	±60.6-AC	±16.9-AC

PROPOSED ZONING SUMMARY

TAXLOT	R4	R-5
-00600	26.82-AC	9.43-AC
-00800	12.56-AC	6.98-AC
-00804	21.25-AC	0.46-AC
	±60.6-AC	±16.9-AC

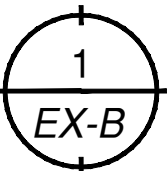
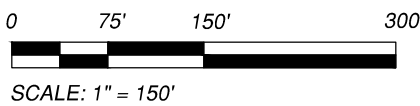
COMPREHENSIVE PLAN TO PROPOSED
ZONE CHANGE SUMMARY

+/-3.6-AC FROM R-5 TO R-4
+/-3.6-AC FROM R-4 TO R-5



PROPOSED ZONING EXHIBIT

SCALE: 1" = 150'

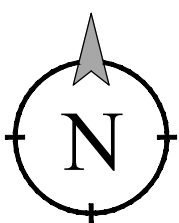


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541.728.6347
adam@kl-engineering.com

ENGINEERING | CONSULTING
PLOT DATE: DECEMBER 1, 2023

Spruce Northwest
Master Development
Plan

Redmond, OR



LEGEND:

- EXISTING (E) URBAN GROWTH BOUNDARY (UGB)
- (E) CITY OF REDMOND LIMITS
- MASTER PLAN BOUNDARY
- PROPOSED (P) ZONE LINE
- (P) R.O.W. LINE
- (P) LOT LINE
- (P) PED. ACCESS EASEMENT
- (P) MULTI-USE TRAIL
- (P) SIDEWALK
- (P) ROADWAY
- (P) OPEN SPACE / COMMON AREA
- (P) MULTI-FAMILY COMPLEX / DEVELOPMENT TRACT
- (P) SINGLE FAMILY RESIDENTIAL LOT (MIN. FRONTAGE: 50-FEET, MIN. LOT SIZE: 5,500 SF)
- (P) ATTACHED TOWNHOME RESIDENTIAL LOT (MIN. FRONTAGE: 20-FEET, MIN. LOT SIZE: 1,500 SF)
- (P) CITY OF REDMOND UTILITY TRACT

CITY OF REDMOND
GREAT NEIGHBORHOOD
PRINCIPLES

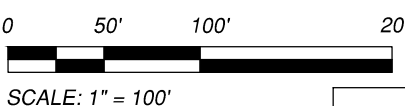
- TRANSPORTATION**
The interconnected street network and trail system are designed along with enhanced open space corridors to invite walking and biking throughout neighborhood and link with community amenities, abutting facilities, and planned future extensions
- HOUSING**
The neighborhood will provide a mix of attached townhouse units, multi-family complexes, and a variety of single family housing options consistent with City of Redmond zoning requirements and adopted Northwest Area Plan policies
- OPEN SPACES, GREENWAYS, RECREATION AND DIVERSE MIX OF ACTIVITIES**
Enhanced, useable open spaces and trails are integrated into the neighborhood to interconnect the centrally located larger community parks along with landscape buffer/trail corridors along the abutting higher order roadways
- INTEGRATED DESIGN ELEMENTS AND PUBLIC ART/GATEWAY FEATURES**
Enhanced landscaping and open space areas are provided at neighborhood entrances with opportunities for neighborhood monument signs, public art, and integrated gateway features
- SCENIC VIEWS**
East-west streets and open spaces are orientated to provide multiple Cascade Range viewing corridors throughout the neighborhood
- CANAL TRAILS**
Existing Central Oregon Irrigation District canal will be piped with project development and will include an adjacent multi-use trail network
- GREEN DESIGN**
Primarily energy efficient solar access building orientation, trail system network to encourage walking and biking, reduced width non-grid streets, and open spaces designed with xeriscaping and plantings to minimize irrigation water demands

MASTER PLAN
DEVELOPMENT SUMMARY:

GROSS LAND AREA	- ± 77.50 ACRES
RIGHT OF WAY AREA	- (24.19 ACRES)
NET DEVELOPMENT AREA	- 53.31 ACRES
OPEN SPACE PROVIDED	- (9.60 ACRES)
C.O.R. UTILITY TRACT	- (0.11 ACRES)
DEV. LAND FOR DENSITY CALCS	- 43.60 ACRES
DEVELOPMENT AREA SUMMARY:	
R4 NET DEVELOPMENT:	35.42 ACRES
R5 NET DEVELOPMENT:	8.18 ACRES
NORTHWEST AREA PLAN (NAP - FRAMEWORK PLAN)	
R-4 Primary Uses:	Mix of Single Family and attached.
Comments:	Medium density zone with mostly single family dwellings but densities range from 5.6 to 14 units per net acre.
R-5 Primary Uses:	Apartments, town houses, condominiums.
Comments:	Multi family dwellings with densities ranging from 10 to 24 units per net acre.
DENSITY REQ. CALC. (MIN.)	- 60.6 AC (5.6 DU/AC) + 16.9 AC (10 DU/AC) = 77.5 AC
DENSITY REQUIREMENT (MIN.)	- 6.56 DU/ NET AC
MINIMUM UNIT COUNT	- 6.56 DU/AC * 43.6 AC = 286 DU
DENSITY REQ. CALC. (MAX.)	- 60.6 AC (14 DU/AC) + 16.9 AC (24 DU/AC) = 77.5 AC
DENSITY REQUIREMENT (MAX.)	- 16.18 DU/ NET AC
MAXIMUM UNIT COUNT	- 16.18 DU/AC * 43.6 AC = 705 DU
R-4 DWELLING UNITS	- 326 DU / 35.42 NET ACRES = 9.2 DU/AC
(174 SINGLE FAMILY UNITS / 24.00 NET ACRES = 7.2 DU/AC, 152 ATTACHED TOWNHOME UNITS / 11.42 NET ACRES = 13.3 DU/AC)	
R-5 DWELLING UNITS	- 130 DU / 8.18 NET ACRES = 15.9 DU/AC
(±100 MULTI-FAMILY COMPLEX UNITS / 6.19 NET ACRES = 16.2 DU/AC, 30 ATTACHED TOWNHOME UNITS / 2.00 NET ACRES = 15.0 DU/AC)	
TOTAL UNIT COUNT	- 456 DU
OVERALL NET DENSITY (456 D.U./43.6AC)	- 10.5 DU/AC

MASTER DEVELOPMENT PLAN

SCALE: 1" = 100'



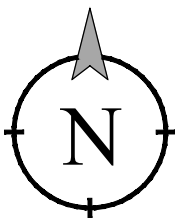
SCALE: 1" = 100'

SUBSEQUENT SUBDIVISION NOTES:

- LOTS FOR SINGLE FAMILY HOMES SHALL BE AT LEAST 5,500 SF AND HAVE A MINIMUM STREET FRONTAGE OF 50-FEET.
- LOTS FOR TOWN HOMES SHALL BE AT LEAST 1,500 SF AND HAVE A MINIMUM STREET FRONTAGE OF 20-FEET.
- FINAL LOT SIZES AND DIMENSIONS WILL BE ESTABLISHED THROUGH THE SUBSEQUENT SUBDIVISION PROCESS.

Spruce Northwest
Transportation Plan
Overview

Redmond, OR



LEGEND:

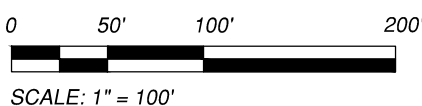
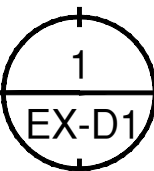
- EXISTING (E) URBAN GROWTH BOUNDARY (UGB)
- (E) CITY OF REDMOND LIMITS
- MASTER PLAN BOUNDARY
- PROPOSED (P) ZONE LINE
- (P) R.O.W. LINE
- (P) R.O.W. CENTERLINE
- (P) LOT LINE
- (P) PED. ACCESS EASEMENT
- (P) MULTI-USE TRAIL
- (P) SIDEWALK
- ARTERIAL ROAD
(100-FT R.O.W., 50-FT ROAD WIDTH)
- COLLECTOR ROAD
(80-FT R.O.W., 36-FT ROAD WIDTH)
- LOCAL RESIDENTIAL GRID ROADS
(60-FT R.O.W., 36-FT ROAD WIDTH)
- LOCAL RESIDENTIAL NON-GRID ROADS
(60-FT R.O.W., 28-FT/36-FT ROAD WIDTH)
- PRIVATE ROADS
(ALLEYS, PARKING FIELD/CIRCULATION)

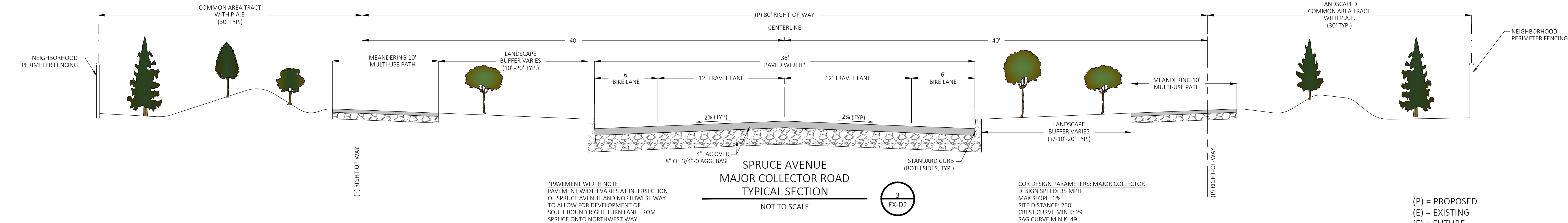
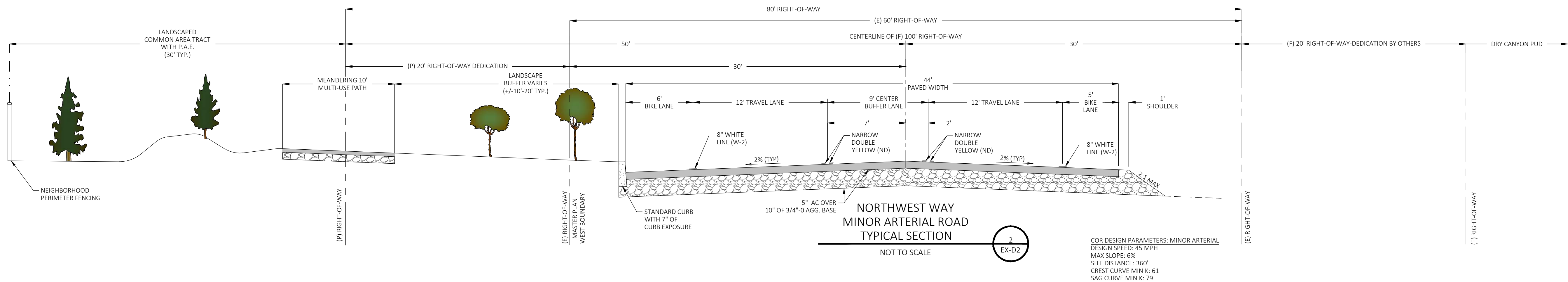
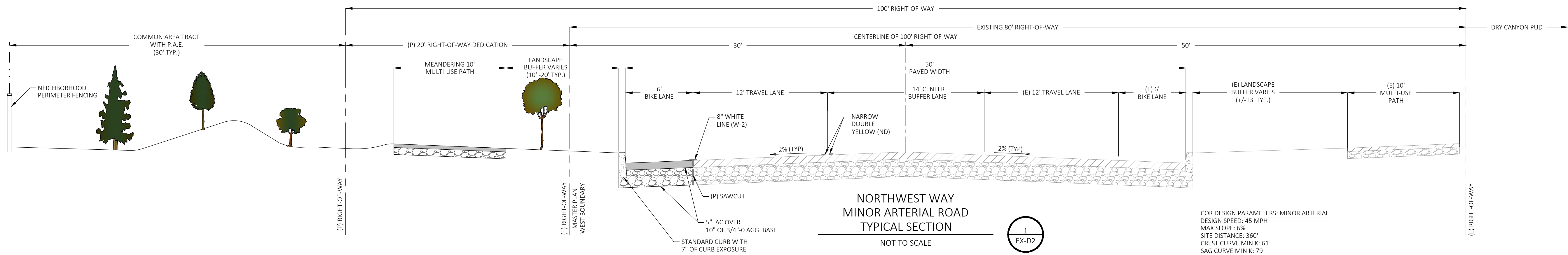
KEY NOTES:

- PROPOSED NORTHWEST WAY ARTERIAL ROADWAY FRONTAGE IMPROVEMENTS (NORTH OF SPRUCE). SEE TYPICAL SECTION #1, EX-D2
- PROPOSED NORTHWEST WAY ARTERIAL ROADWAY FRONTAGE IMPROVEMENTS (SOUTH OF SPRUCE). SEE TYPICAL SECTION #2, EX-D2
- PROPOSED SPRUCE AVENUE COLLECTOR ROADWAY IMPROVEMENTS (ALIGN WITH INTERSECTION CONSTRUCTED WITH DRY CANYON, TRAIL BOTH SIDES). SEE TYPICAL SECTION #3, EX-D2
- PROPOSED QUINCE AVENUE LOCAL GRID ROADWAY IMPROVEMENTS (R.O.W. CENTERED ALONG SOUTHERN SUBJECT PROPERTY BOUNDARY WITH ADDITIONAL RIGHT OF WAY DEDICATION FROM TAXLOT 15-13-05-00-00902). SEE TYPICAL SECTION #1, EX-D3
- PROPOSED NW 30TH STREET LOCAL GRID ROADWAY IMPROVEMENTS (WITH MEANDERING MULTI USE TRAIL LOCATED WITHIN RIGHT OF WAY, COMMON AREA, OR PED. ACCESS EASEMENT). SEE TYPICAL SECTION #4, EX-D3
- PROPOSED LOCAL GRID ROADWAY IMPROVEMENTS SEE TYPICAL SECTION #5, EX-D3
- PROPOSED LOCAL NON-GRID ROADWAY IMPROVEMENTS SEE TYPICAL SECTION #6, EX-D3
- PROPOSED PRIVATE ALLEY IMPROVEMENTS SEE TYPICAL SECTION #6, EX-D3
- CONCEPTUAL PRIVATE DRIVE, TBD WITH FUTURE DEVELOPMENT TRACT SITE PLAN APPROVAL.
- PROPOSED FEE IN LIEU OF CONSTRUCTION FOR NW UPAS STREET IMPROVEMENTS (UGB LIMIT ALONG CENTERLINE AND LACK OF RIGHT OF WAY) SEE TYPICAL SECTION #2, EX-D3
- NOT USED.
- PROPOSED 10-FOOT WIDE MEANDERING MULTI-USE TRAIL IN ACCORDANCE WITH CITY OF REDMOND STANDARDS, LOCATED WITHIN RIGHT OF WAY, COMMON AREA, OR PED. ACCESS EASEMENT.
- PROPOSED LOCAL (NON-GRID) ROAD "EYEBROW" CORNER PER CITY OF REDMOND STANDARDS.
- PROPOSED EMERGENCY ACCESS GATE TO PROHIBIT DIRECT VEHICULAR ACCESS FROM DEVELOPMENT TO UPAS AVE.

MASTER DEVELOPMENT
TRANSPORTATION PLAN

SCALE: 1" = 100'

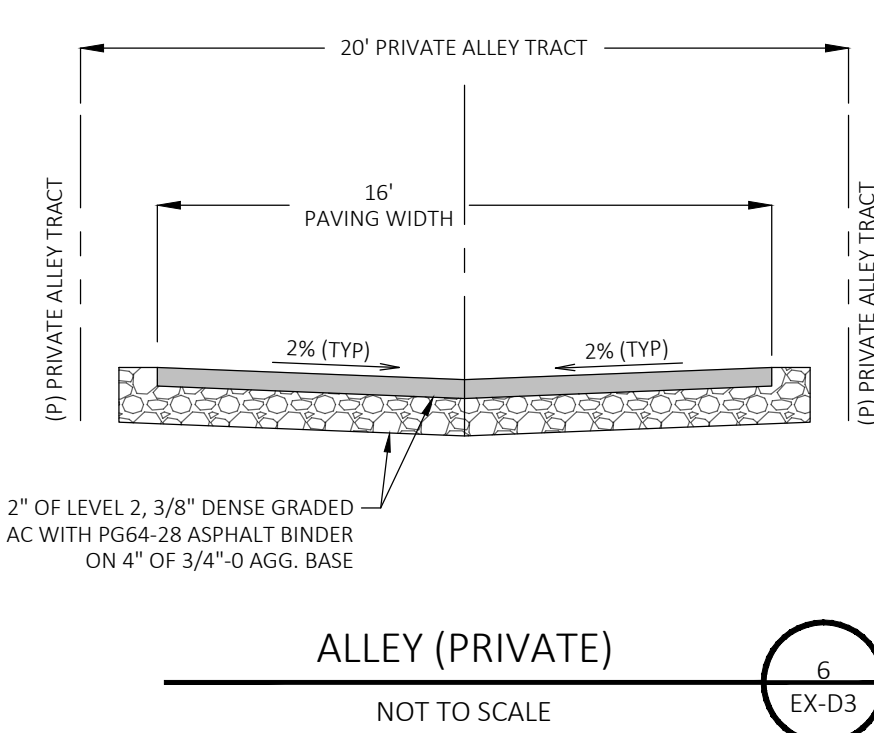
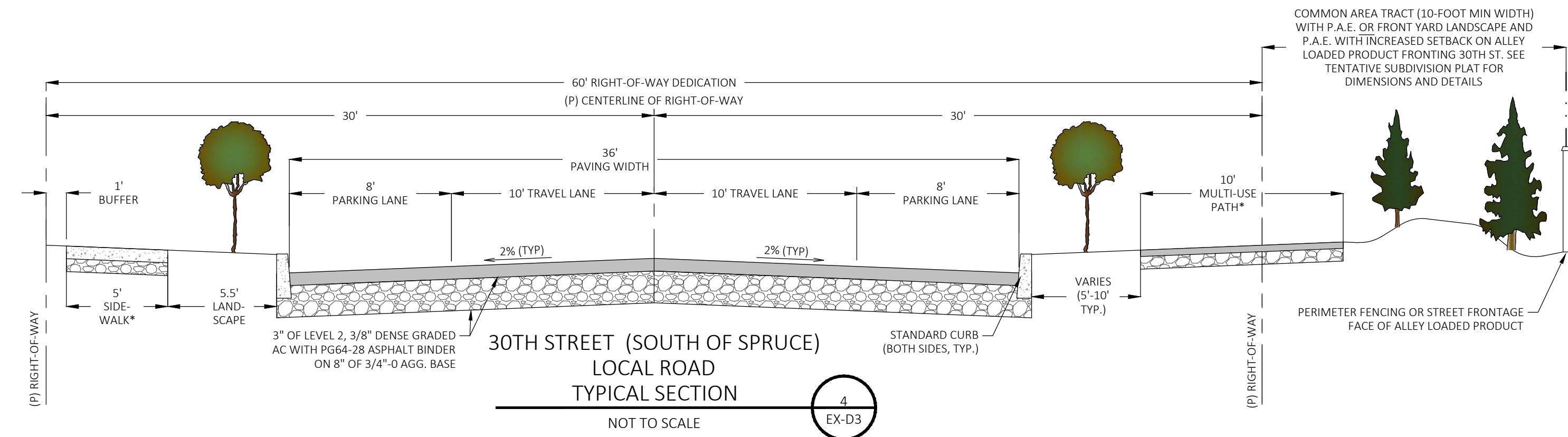
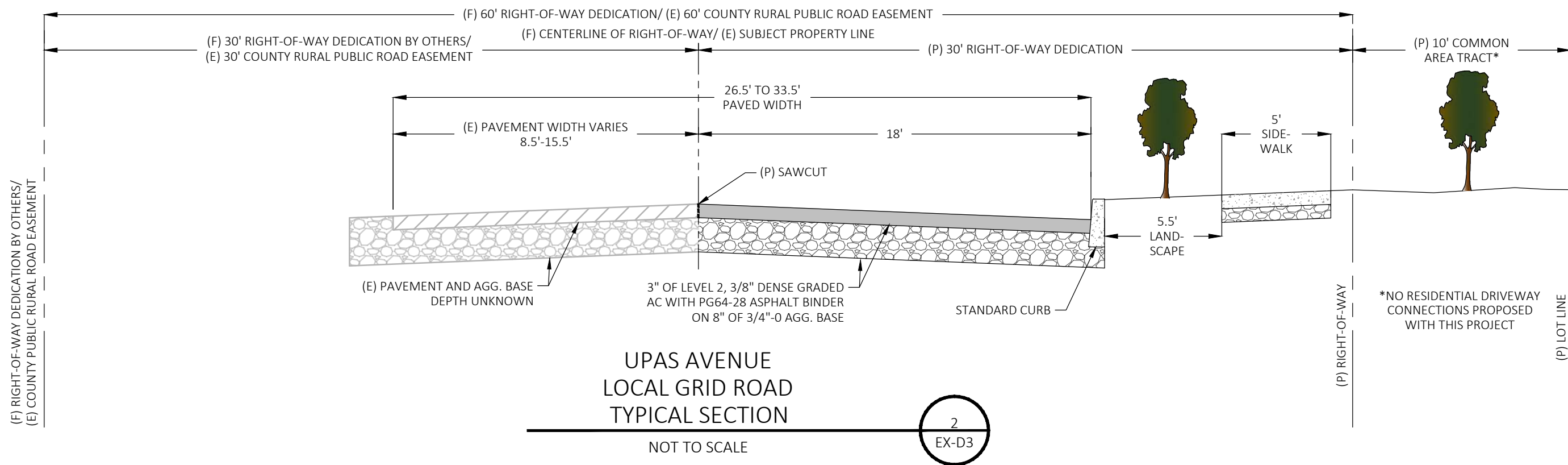
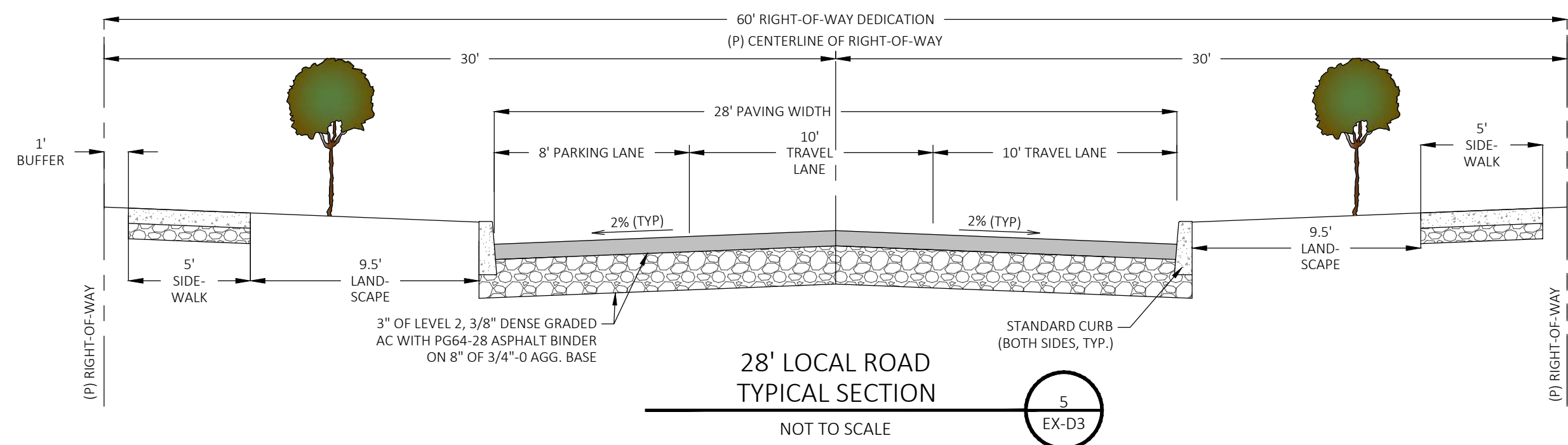
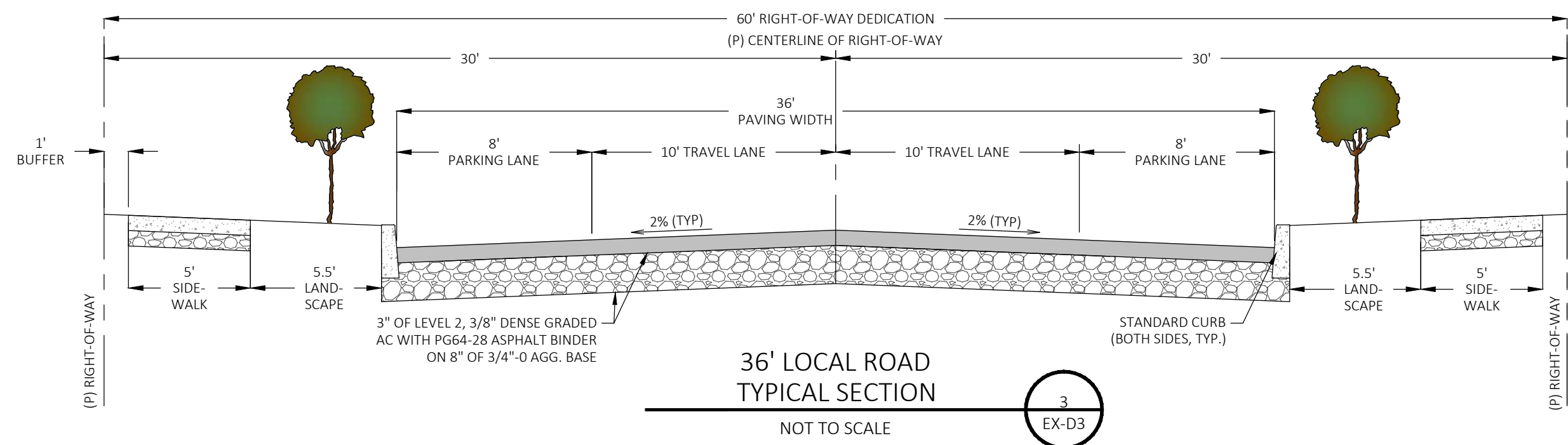
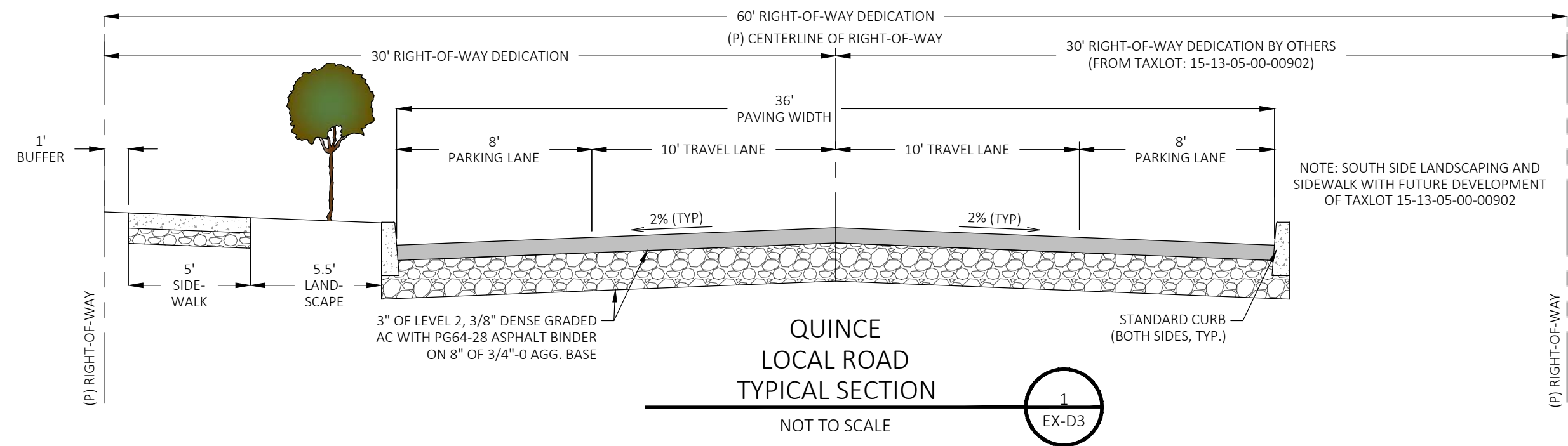




(P) = PROPOSED
(E) = EXISTING
(F) = FUTURE
P.A.E. = PEDESTRIAN ACCESS EASEMENT

1	1	1	DATE:
1	1	1	BY:
			DESCRIPTION:
			REV:

SCALE:	PROJECT NO:
DATE: 12/1/2023	XXXX-XX
DRAWN: be	CHECKED: ae
SHEET NO:	EX-D2

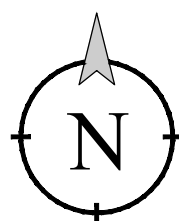


COR DESIGN PARAMETERS: LOCAL ROAD
DESIGN SPEED: 25 MPH
MAX SLOPE: 10%
SITE DISTANCE: 155'
CREST CURVE MIN K: 12
SAG CURVE MIN K: 26

COR DESIGN PARAMETERS: ALLEY
DESIGN SPEED: 15 MPH
MAX SLOPE: 10%
SITE DISTANCE: 80'
CREST CURVE MIN K: 3
SAG CURVE MIN K: 10

Spruce Northwest
Master Development
Plan
OVERALL PUBLIC
FACILITIES PLAN
OVERVIEW

Redmond, OR



EXISTING FIRE HYDRANT DATA TABLE					
FH I.D.#	STATIC (PSI)	RESIDUAL (PSI)	PITOT (PSI)	FLOW (GPM)	TEST DATE
FH1862*	104				
FH1863	101	97	87	1574	4/26/2021
FH1860*	104				
FH1861*	104				

*FLOW DATA NOT YET CONDUCTED/ AVAILABLE WITH CITY GIS

NOTE: EXISTING FIRE HYDRANT FLOW DATA WAS TAKEN FROM CITY OF REDMOND ONLINE MAPPING/ GIS ON 3/31/2023. HYDRANT FLOW TEST DATA MEASURED FOR SYSTEM CONDITIONS AT THE TIME OF THE TEST AND MAY NOT BE REPRESENTATIVE OF THE MINIMUM OR MAXIMUM PRESSURE AND FLOW AVAILABLE AT THE HYDRANT.

LEGEND	
	EXISTING URBAN GROWTH BOUNDARY
	EXISTING CITY OF REDMOND LIMITS
	MASTER PLAN BOUNDARY
	PROPOSED RIGHT-OF-WAY LINE
	PROPOSED LOT LINE
	EXISTING EDGE OF PAVEMENT/ CURB LINE
	EXISTING CURB
	EXISTING FENCE
	EXISTING C.O.R. WATER MAIN
	EXISTING IRRIGATION DITCH
	EXISTING IRRIGATION PIPE
	EXISTING COID EASEMENT
	EXISTING FIRE HYDRANT
	EXISTING C.O.R. SANITARY SEWER MAIN
	EXISTING C.O.R. SANITARY SEWER MANHOLE
	EXISTING C.O.R. STORM LINE
	EXISTING C.O.R. CATCH BASIN
	EXISTING C.O.R. DRYWELL
	EXISTING C.O.R. STORM SEDIMENTATION MANHOLE
	EXISTING UTILITY POLE WITH OVERHEAD UTILITY LINES
	PROPOSED MULTI-USE PATH
	PROPOSED C.O.R. WATER MAIN
	PROPOSED FIRE HYDRANT
	PROPOSED FAR WEST SEWER INTERCEPTOR (SIZE NOTED)
	PROPOSED C.O.R. SANITARY SEWER MAIN (SIZE NOTED)
	PROPOSED SANITARY SEWER MANHOLE AND FLOW DIRECTION
	PROPOSED C.O.R. SANITARY SEWER FORCE MAIN
	GRAVITY SEWER SERVICEABLE AREA TO FAR WEST SEWER INTERCEPTOR LIMIT
	PROPOSED COID IRRIGATION CANAL PIPE
	PROPOSED DRYWELL
	PROPOSED SEDIMENTATION MANHOLE
	PROPOSED CATCH BASIN

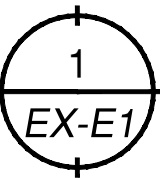
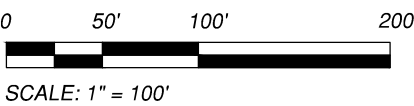
WATER AND SEWER UTILITY NOTES:

- INDIVIDUAL DOMESTIC WATER AND SANITARY SEWER SERVICES SHALL BE PROVIDED TO EACH LOT WITH FUTURE PHASED INFRASTRUCTURE PERMITTING IN ACCORDANCE WITH CITY OF REDMOND STANDARDS AND SPECIFICATIONS.
- LOCATIONS SHOWN FOR COMMON TRACT IRRIGATION SERVICES ARE PRELIMINARY AND SUBJECT TO CHANGE DURING FINAL DESIGN.

*SEWER PEAK FLOW ESTIMATES ARE FOR THE COMPLETE BUILD OUT OF LOTS PROPOSED WITH THE SPRUCE NORTHWEST MASTER DEVELOPMENT PLAN AND PER CITY OF REDMOND DESIGN STANDARDS I.L.C.9.2.a.9:
- SINGLE FAMILY RESIDENTIAL: 130 GAL/ DU/ DAY
- TWO FAMILY/ DUPLEX: 260 GAL/ DU/ DAY
- MULTIFAMILY: 105 GAL/ DU/ DAY (DU ESTIMATED PER ACRE)
- PEAK FACTOR: 3.0 FOR FLOWS LESS THAN 1 MGD (ASSUMED 22 HOUR DAY)

OVERALL PUBLIC FACILITIES
PLAN

SCALE: 1" = 100'



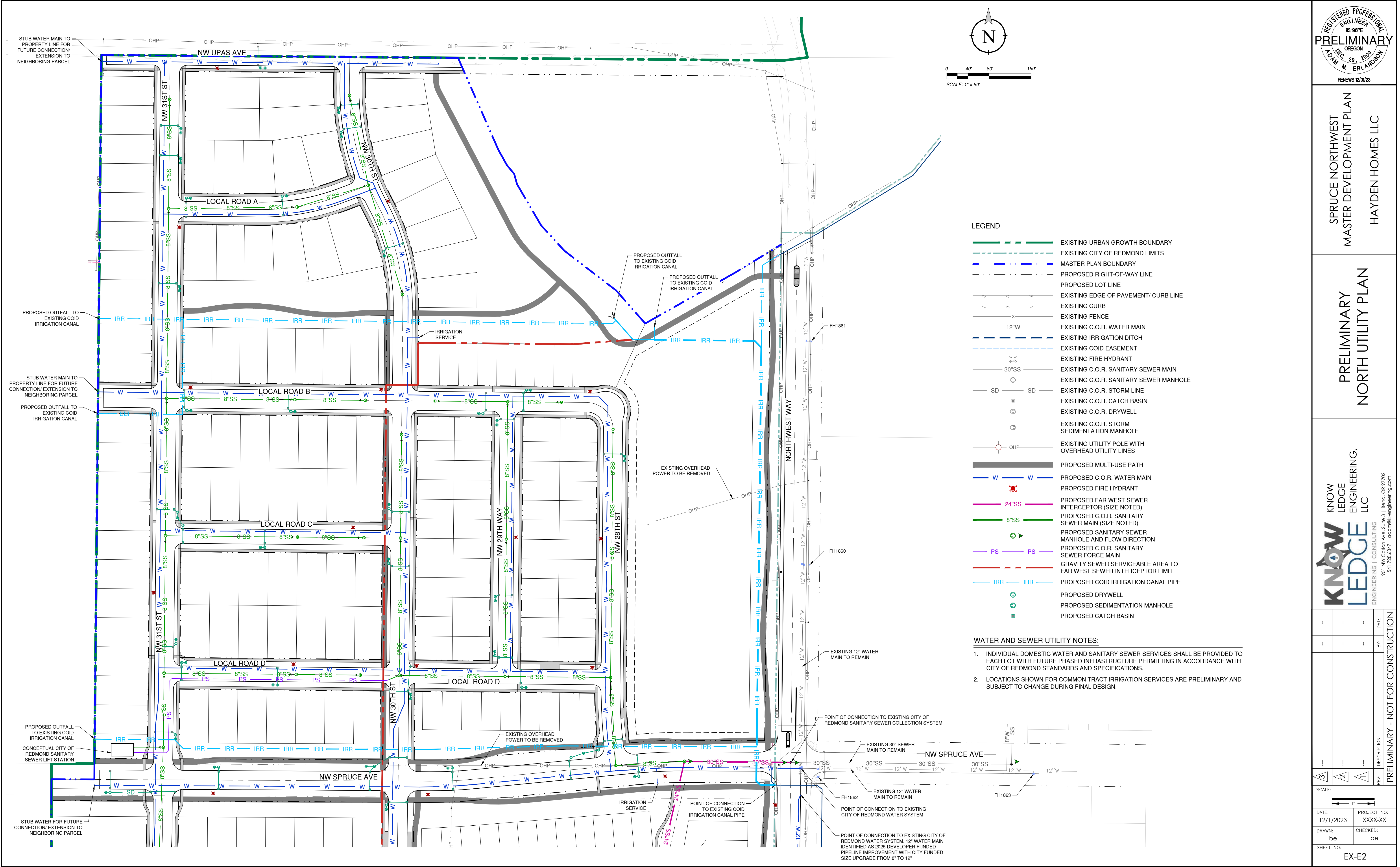
SEE EXHIBITS E3 AND E4 FOR
PROPOSED GRADING AND
DRAINAGE IMPROVEMENTS



KNOW LEDGE
ENGINEERING, LLC
901 NW Carlton Ave., Suite 3
Bend, OR 97703
541.728.6347
adam@kl-engineering.com

ENGINEERING | CONSULTING

PLOT DATE: DECEMBER 1, 2023



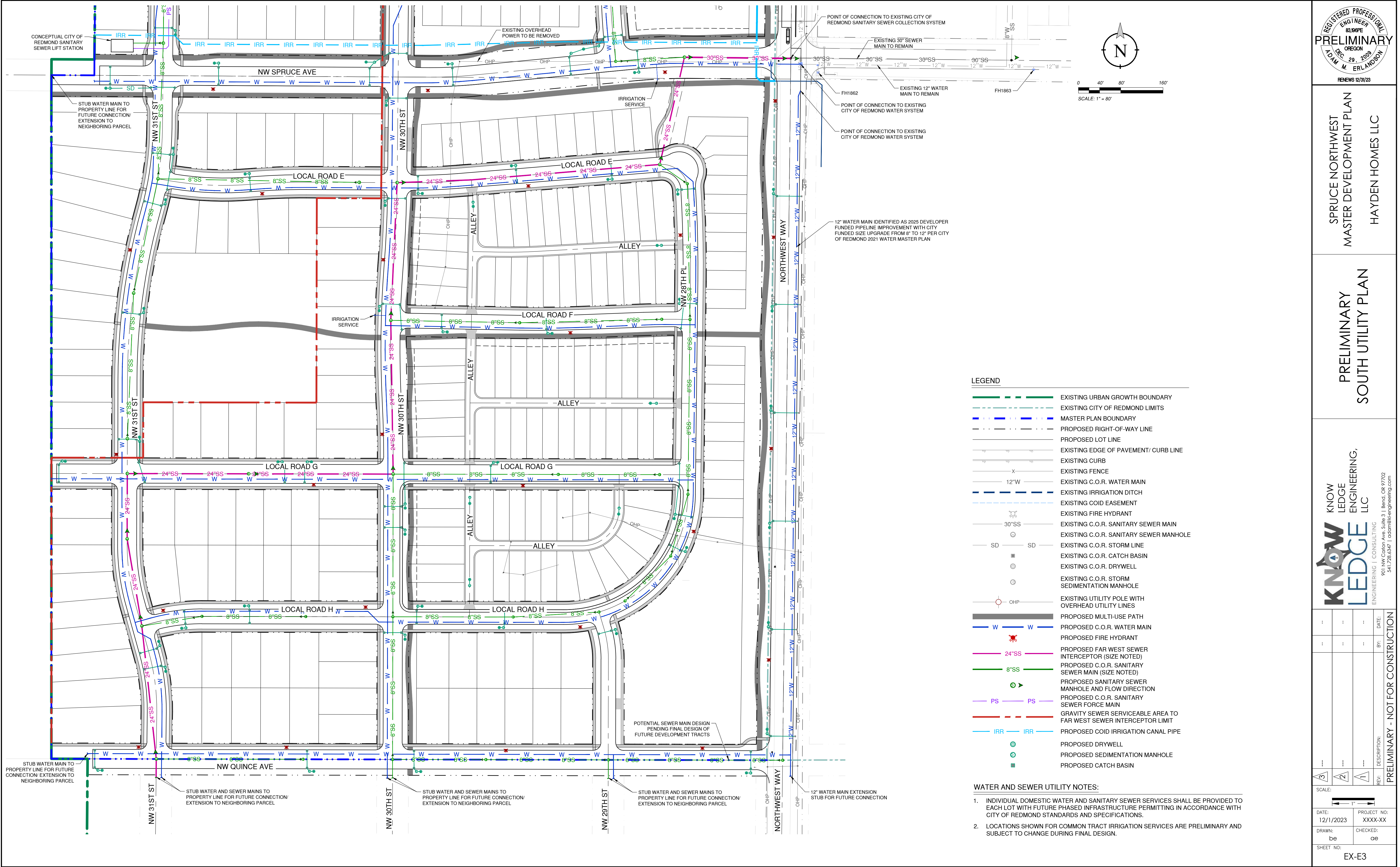
REGISTERED PROFESSIONAL ENGINEER
83,186 P.E.
OREGON
29, 2008
A.D.M. M. ERLANDSON
RENEWALS 12/31/23

SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

PRELIMINARY
NORTH UTILITY PLAN

KNOW
LEDGE
ENGINEERING,
LLC
ENGINEERING | CONSULTING
901 NW Cotton Ave, Suite 3 | Bend, OR 97702
541.728.6547 | adam@knowledgeengineering.com

DATE:	12/1/2023	PROJECT NO:	XXXX-XX
DRAWN:	be	CHECKED:	ae
SHEET NO:	EX-E2		



REGISTERED PROFESSIONAL ENGINEER
83,186 P.E.
OREGON
29, 2008
A.D.M. M. ERLANDSON
RENEWED 12/31/23

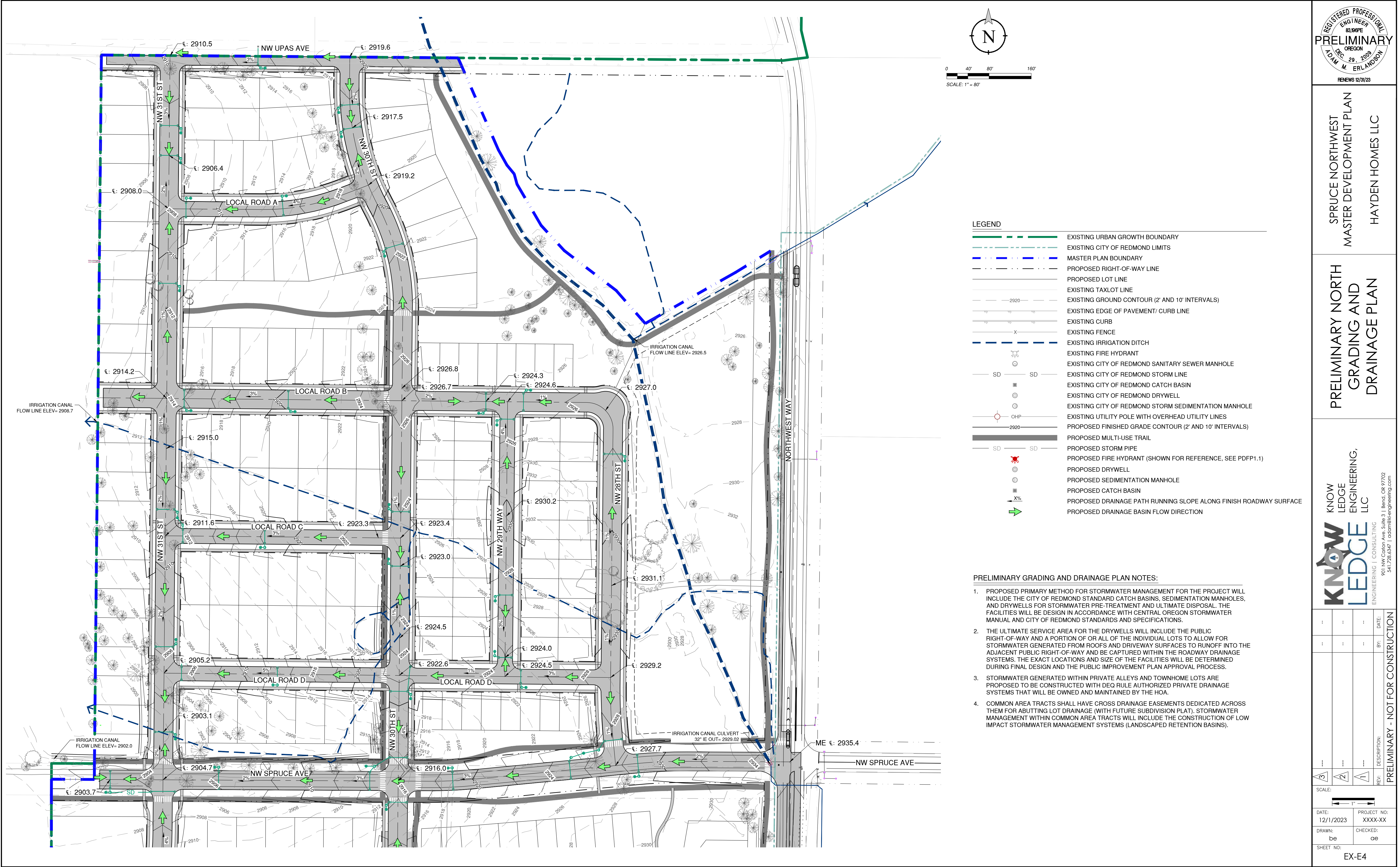
SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

PRELIMINARY
SOUTH UTILITY PLAN

KNOW
LEDGE
ENGINEERING,
LLC
ENGINEERING | CONSULTING
901 NW Cotton Ave, Suite 3 | Bend, OR 97702
541.728.6547 | adam@knowledgeeng.com

DATE:	12/1/2023	PROJECT NO:	XXXX-XX
DRAWN:	be	CHECKED:	ae
SHEET NO:	EX-E3		

PRELIMINARY - NOT FOR CONSTRUCTION



REGISTERED PROFESSIONAL
ENGINEER
83186PPE
OREGON
A.D.M.
M. ERLANDSON
DEC 29, 2008
RENEWS 12/31/23

SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

PRELIMINARY NORTH
GRADING AND
DRAINAGE PLAN

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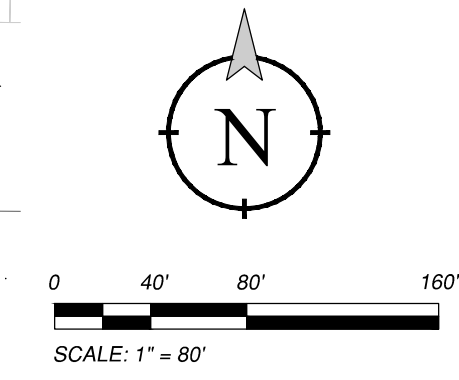
DATE:	12/1/2023	PROJECT NO:	XXXX-XX
DRAWN:	be	CHECKED:	ae
SHEET NO:	EX-E4		



LEGEND

- EXISTING URBAN GROWTH BOUNDARY
- EXISTING CITY OF REDMOND LIMITS
- MASTER PLAN BOUNDARY
- PROPOSED RIGHT-OF-WAY LINE
- PROPOSED LOT LINE
- EXISTING TAXLOT LINE
- EXISTING GROUND CONTOUR (2' AND 10' INTERVALS)
- EXISTING EDGE OF PAVEMENT/ CURB LINE
- EXISTING CURB
- EXISTING FENCE
- EXISTING IRRIGATION DITCH
- EXISTING FIRE HYDRANT
- EXISTING CITY OF REDMOND SANITARY SEWER MANHOLE
- EXISTING CITY OF REDMOND STORM LINE
- EXISTING CITY OF REDMOND CATCH BASIN
- EXISTING CITY OF REDMOND DRYWELL
- EXISTING CITY OF REDMOND STORM SEDIMENTATION MANHOLE
- EXISTING UTILITY POLE WITH OVERHEAD UTILITY LINES
- PROPOSED FINISHED GRADE CONTOUR (2' AND 10' INTERVALS)
- PROPOSED MULTI-USE TRAIL
- PROPOSED STORM PIPE
- PROPOSED FIRE HYDRANT (SHOWN FOR REFERENCE, SEE PDFP1.1)
- PROPOSED DRYWELL
- PROPOSED SEDIMENTATION MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PATH RUNNING SLOPE ALONG FINISH ROADWAY SURFACE
- PROPOSED DRAINAGE BASIN FLOW DIRECTION

- PRELIMINARY GRADING AND DRAINAGE PLAN NOTES:**
- PROPOSED PRIMARY METHOD FOR STORMWATER MANAGEMENT FOR THE PROJECT WILL INCLUDE THE CITY OF REDMOND STANDARD CATCH BASINS, SEDIMENTATION MANHOLES, AND DRYWELLS FOR STORMWATER PRE-TREATMENT AND ULTIMATE DISPOSAL. THE FACILITIES WILL BE DESIGN IN ACCORDANCE WITH CENTRAL OREGON STORMWATER MANUAL AND CITY OF REDMOND STANDARDS AND SPECIFICATIONS.
 - THE ULTIMATE SERVICE AREA FOR THE DRYWELLS WILL INCLUDE THE PUBLIC RIGHT-OF-WAY AND A PORTION OF OR ALL OF THE INDIVIDUAL LOTS TO ALLOW FOR STORMWATER GENERATED FROM ROOFS AND DRIVEWAY SURFACES TO RUNOFF INTO THE ADJACENT PUBLIC RIGHT-OF-WAY AND BE CAPTURED WITHIN THE ROADWAY DRAINAGE SYSTEMS. THE EXACT LOCATIONS AND SIZE OF THE FACILITIES WILL BE DETERMINED DURING FINAL DESIGN AND THE PUBLIC IMPROVEMENT PLAN APPROVAL PROCESS.
 - STORMWATER GENERATED WITHIN PRIVATE ALLEYS AND TOWNHOME LOTS ARE PROPOSED TO BE CONSTRUCTED WITH DEC RULE AUTHORIZED PRIVATE DRAINAGE SYSTEMS THAT WILL BE OWNED AND MAINTAINED BY THE HOA.
 - COMMON AREA TRACTS SHALL HAVE CROSS DRAINAGE EASEMENTS DEDICATED ACROSS THEM FOR ABUTTING LOT DRAINAGE (WITH FUTURE SUBDIVISION PLAT). STORMWATER MANAGEMENT WITHIN COMMON AREA TRACTS WILL INCLUDE THE CONSTRUCTION OF LOW IMPACT STORMWATER MANAGEMENT SYSTEMS (LANDSCAPED RETENTION BASINS).



REGISTERED PROFESSIONAL
ENGINEER
OREGON
ADAM M. ERLANDSON
29, 2008

PRELIMINARY

RENEWALS 12/31/23

SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

PRELIMINARY SOUTH
GRADING AND
DRAINAGE PLAN

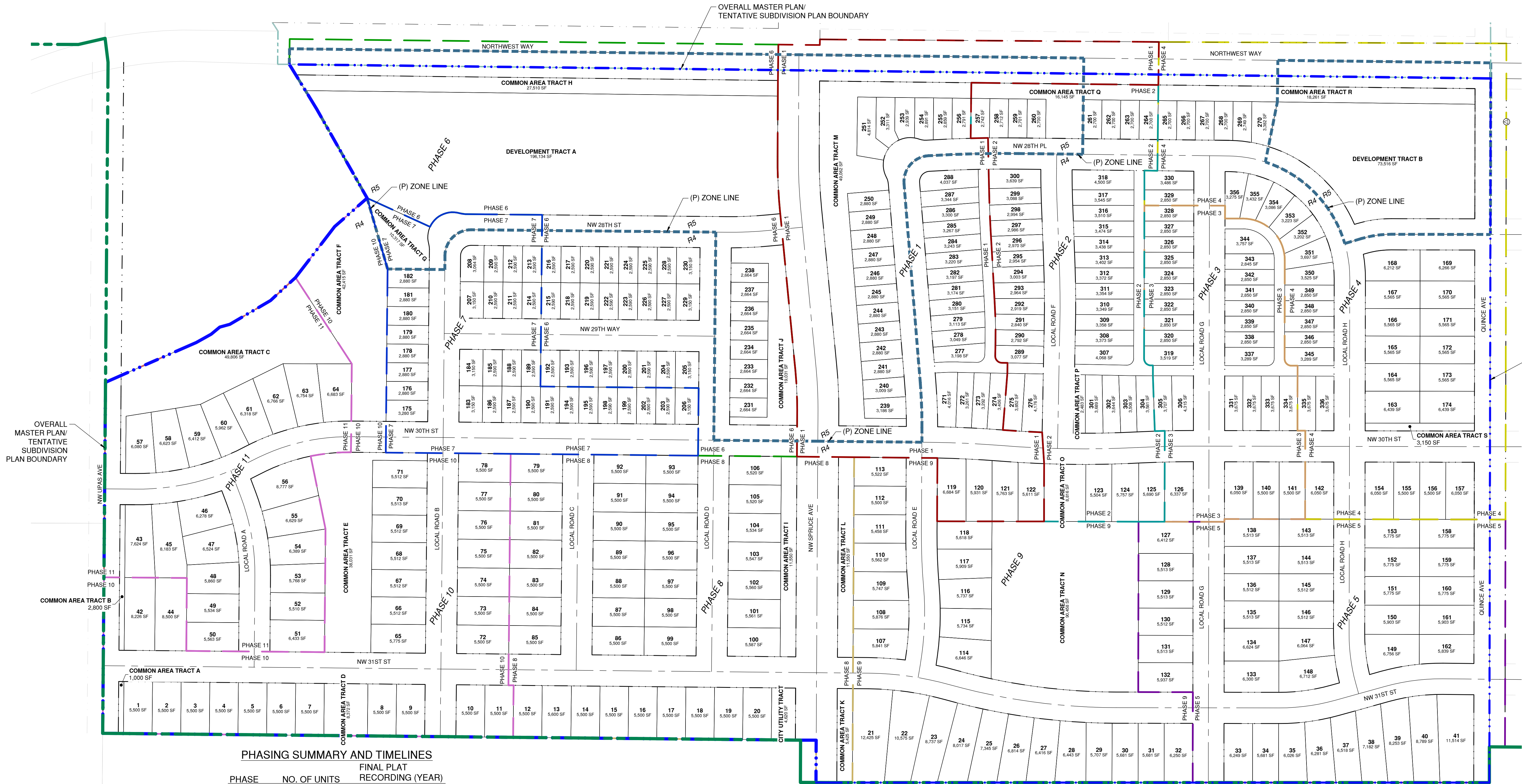
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LLC
ENGINEERING | CONSULTING
901 NW Cotton Ave, Suite 3 | Bend, OR 97702
541.728.6547 | adam@knowledge-engineering.com

DATE: 12/1/2023	PROJECT NO: XXXX-XX
DRAWN: be	CHECKED: ae
SHEET NO: EX-E5	

PRELIMINARY - NOT FOR CONSTRUCTION

SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

TENTATIVE
SUBDIVISION PLAN
OVERVIEW



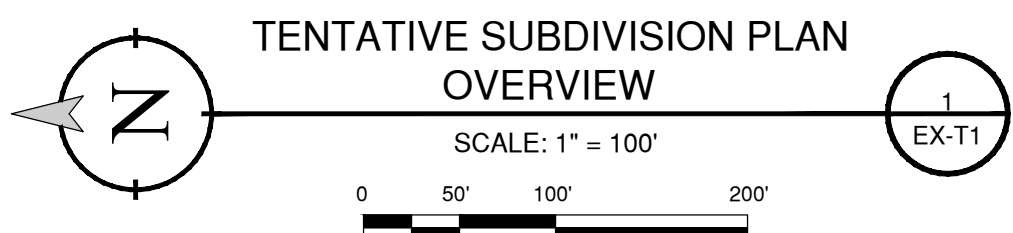
PHASING SUMMARY AND TIMELINES

PHASE	NO. OF UNITS	FINAL PLAT RECORDING (YEAR)
PHASE 1	38	2025
PHASE 2	41	2026
PHASE 3	28	2026
PHASE 4	39, DEV TRACT B	2027
PHASE 5	37	2027
PHASE 6	32, DEV TRACT A	2028
PHASE 7	32	2028
PHASE 8	37	2029
PHASE 9	24	2029
PHASE 10	27	2030
PHASE 11	21	2030

- NOTES:
- THE GENERAL PHASING, SEQUENCING, AND DEVELOPMENT TIMELINES ARE ESTIMATED BASED ON CURRENT MARKET CONDITIONS. THE DEVELOPMENT SCHEDULE MAY BE ALTERED BY FUTURE MARKET CONDITIONS AS DETERMINED BY APPLICANT.
 - THE PUMP STATION MAY BE INSTALLED AT AN EARLIER DATE PENDING FUTURE MARKET CONDITIONS AS DETERMINED BY APPLICANT.
 - IF PHASING SEQUENCE IS ALTERED BY FUTURE MARKET CONDITIONS, ALL REQUIRED CONNECTING INFRASTRUCTURE IMPROVEMENTS TO SERVE A PARTICULAR PHASE SHALL BE COORDINATED WITH, REVIEWED, AND APPROVED BY THE CITY OF REDMOND ENGINEERING DEPARTMENT WITH FUTURE INFRASTRUCTURE PERMITTING PROCESS.

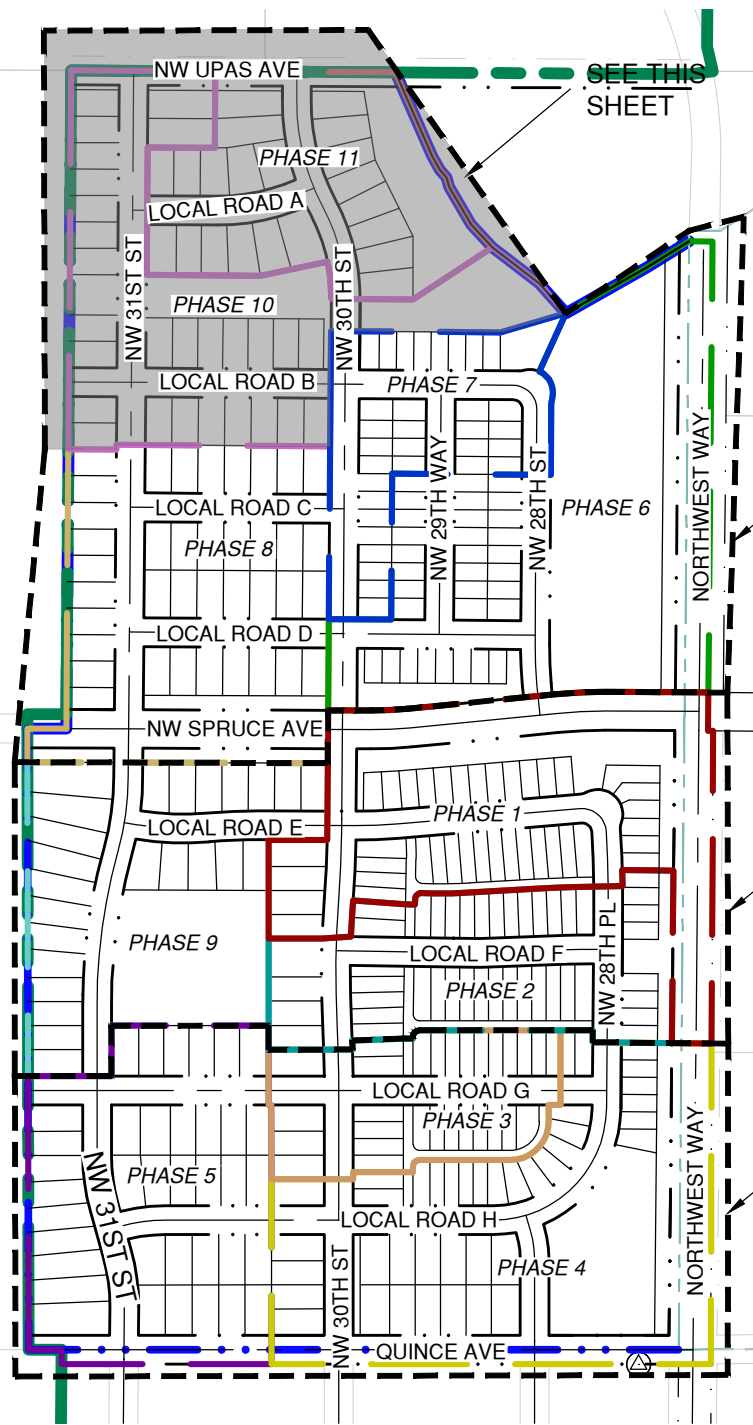
GRAVITY SEWER TO
NORTHWEST INTERCEPTOR

REQUIRE OPERATIONAL
PUMP STATION



OVERALL MASTER PLAN/
TENTATIVE SUBDIVISION PLAN
BOUNDARY

OVERALL MASTER PLAN/
TENTATIVE SUBDIVISION PLAN
BOUNDARY

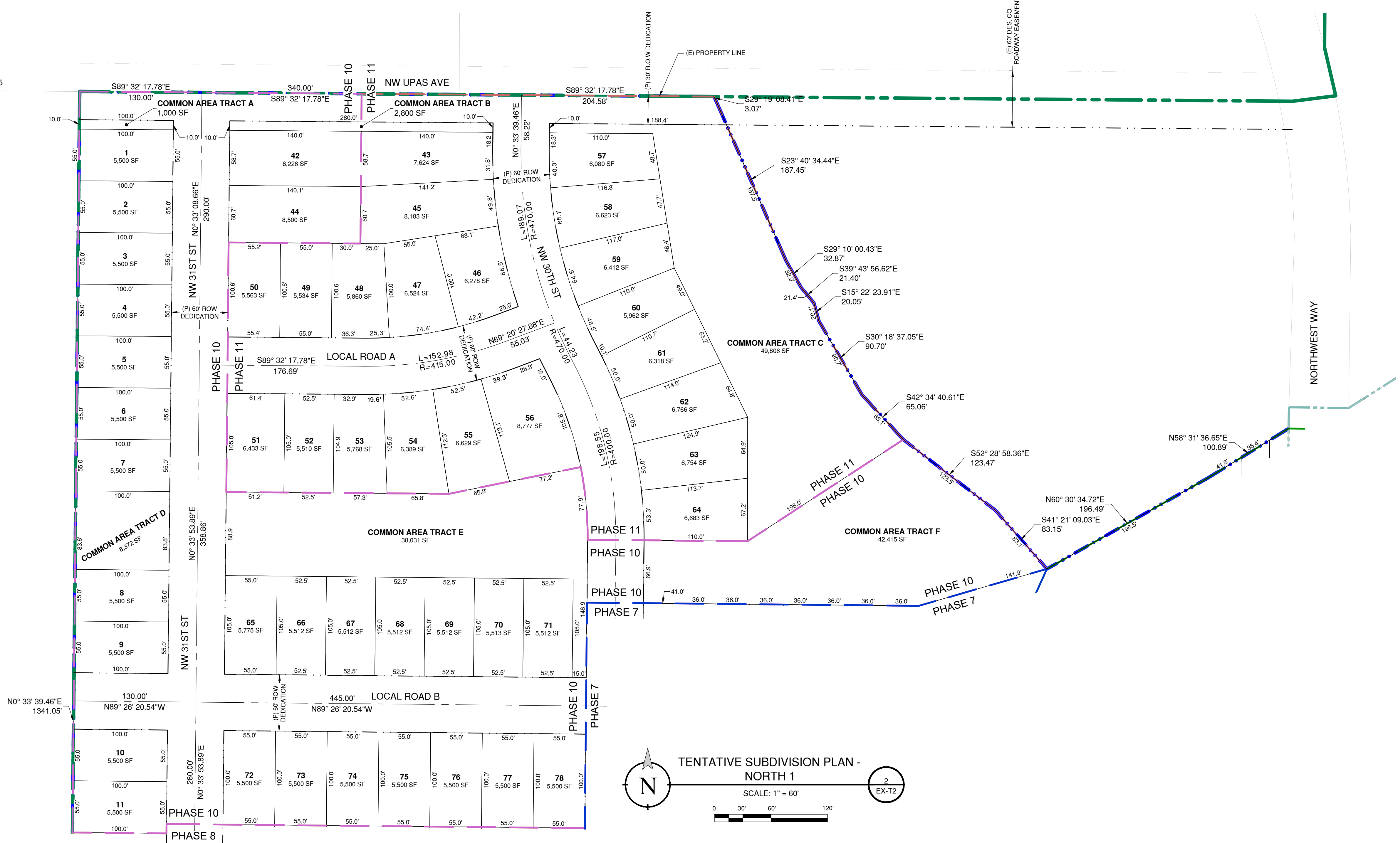


TENTATIVE
SUBDIVISION PLAN
OVERVIEW
SCALE: 1" = 400'
0 200' 400' 800'

SEE 2/EX-T3

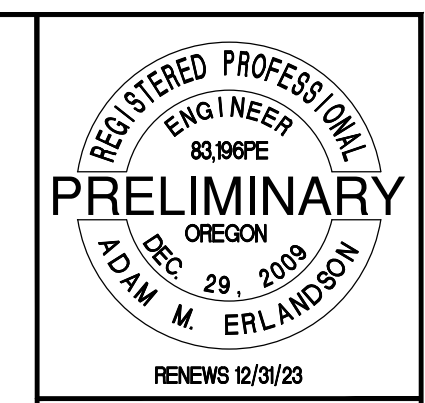
SEE 2/EX-T4

SEE 2/EX-T5



TENTATIVE SUBDIVISION PLAN -
NORTH 1
SCALE: 1" = 60'
0 30' 60' 120'

PUBLIC UTILITY EASEMENT DIMENSIONS AND
CONFIGURATION TO BE DETERMINED DURING FINAL DESIGN.

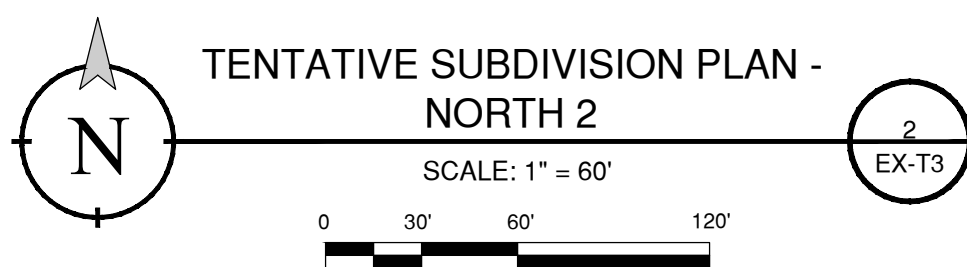
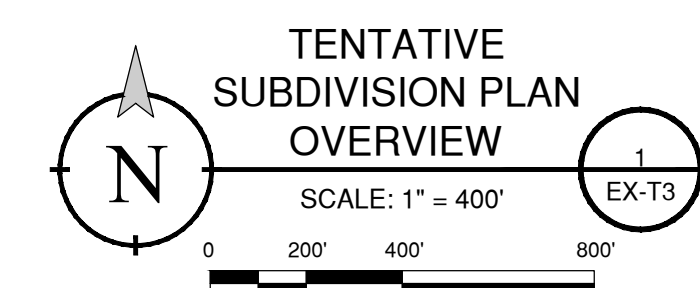


SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

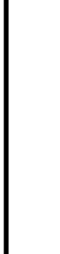
TENTATIVE
SUBDIVISION PLAN -
NORTH 1

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LLC
ENGINEERING | CONSULTING
901 NW Cotton Ave, Suite 3 | Bend, OR 97702
541.728.6547 | adam@knowledge-engineering.com

1	1	1	DATE:
1	1	1	BY:
1	1	1	DESCRIPTION:
1	1	1	REVISION:
1	1	1	DATE:
1	1	1	PROJECT NO:
1	1	1	XXXX-XX
1	1	1	DRAWN:
1	1	1	be
1	1	1	CHECKED:
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1	1	1	SHEET NO:
1	1	1	EX-T2



TENTATIVE
SUBDIVISION PLAN -
NORTH 2



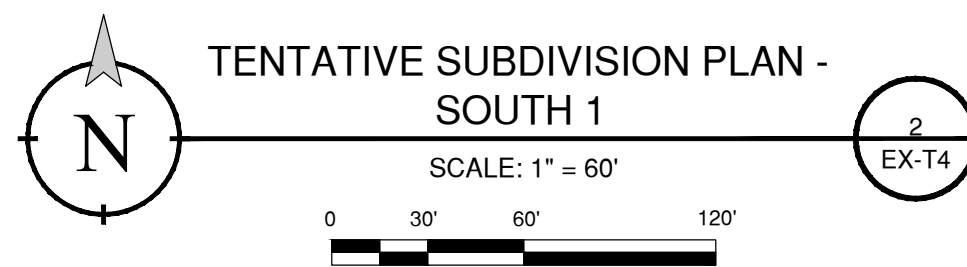
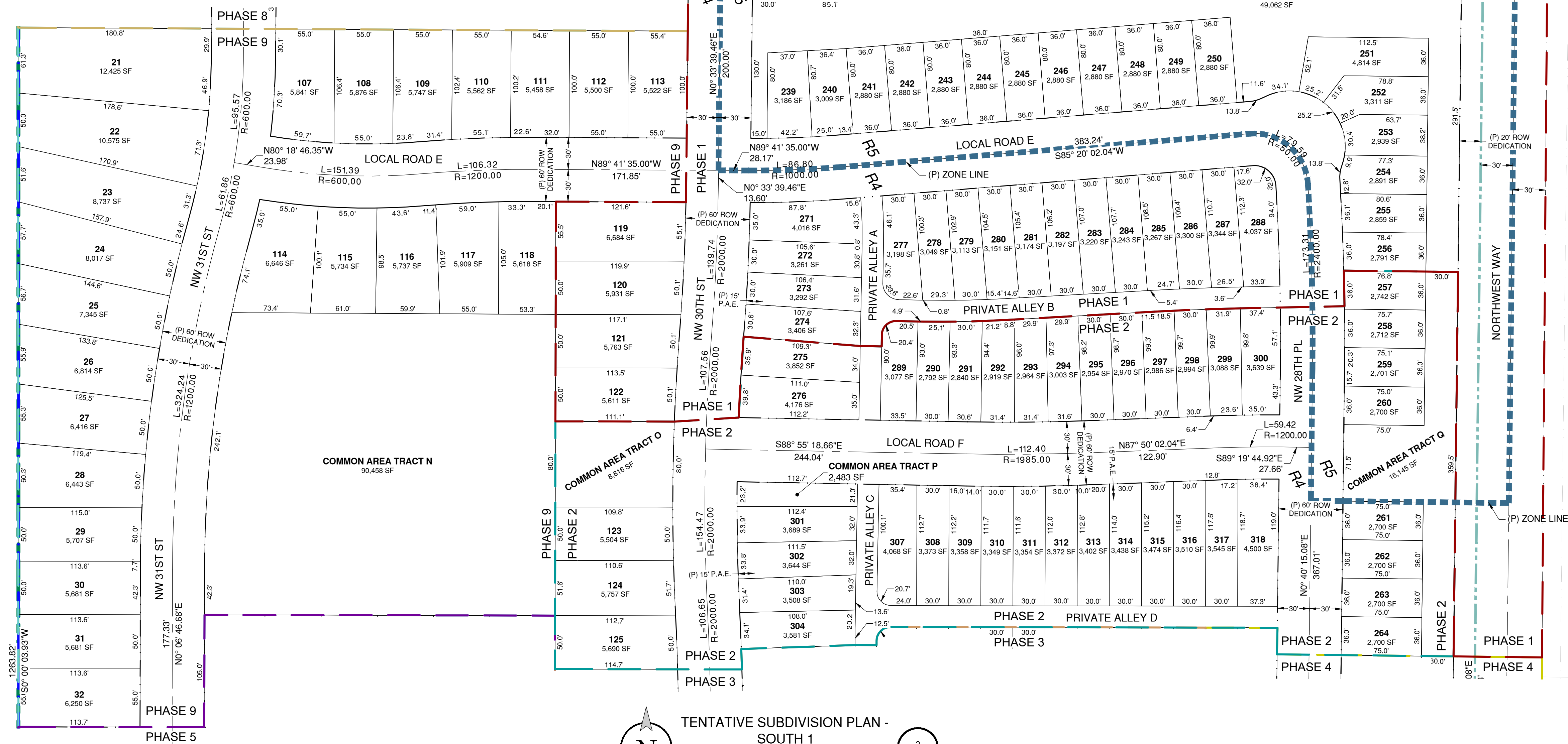
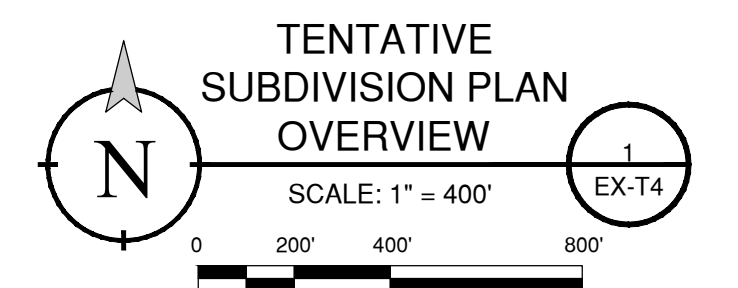
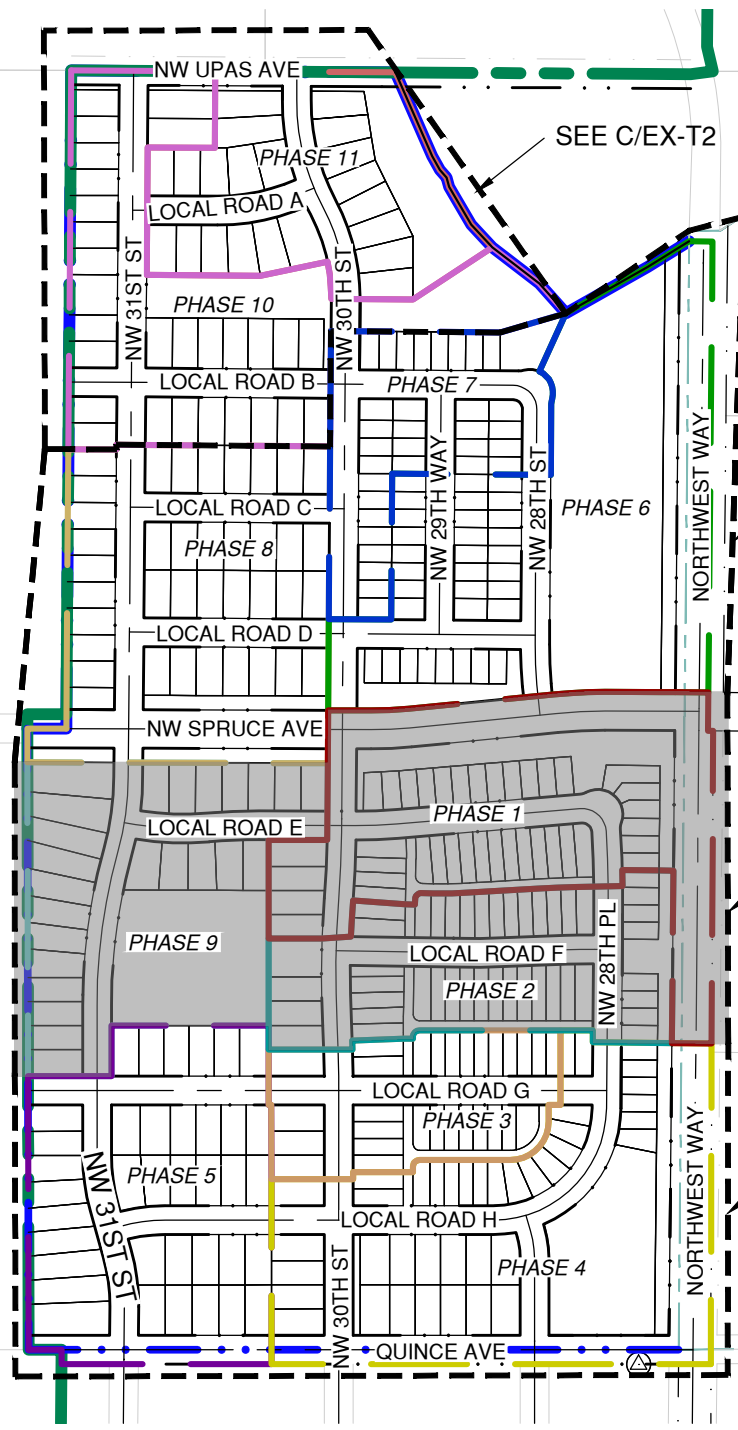
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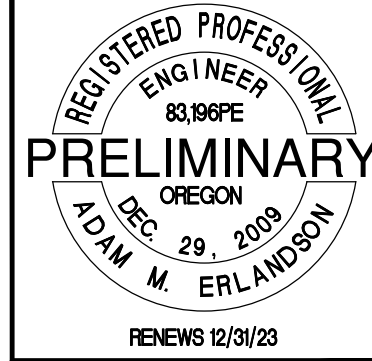
901 NW Catron Ave. Suite 3 | Bend, OR 97702

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PUBLIC UTILITY EASEMENT DIMENSIONS AND
CONFIGURATION TO BE DETERMINED DURING FINAL DESIGN



PUBLIC UTILITY EASEMENT DIMENSIONS AND CONFIGURATION TO BE DETERMINED DURING FINAL DESIGN.

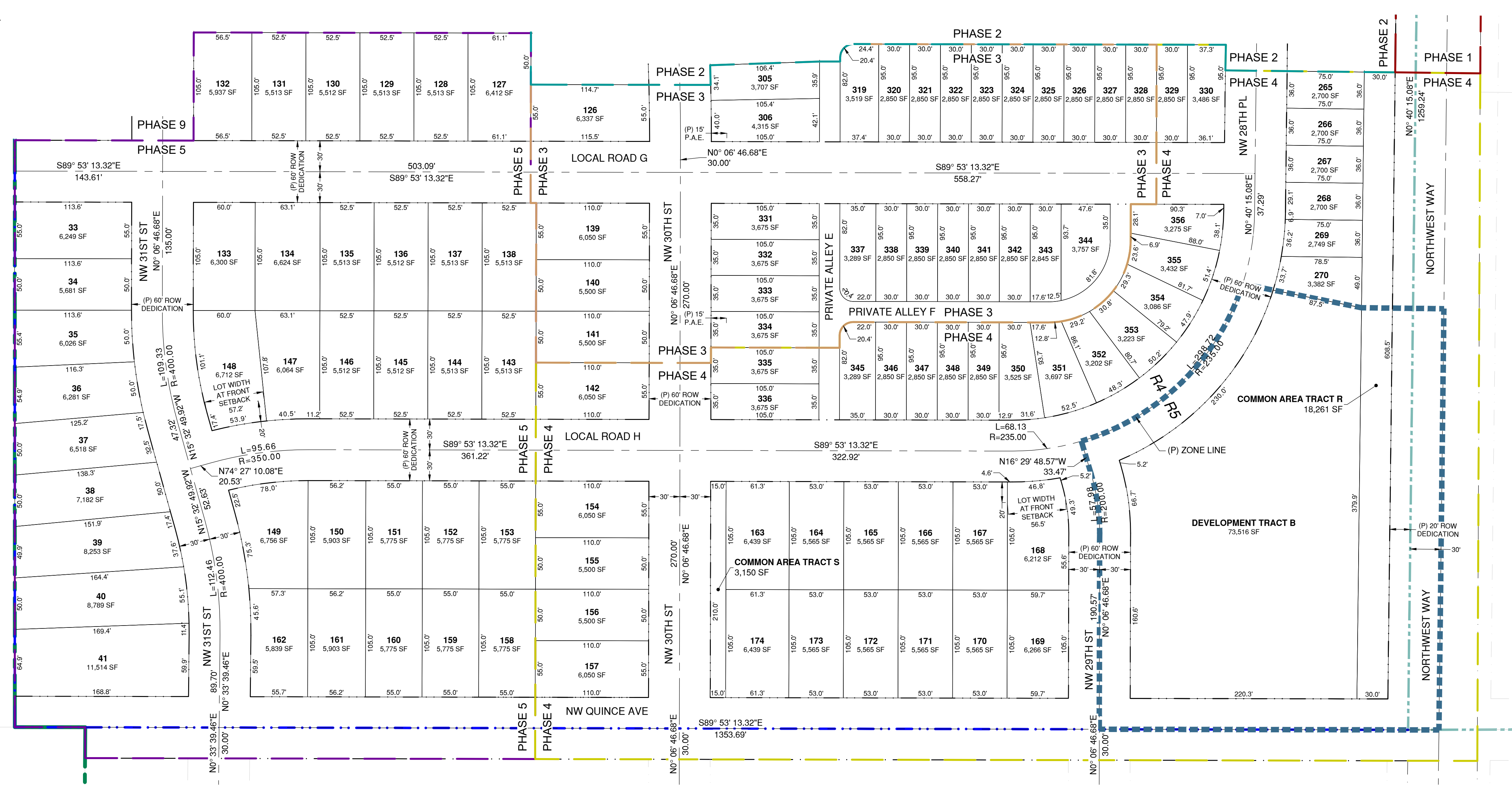
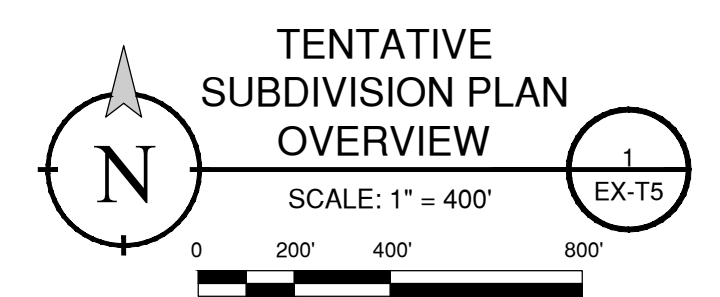
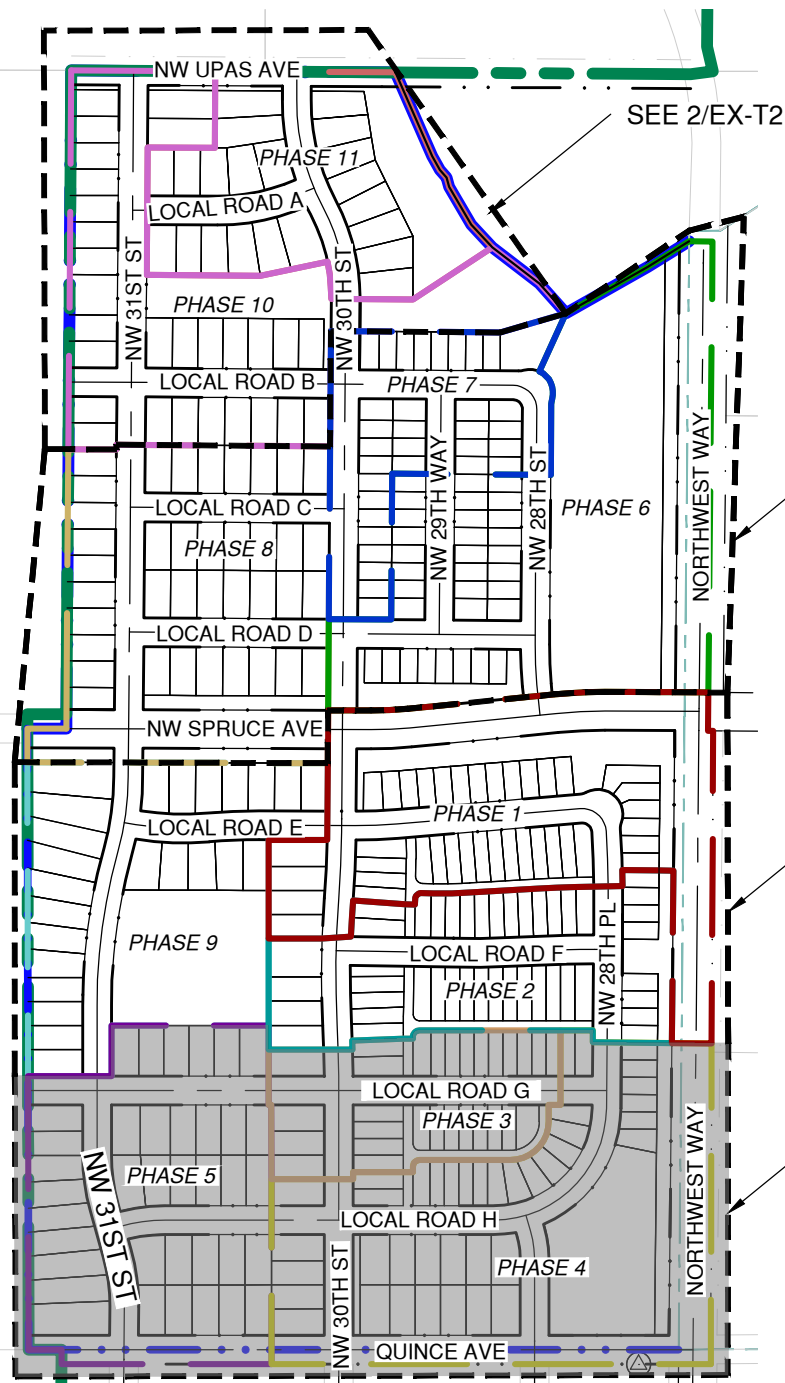


SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

TENTATIVE SUBDIVISION
PLAN - SOUTH 1

KNOW
LEDGE
ENGINEERING, LLC
ENGINEERING | CONSULTING
901 NW Cotton Ave, Suite 3 | Bend, OR 97702
541.728.6549 | adam@knowledge-engineering.com

DATE:	12/1/2023	PROJECT NO:	XXXX-XX
DRAWN:	be	CHECKED:	ae
SHEET NO:	EX-T4	PRELIMINARY - NOT FOR CONSTRUCTION	



Burden of Proof Statement
Spruce Northwest Master Development Plan
Master Development Plan / Comprehensive Plan Map Amendment / Zone Change

Applicant: Hayden Homes
Megan Norris
2464 SW Glacier Place, Suite #110
Redmond, OR 97756

Owner: HLM, Inc.
1513050000600 963 SW Simpson Avenue #110
Bend, OR 97702

Owner: TeAmo Despacio, LLC
1513050000804 963 SW Simpson Avenue #110
Bend, OR 97702

Owner: Northwest Way Land JV, LLC
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Location: The application development area contains multiple properties that are located in the northwest corner of the Redmond Urban Growth Boundary (UGB); west of Northwest Way, north of the NW Quince Avenue extension, and south of NW Upas Avenue. The central portion of the property is located at the intersection of Northwest Way and NW Spruce Avenue and the Dry Canyon Village development is located east of the site.

The properties have been assigned the following addresses and tax map and lot numbers.

Address	Tax Map and Lot Number
2917 NORTHWEST WAY	1513050000600
2515 NORTHWEST WAY	1513050000800
2902 NW SPRUCE AVE	1513050000804

Request: Review of a Master Development Plan of a 76.82-acre area, along with a Comprehensive Plan Map Amendment and Zone Change that affects 7 acres of land (changing 3.5 acres of land from R-4 to R-5 and 3.5 acres of land from R-5 to R-4). The planned development is consistent with the Northwest Area Plan (NAP) and it will establish approximately 456 dwellings units (174 detached single family homes, 182 townhomes and approximately 100 multi-family), over 9 acres of parks / open space, and all public utilities and facilities needed to serve the development.

I. Summary and Background

Summary

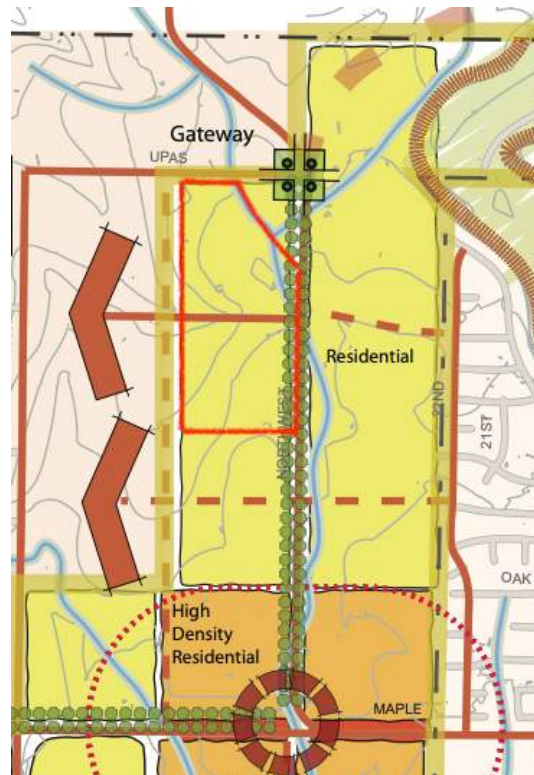
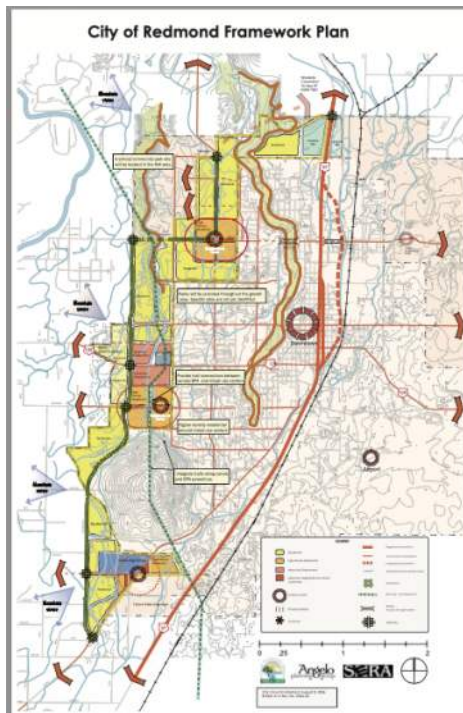
The proposal includes a Comprehensive Plan Map Amendment and Zone Change to “swap” 7 acres of R-4 and R-5 land (changing 3.5 acres of land from R-4 to R-5 and 3.5 acres of land from R-5 to R-4), along with a Master Development Plan for 76.82 acres of land within the Northwest Areas Plan (NAP). Subsequent to approval, the property will be annexed into the City. The project will provide approximately 456 dwelling units¹, over 9 acres of park/open space, well-connected streets, sidewalks, trails, water and sewer facilities, and all utilities needed to serve the property. Furthermore, the project will pipe the irrigation canals on the property. The project has been designed to be consistent with the City’s Long Range Planning documents for the subject property and surrounding areas, including the Comprehensive Plan, the 2006 Framework Plan (associated with the 2006 UGB Expansion) and the Northwest Area Plan (NAP).

Background

The subject property was brought into the Redmond Urban Growth Boundary (UGB) in 2006. In association with, and subsequent to, inclusion into the UGB, the property (and greater northwest area) have had a substantial amount of community planning time and energy invested into it. At the time of inclusion into the Redmond UGB, the subject property included 60.21 acres of R-4 designated land and 16.61 acres of R-5 designated land; land that was intended for residential purposes. With the UGB Expansion, the City adopted a Framework Plan to better plan for growth in the northwest area of the Redmond UGB; as established in the Introduction of the Findings for the UGB Expansion and Framework Plan (Page 2):

¹ The design is planned to include 174 detached single-family units, 182 attached cottage/townhome units and approximately 100 multi-family complex units.

This single UGB amendment is designed to provide housing and associated needs for the next 20 years. The entire area proposed for UGB expansion is illustrated in Figure 1.1, and the properties included in this area are listed in Exhibit A. However, it is the “Northwest Area” that is expected to be the first portion of the proposed UGB expansion area to be provided with services and urbanize. This area is illustrated in Figure 1.2 and properties inside this area are listed in Exhibit B. Consequently, more detailed transportation and public facility planning has been performed for this area.



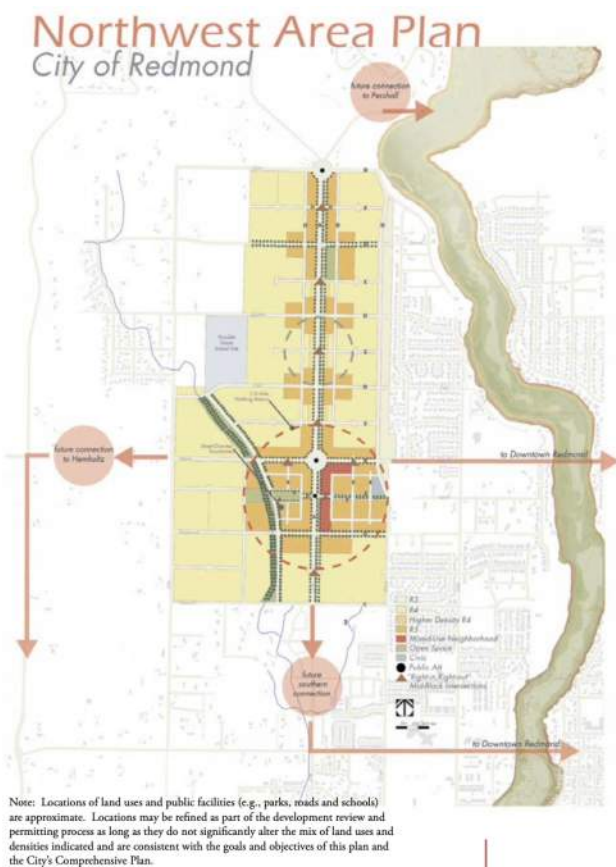
In August 2007, subsequent to the 2006 UGB Expansion and Framework Planning process, the City of Redmond undertook an additional, and more refined Area Planning process for Northwest Redmond. The end result was the “Northwest Area Plan (NAP) Land Use and Public Improvements”. The NAP is a refinement to the Comprehensive Plan and to the Framework Plan. The Redmond community made a substantial investment into this planning effort; the NAP enhances and refines the development details to the otherwise broad Comprehensive Plan and Framework Plan. As detailed in the NAP document (pages 2-4), the NAP is consistent with the:

- City Comprehensive
- Framework Plan
- Statewide Planning Goals
- Great Neighborhood Principles

The added level of analysis, assessment, and planning that went into the NAP was intended to ensure effective planning for the community. Such a process helps to ensure

adequate facilities can be provided to the area and it aids both property owners and neighbors to understand and anticipate future development that could occur. As noted in the document (Page 8):

The annexation and development approval process may be accelerated, provided the zoning and proposed land development is consistent with the NAP.



The current project is consistent with the NAP. While the project does include a minor Comprehensive Plan Map Amendment (to slightly adjust the exact location of the R-4 and R-5 lands on the subject property), the end result is the same as in 2006, 60.21 acres of R-4 designated land and 16.61 acres of R-5 designated land, in the same general location. The R-4 and R-5 relocations are minor and are only needed to accommodate an efficient design. Minor changes like this were anticipated with the NAP (page 4):

1.4 Plan Adoption and Implementation

The neighborhood plan will be adopted as an element of the Redmond Comprehensive Land Use Plan. A separate map amendment will be adopted along with the plan. That map amendment will formally establish general land use plan designations for each property covered by the plan. However, the Plan designations and specific zoning may be slightly modified

during Plan implementation. Because the neighborhood plan amends the comprehensive plan, adoption requires legislative approval by the city council.

Overall, the applicant has utilized the adopted long range plans to guide the design of the proposed Master Development Plan. As detailed in the attached plans and throughout this document, the project is based upon and consistent with the Redmond Comprehensive Plan, the Framework Plan, and the NAP. As such, the applicant anticipates that the annexation and development approval process may be accelerated, to the extent possible.

II. Applicable Criteria, Standards, and Procedures:

The following documents, statutes, rules, and/or Code sections are directly or indirectly relevant or applicable to the proposal.

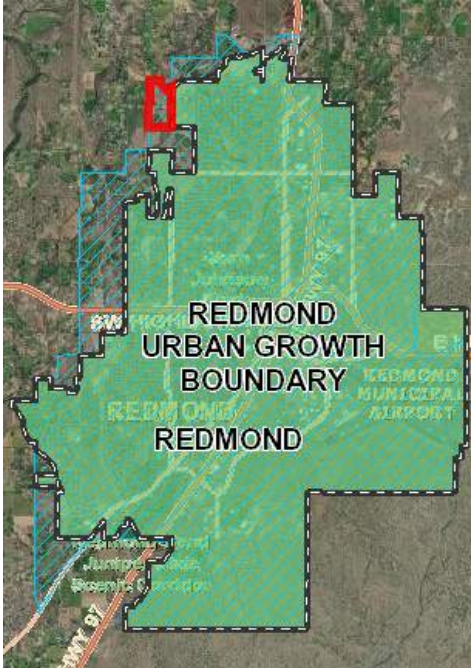
- The City of Redmond Urban Area 2040 Comprehensive Plan
- The City of Redmond Framework Plan
- Northwest Area Plan
- City of Redmond Transportation System Plan
- City of Redmond Public Facility Master Plans (Water, Wastewater)
- City of Redmond Park Master Plan
- Oregon Revised Statutes (ORS) – ORS 197.250
- Oregon Administrative Rules (OAR)
 - Division 12, Transportation Planning Rule – OAR 660-012-0000
 - Division 15, Statewide Planning Goals and Guidelines – OAR 660-015-0000
- The City of Redmond Development Code, Chapter 8;
 - Section 8.0115, General Residential R-4 Zone
 - Section 8.0120, High density Residential R-5 Zone
 - Section 8.0130, Urban Holding UH-10 Zone
 - Section 8.0135, Table A, Residential Zones, Uses Permitted
 - Section 8.0140, Table B Minimum Standards
 - Section 8.0270, Master Development Plans
 - Section 8.0385, Neighborhood Meeting Requirements
 - Sections 8.0750 through 8.0770, Amendments

III. General Facts:

1. LOCATION: The application area contains multiple properties that are located in the northwest corner of the Redmond Urban Growth Boundary (UGB); west of Northwest Way, north of the NW Quince Avenue extension, and south of NW Upas Avenue. The central portion of the property is located at the intersection of Northwest Way and NW Spruce Avenue and the Dry Canyon Village development is located east of the site.

The properties have been assigned the following addresses and tax map and lot numbers.

Address	Tax Map and Lot Number
2917 NORTHWEST WAY	1513050000600
2515 NORTHWEST WAY	1513050000800
2902 NW SPRUCE AVE	1513050000804



2. ZONING AND GENERAL PLAN DESIGNATIONS: The subject properties have not been annexed into the City, thus are zoned Urban Holding 10 (UH-10); they are designated R-4 and R-5 on the Redmond Comprehensive Plan Map. The properties are located within the Redmond UGB, but are located outside of the Redmond City Limits.

3. SITE DESCRIPTION & SURROUNDING USES: The area subject to the application is 76.82 acres in size. The topography generally slopes to the west, it has over 30 feet of elevation change over the property, and has canals and ridges transect the property. The property has been developed with 3 dwellings and a number of farm buildings. The site has historically been irrigated, containing hay fields, and it has been used for livestock grazing. The northernmost tax lot has the greatest amount of topographic variance, ridges, and Juniper trees amongst the unirrigated area, along with trees and vegetation, in addition to the farm house. The southern tax lots primarily consist of irrigated fields and farm houses, with trees around the farm houses and a few unirrigated ridge areas.

The property is abutted by Northwest Way to the east and NW Upas Avenue to the north.

- Northwest Way is classified as a *Minor Arterial*. It has a varying ROW width ranging from 60- to 80-feet. Along the site frontage, Northwest Way has two travel lanes and bicycle lanes. Also, a striped median is provided along a portion of the site frontage. Frontage improvements for the Dry Canyon PUD have been built along a portion of the east side of the road, which include curb, landscape strip, and a paved multi-use path.
- NW Upas Avenue is a *Local Street* on the northern edge of the site. It connects to NW 35th Street to the west and terminates at a T-intersection with Northwest Way. NW Upas is a two-lane rural road with gravel shoulders. While the road contains a public access easement, private property ownership extends to the roadway centerline.

East of the site, a 30-inch sewer main has been extended within NW Spruce Avenue, extending west to Northwest Way. The existing sewer system provides a gravity main at the edge of the subject property, which connects to a broader system that extends to the City's Wastewater Treatment Facility, consistent with the City of Redmond Public Facility Plan. A 12-inch water main is located in Northwest Way, extending from NW Spruce Avenue to the northern point of the property. The existing system has a flow rate of 1574 GPM at Hydrant FH1863. The existing water system connects to a broader system that serves the City, consistent with the City of Redmond Public Facility Plan.

The property is located at the rural/urban interface, it is within the Redmond UGB, but outside of the City Limits. Properties to the north and west are located outside of the Redmond UGB; they are zoned Deschutes County – Exclusive Farm Use and used for small agricultural and rural residential uses. Properties to the east are located within the Redmond UGB and the Redmond City Limits; they are zoned R-4 and R-5, and they are experiencing rapid urban development, including clearing and site preparation for detached single-family homes, townhouses, and multi-family developments.

4. PROPOSAL: Master Development Plan of a 76.82-acre area, along with a Comprehensive Plan Map Amendment and Zone Change that affects 7 acres of land (changing 3.5 acres of land from R-4 to R-5 and 3.5 acres of land from R-5 to R-4). The planned development is consistent with the Northwest Area Plan (NAP) and it will establish approximately 456 dwellings units (174 detached single family homes, 182 townhomes and approximately 100 multi-family), over 9 acres of parks / open space, and all public utilities and facilities needed to serve the development.

5. EXHIBITS: In addition to this burden of proof statement, the applicant submits the following exhibits in support of this proposal:

- Application Forms & Fees
- Title Report
- Traffic Impact Analysis / TPR Analysis

- Master Development Plan Packet
 - Master Development Plan
 - Existing Conditions
 - Master Development Plan
 - Uses and Densities
 - Street Layout
 - Parks/Open Space
 - Trails and Amenities
 - Transportation Plan
 - Street Sections
 - Public Facilities Plans
 - Preliminary Grading and Drainage Plans
 - Architectural Design Examples
 - Sign Examples
 - Draft CC&Rs

- Comprehensive Plan / Zoning Map Packet
 - Existing Plan Designations and Zones / Proposed Plan Designations and Zones

6. NEIGHBORHOOD MEETING: Two Neighborhood Meetings were held, one on June 20, 2023 and one on June 29, 2023. The meetings were held at St. Thomas Catholic Church, 1720 NW 19th Street in Redmond, which is less than a mile from the subject property. Prior to the June 20, 2023 meeting, notice was sent to neighboring property owners within 750 feet and a sign was posted on the property for over 7 days prior to the June 29, 2023 meeting. At the meetings, sign-in sheets were provided, project details were relayed, and the applicant heard questions and concerns from attendees. The meetings were held in conformance with RDC 8.0385; details of the meetings are included as an Exhibit.

7. PUBLIC NOTICE: The applicant understands that the City of Redmond Planning

Division will send and publish notice of the application as required by the Redmond Development Code and Statutory requirements.

IV. Compliance with The City of Redmond Development Code

RESIDENTIAL USE ZONES

8.0115 General Residential R-4 Zone.

8.0120 High Density Residential R-5 Zone.

Applicant Response: While these sections are listed in the Code; the Code does not provide any standards under these sections.

8.0130 Urban Holding UH-10 Zone. The City shall administer the provisions of Title 20 Redmond Urban Area Zoning Ordinance of the Deschutes County Code for this County zoning district.

- 1. Master Development Plans.** The development and approval of an Urban Area Master Plan subject to the provisions of RDC 8.0270 is required as a condition of annexation, prior to or concurrent with rezoning from UH-10 to City zoning districts.

Applicant Response: The property is not annexed into the City; therefore it is zoned UH-10. The proposed development includes an Urban Area Master Plan, which is being submitted concurrent with an annexation request. A complete review of RDC 8.0270 is included below and as detailed therein, the proposal complies with all criteria and standards of that section; therefore it can be approved. Approval of the proposed Master Development Plan and concurrent annexation will result in conformance with this provision.

- 2. Exception to Master Development Plans Requirement.** Approval of a development plan may be granted without going through a Master Development Plan process according to the following requirements:

Non-Residential Properties...

Applicant Response: The proposal is for a residential development; therefore, this section does not apply.

Residential Properties...

- I. The parcel is 3 acres or less in size; and,...**

Applicant Response: The property exceeds 3 acres in size and therefore is not eligible for an exception; an exception to the Master Development Plan requirements is not requested.

8.0135 Table A, Residential Zones, Uses Permitted. The following uses are allowed outright or conditionally in each of the Residential zones as follows:

Residential Uses:	R-4	R-5	RESTRICTIONS AND REQUIREMENTS:
Accessory Building:			
Detached sheds, shops, garages	O	O	Must be located within the property and not in the yard setback areas. Moveable shipping containers, or similar, are not allowed.
Guest House	O	O	No kitchen; uses main houses' sewer & water
Accessory Dwelling Unit / Accessory Suite	O	O	Uses main houses' sewer & water or individual City Services; may have kitchen
Accessory Use	O	O	Includes Home Occupations
Apartments			See Multi-Family Complex / Dwelling
Bed and Breakfast	C	C	
Boarding or Rooming House	O	O	
Cottage Development	O	O	
Manufactured Home	O	O	See Single Family Detached Dwelling
Manufactured Home Park	O	O	See Section 8.0375
Manufactured Home Subdivision	O	O	Subject to compliance w/ applicable ORS
Multi Family Complex (5 + units)	O	O	
Single Family Detached Dwelling, Duplex, Triplex, Quadplex, Townhouse, Cottage Cluster	O	O	
Nursing, Convalescent, and Assisted Living Facility	C	C	More than 15 people
Planned Unit Development	C	C	
Residential Care Facility	C	O	Defined in and regulated by ORS
Residential Care Home	O	O	Defined in and regulated by ORS
Non Residential Uses	R-4	R-5	RESTRICTIONS AND REQUIREMENTS:
Child Care Facility:			
Child Care Center	C	C	
Child Care Home	O	O	
Church, Religious Institution	C	C	
Community Center (private)	C	C	

Community Pool (private)	C	C	
Farm Use, Farming	O	O	
Mini Storage	N	N	
Multi-Use Trail	O	O	
Park	O	O	
Livestock	O	O	Subject to livestock provisions, section 8.0365
Office	C	C	Conditional in conjunction with a master plan or PUD
Retail	C	C	Conditional in conjunction with a master plan or PUD
School (private)	C	C	
Tennis Court (private)	O	O	Non-commercial use only
Public Facility or Emergency Management Services	C	C	
City Owned Utility Facility	O	O	
Private Utility Facility	C	C	

All “R” zones are subject to density transfer provisions. See 8.0020, “Definitions”, Density Transfer, and 8.0367, “OSPR / ‘R’ Zone Density Transfer Provisions.

Applicant Response: The Master Development Plan includes R-4 and R-5 zoned areas and the design is planned to accommodate 3 housing types, a park, trails and open spaces, all of which are permitted in both the R-4 and R-5 Zones.

Planned Housing and Development Types

- Detached single-family homes (174)
- Attached cottage/townhomes (182)
- Multi-family complexes (approximately 100 units)
- Parks and open spaces (9.03 acres)

Pursuant to Table A all of the planned uses of the Master Development Plan area are permitted outright in the zone which they are planned in. Thus, the proposal adequately provides lands that can be developed with uses that are permitted in the R-4 and R-5 zones. Details of the uses will be finalized in association with subsequent land use applications, including Land Divisions, Site Plan Review and/or Building Permit submittals.

8.0140 Table B, Minimum Standards. The following minimum standards apply in each of the Residential zones as follows:

Standard:	R-4	R-5
Minimum Lot size - Square Feet		
Single Family, Duplex, Triplex	5,500	5,500
Quadplex, Cottage Clusters	7,000	7,000
Townhouse	1,500	1,500
Multi-family Complex: 5+ units	No Minimum Lot Size Must Meet Density Standards	

Density – Units/Net Acre		
Minimum Density: All	5	8
Maximum Density: Single Family	8	8
Maximum Density: Duplex, Triplex, Quadplex, Cottage Cluster	No Maximum Density Must Meet Minimum Lot Size	
Maximum Density: Townhouses	25	25
Maximum Density: Multi-family Complex 5+ units	14.5	17.4
Standard	R-4	R-5
Minimum Setback Distance - Feet		
Front Façade, excluding garage	10	10
Interior Side	5	5
Street Side	10	10
Rear	15	5
Attached Garage, access from alley or street	20	20
Setbacks:		
ADUs: Specified in Section 8.0325		
Detached Accessory Structures: Specified in Section 8.0323		
Cottage Clusters: Specified in Section 8.0143		
Cottage Developments: Specified in Section 8.0285 et seq.		
Multi-family Complexes: Specified in Section 8.3035.4E. Table A.		
Townhouses: Specified in Section 8.0142		
Maximum Building Height - Feet	45	45
Minimum Street Frontage - Feet		
Standard Street	50	40
Cul-de-sac	30	30
Flag Lot	20	20
Townhouse	20	20

Applicant Response: Each of the standards of this section are addressed below:

Minimum Lot Size: The Master Development Plan is designed for single-family dwellings in the R-4 Zone, attached cottage / townhomes in the R-4 and R-5, and Multi-Family in the R-5.

Detached Single Family – This unit type is only proposed in the R-4 Zone. The provisions of this section require a minimum lot size of 5,500 square feet. The applicant is aware of the lot size requirements and has conceptually designed the Master Development Plan to accommodate the minimum required lot size. Final lot size and dimensions will be established with subsequent Subdivision review.

Attached Cottage / Townhouse - These unit types are planned in both the R-4 and R-5 Zones. While referred to as “attached” cottages, these units are small dwelling units, on their own lot with a shared wall, thus “townhomes”. In both R-4 and R-5 Zone, the minimum lot size for townhomes is 1,500 square feet. The applicant is aware of the lot size requirements and has conceptually designed the Master Development Plan to accommodate the minimum required lot size. Final lot size and dimensions will be established with subsequent Subdivision review.

Multi-family Complex: 5+ units – This unit type is only planned in the R-5 Zone. The Code does not establish a minimum lot size for this unit type.

Density

Minimum Density - Overall R-4 – As detailed on the Master Development Plan Set, the R-4 Zoned area will provide 326 units on 35.42 net developable acres, which calculates to a density of 9.2 units per acre. The proposed design exceeds the minimum required 5 units per acre.

Minimum Density - Overall R-5 – As detailed on the Master Development Plan Set, the R-5 Zoned area will provide approximately 130 units on 8.12 net developable acres, which calculates to a density of 16 units per acre. The proposed design exceeds the minimum requires 8 units per acre .

Maximum Density - Single Family – Single-family detached housing is only proposed in the R-4 Zoned area. As detailed in the Plan Set, the design provides 174 detached single family units on 24 net acres of land, which equates to 7.2 units per acre and is less than the maximum allowed 8 units per acre.

Maximum Density - Townhouses – Within both the R-4 and R-5 Zones, townhouses are allowed up to a maximum of 25 units per acre. As detailed on the Plan Set, in the R-4 zoned land the design provides 152 units on 11.42 net acres, resulting in 13.3 units per acre. In the R-5 zoned land the design provides 30 units on 2 net acres, resulting in 15 units per acre. As detailed on the Plan Set, the townhouse density is less than 25 units per acres and in conformance with the allowed density for the unit type.

Maximum Density - Multi-family Complex 5+ - Multi-family complex housing is only proposed in the R-5 Zoned area. As detailed in the Plan Set, the design provides approximately 100 multi- family housing units on 6.12 net acres of land, which equates to 16.3 units per acre and is less than the maximum allowed 17.4 units per acre.

As detailed on the plans and described above, the proposed density conforms to the specific density requirements that apply to the unit types that are proposed.

Setbacks: The current application is for a Comprehensive Plan Map Amendment / Zone Change and Master Development Plan. While the applicant understand the setback standards of this section, and has conceptually designed the project to conform to all setback requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and setbacks will be reviewed at that time.

Height: The current application is for a Comprehensive Plan Map Amendment / Zone Change and Master Development Plan. While the applicant understands the height standards of this section, and has conceptually designed the project to conform to all height requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and building heights will be reviewed at that time.

Minimum Street Frontage:

The Master Development Plan is designed for single-family dwellings in the R-4 Zone, attached cottage / townhome in the R-4 and R-5, and multi-family in the R-5.

Standard Street – This code section establishes a minimum frontage of 50 feet in the R-4 Zone and 40 feet in the R-5 Zone. The applicant is aware of the lot frontage requirements and has conceptually designed the Master Development Plan to accommodate the noted lot frontage requirements. Final lot size and dimensions will be established with subsequent Subdivision review.

Attached Cottage / Townhouse - In both R-4 and R-5 Zone, the minimum lot frontage is 20 feet. The applicant is aware of the lot size requirements and has conceptually designed the Master Development Plan to accommodate the noted lot frontage dimensions. Final lot size and dimensions will be established with subsequent Subdivision review.

As an Exhibit in the Master Development Plan packet, a Tentative Plan for the entire property has been provided. The Tentative Plan documents that proposed acreages and number of units can comply with the design standards described in this section. The elements of the Tentative Plan are not intended to be adopted as part of the Master Development Plan, but instead provide a conceptual reference (documenting that the development/design standards of this section can be met). Final lot design and building locations will be reviewed with subsequent Site Plan and/or Land Division applications. Keeping these elements off the adopted Master Development Plan allows minor adjustments to the final design of lots, building footprints and parking locations at time of Site Plan and/or Land Division, without modifying the Master Development Plan.

8.0141 Single Family Detached Dwellings and Plexes Development and Design Standards...

Applicant Response: The current proposal is for a Master Development Plan that anticipates single-family dwellings, in addition to a Comprehensive Plan Map Amendment, and a Zone Change. The proposal does not include any structural design review, thus does not include detailed design at this time. Subsequent to Master Development Plan approval, the applicant anticipates proceeding with the step of detailed design. The standards of this section will apply to subsequent detailed design, which will be reviewed in association with Building Permits for the single-family dwellings that are developed within the Master Development Plan area.

8.0142 Townhouse Development and Design Standards

1. **Procedure. New townhouses shall be reviewed for conformance with the requirements listed in this section**
2. **Table A: Minimum Standards.**

Standard:	R-4	R-5
Maximum Density (Units/Net Acre)	25	25
Minimum Lot Size (Square Feet)	1,500	1,500
Maximum Building Height (Feet)	45	45
Minimum Street Frontage (Feet)	20	20
Minimum Setback Distance (Feet)...		

Applicant Response: Each of the standards of this section are addressed below:

Density: The Master Development Plan is designed for attached cottages / townhomes in the R-4 and R-5 zones.

Maximum Density - Townhouses – Within both the R-4 and R-5 Zones, townhouses are allowed up to a maximum of 25 units per acre. As detailed on the Plan Set, in the R-4 zoned land the design provides 152 units on 11.42 net acres, resulting in 13.3 units per acre. In the R-5 zoned land the design provides 30 units on 2 net acres, resulting in 15 units per acre. As detailed on the Plan Set, the townhouse density is less than 25 units per acres and in conformance with the allowed density for the unit type.

Minimum Lot Size: The Master Development Plan is designed for attached cottages / townhomes in the R-4 and R-5 zones.

Attached Cottage / Townhouse - These unit types are planned in both the R-4 and R-5 Zones. While referred to as “attached” cottage, these units are small dwelling units, on their own lot with a shared wall, thus “townhomes”. In both R-4 and R-5 Zones, the minimum lot size is 1,500 square feet. The applicant is aware of the lot size requirements and has conceptually designed the Master Development Plan to

accommodate the noted lot sizes. Final lot sizes and dimensions will be established with subsequent Subdivision review.

Height: The current application is for a Comprehensive Plan Map Amendment / Zone Change and Master Development Plan. While the applicant understands the height standards of this section, and has conceptually designed the project to conform to all height requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and building heights will be reviewed at that time.

Minimum Street Frontage: The Master Development Plan is designed for attached cottages / townhomes in the R-4 and R-5. In both R-4 and R-5 Zones, the minimum lot frontage is 20 feet for townhomes. The applicant is aware of the street frontage requirements and has conceptually designed the Master Development Plan to accommodate the noted lot frontage dimensions. Final lot sizes and dimensions will be established with subsequent Subdivision review.

Setbacks: The current application is for a Comprehensive Plan Map Amendment / Zone Change and Master Development Plan. While the applicant understands the setback standards of this section and has conceptually designed the project to conform to all setback requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and setbacks will be reviewed at that time.

3. Off-Street Parking...

Applicant Response: The current application is for a Comprehensive Plan Map Amendment / Zone Change and Master Development Plan. While the applicant understands the parking standards that apply to townhouses and has conceptually designed the project to conform to all parking requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and parking requirements will be reviewed at that time.

4. Areas Owned in Common. For townhouse projects, common areas must be maintained by a homeowners association or other legal entity. A homeowners association may also be responsible for exterior building maintenance. A copy of any applicable covenants, restrictions and conditions must be recorded and provided to the City prior to issuance of a building permit.

Applicant Response: No townhouse areas are planned to be owned in common at this time. In the event that the final townhouse designs result in areas owned in common, any needed legal entity / agreements will be established prior to issuance of a building permit, for said units,

5. Design Standards...

Applicant Response: The current application is for a Comprehensive Plan Map Amendment / Zone Change and Master Development Plan. While the applicant understands the design standards that apply to townhouses and has conceptually designed the project to conform to all design requirements, specific townhouse buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and all design requirements will be reviewed at that time.

8.0143 Cottage Cluster Development and Design Standards....

Applicant Response: While the project includes a product type that is referred to as attached cottage / townhomes, these units are small dwelling units, on their own lot, with a shared wall, thus “townhomes”. The project does not include a cottage cluster development; therefore this section does not apply.

MASTER DEVELOPMENT PLANS & PLANNED UNIT DEVELOPMENTS

8.0270 Master Development Plans. A Master Development Plan is required as a condition of annexation, or after annexation, but prior to or concurrent with rezoning from Urban Holding-10 to other City zoning districts. The specific requirements for a Master Development Plan are:

Applicant Response: The proposal involves rezoning properties that are currently zoned UH-10. The applicant is submitting the Master Development Plan concurrent with the Annexation. The submittal conforms to the requirements of this section.

- 1. Applicability. This section applies to properties proposed for annexation or rezoning from Urban Holding-10, except that in the event that an applicant has applied for a Planned Unit Development application prior to or concurrent with rezoning from Urban Holding-10, the Master Development Plan approval criteria shall be those used for the Planned Unit Development application and the Great Neighborhood Principles.**

Applicant Response: The proposal includes UH-10 properties, and with this Master Development Plan review the site is also planned for annexation. The project does not include a Planned Unit Development. As detailed throughout this narrative, the project is located within the Northwest Areas Plan (NAP), the NAP has been found to be consistent with the Great Neighborhood Principles, and the proposal is entirely consistent with the NAP. It therefore follows that the project is consistent with the Great Neighborhood Principles. Additional analysis of the Great Neighborhood Principles are included below and as detailed therein, the specific project is consistent with the Great Neighborhood Principles.

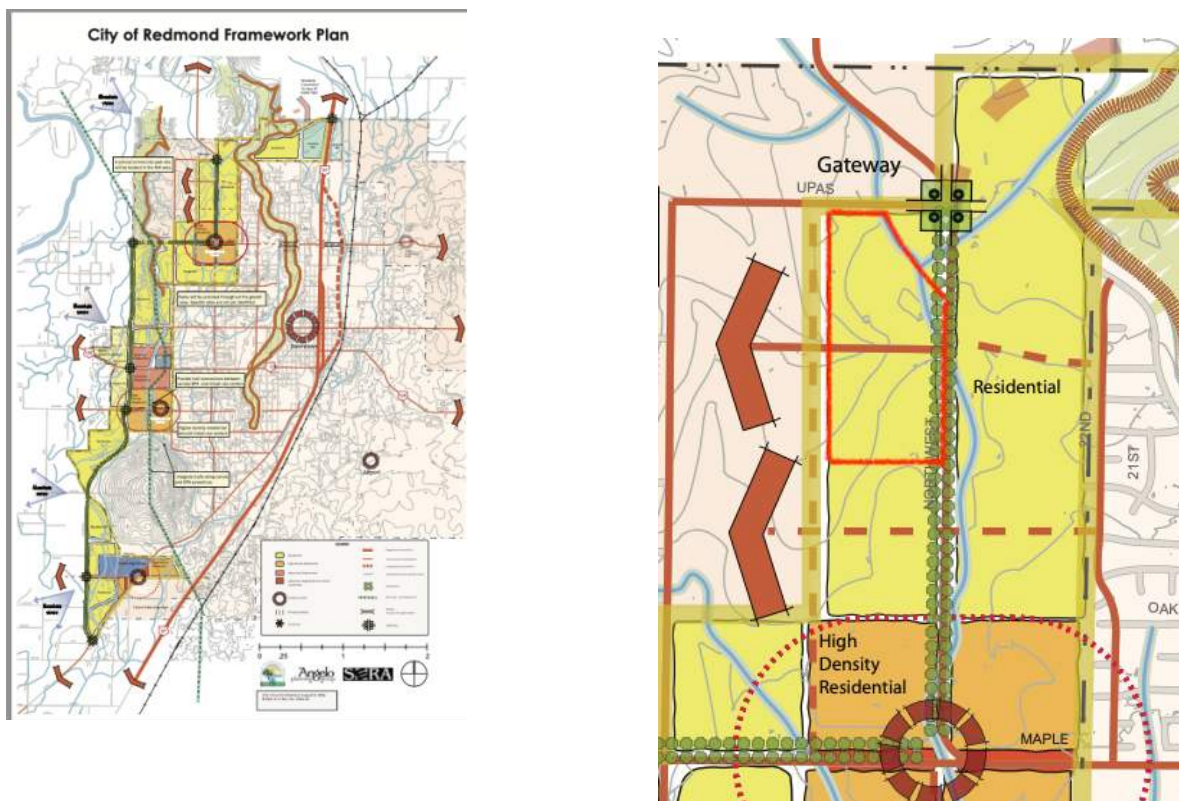
2. Purpose. The purpose of Master Development Plan is to provide:

Applicant Response: This section is a purpose statement and it does not contain any measurable approval criteria or development standards. Specific development standards and approval criteria have been adopted into the Redmond Development Code to carry out the purpose items referenced in this section. As detailed through a review of this Chapter and the entire Redmond Development Code, the proposal complies with all applicable development standards and approval criteria that have been adopted to carry out the purpose of Master Development Plans, thus the proposal complies with this section.

A. Orderly and efficient development of the City consistent with Urban Framework Plans and an adopted Area Plan.

Applicant Response: The property is detailed in the Framework Plan and it is within the Northwest Area Plan (NAP).

Below is an excerpt from the Framework Plan that focuses on the area of the subject property.

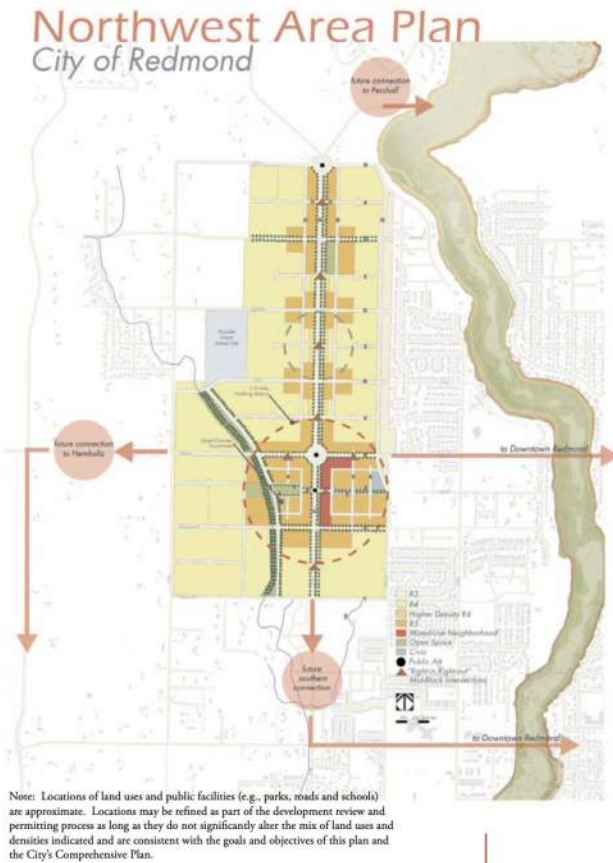


The Framework Plan establishes the following elements on the subject property:

- The property is identified as “Residential”
- A north/south “Boulevard” along the eastern property line (location of Northwest Way)

- An east/west “Community Connection” in the area of NW Upas Avenue
- An east/west “Community Connection” in the area of NW Spruce Avenue
- An east/west “Proposed Connection” in the area of NW Quince Avenue

Below is an excerpt from the Framework Plan that focuses on the area of the subject property.



The NAP establishes the following elements on the subject property:

- The property is identified as “Higher Density R4” and “R5”
- Labels similar to the Framework Plan “Boulevard” are identified along Northwest Way and NW Spruce Avenue, it is understood that these labels signify trails.
- A “Right-in / Right-out Mid-Block Intersection” is noted at the NW Quince Avenue / Northwest Way intersection.

As detailed on the Master Development Plan exhibit, the proposal includes the following features that carry out the items referenced on the Framework Plan:

- The proposal will maintain 60.21 acres of R-4 zoned land and 16.61 acres of R-5 zoned land.

- The proposal provides detached single family homes and attached cottages/townhomes on R-4 zoned land, and townhomes and multi-family complexes on R-5 zoned land. The planned residential uses are consistent with the R-4 and R-5 Zone requirements.
- Right-of-way improvements that conform to the City of Redmond Arterial Street standards (travel lanes, curbs, walkways, planter strips) are proposed along Northwest Way. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Right-of-way improvements that conform to the City of Redmond Collector Street standards (travel lanes, curbs, walkways, planter strips) are proposed along NW Spruce Avenue. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Internal grid and non-grid streets improvements that conform to the City of Redmond Street standards (travel lanes, curbs, walkways, planter strips) are proposed along the internal streets. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Trails are proposed along the Northwest Way and NW Spruce Avenue frontages.
- The Master Development Plan proposes an overall density of 10.47 units per acre, conforming to all of the applicable R-4 and R-5 density requirements.
- Water is planned to be provided to and through the site in conformance with City Standards.
- Wastewater is proposed to be provided to and through the site in conformance with City Standards.
- Irrigation canals that cross the property will be piped.

As detailed above, the proposal complies with the all of the notes and the overall intent of both the 2006 Framework Plan and the NAP; therefore the proposal complies with this section.

B. Compatibility and/or transitions with adjacent developments and the character of the area.

Applicant Response: The property sits on the northwestern edge of the Redmond UGB. The surrounding area includes rural properties that are located outside of the Redmond UGB to the north and west, developing properties (within the UGB and City Limits) of the Dry Canyon Village to the east², and under-developed land that has previously been used as small-scale farms (in the UGB, but outside of the City Limits) to the south. The manner in which the subject property is planned to develop (including zoning, levels of development, use types, street design, and overall character) is explicitly established in the Northwest Area Plan. The NAP establishes the following elements on the subject property:

- The property is identified as “Higher Density R4” and “R5”

² Detached single-family homes, townhomes and multi-family complexes

- Labels similar to the Framework Plan “Boulevard” are identified along Northwest Way and NW Spruce Avenue, it is understood that these labels signify trails.
- A Right-in / Right-out Mid-Block Intersection is noted at the NW Quince Avenue / Northwest Way intersection.

As detailed on the Master Development Plan exhibit, the proposal includes the following features that carry out the items referenced on the Framework Plan and the NAP:

- The proposal will maintain 60.21 acres of R-4 zoned land and 16.61 acres of R-5 zoned land.
- The proposal provides detached single family homes and attached cottages/townhomes on R-4 zoned land, and townhomes and multi-family complexes on R-5 zoned land. The planned residential uses are consistent with the R-4 and R-5 Zone requirements.
- Right-of-way improvements that conform to the City of Redmond Arterial Street standards (travel lanes, curbs, walkways, planter strips) are proposed along Northwest Way. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Right-of-way improvements that conform to the City of Redmond Collector Street standards (travel lanes, curbs, walkways, planter strips) are proposed along NW Spruce Avenue. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Internal grid and non-grid streets improvements that conform to the City of Redmond Street standards (travel lanes, curbs, walkways, planter strips) are proposed along the internal streets. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Trails are proposed along the Northwest Way and NW Spruce Avenue frontages.
- The Master Development Plan proposes an overall density of 10.47 units per acre, conforming to all of the applicable R-4 and R-5 density requirements.
- Water is planned to be provided to and through the site in conformance with City Standards.
- Wastewater is proposed to be provided to and through the site in conformance with City Standards.
- Irrigation canals that cross the property will be piped.

Overall the design is consistent with the NAP, including general zone locations, use types, intensity of development, street location and design, and overall character; therefore the proposal will provide compatibility and transitions as envisioned and planned by the City and consistent with this provision.

C A complementary mix of uses and activities.

Applicant Response: The property is located in an area that has been described on the City of Redmond Framework Plan and the NAP. In the development of the Framework Plan and the NAP, uses and activities for the City were studied, and desired uses for the area were established. Through the prior planning processes, the items detailed on the

NAP Map were determined to sufficiently balance community needs, be complementary, and be desired by the City. The NAP includes the following elements:

- The property is identified as “Higher Density R4” and “R5”
- Labels similar to the Framework Plan “Boulevard” are identified along Northwest Way and NW Spruce Avenue, it is understood that these labels signify trails.
- A Right-in / Right-out Mid-Block Intersection is noted at the NW Quince Avenue / Northwest Way intersection.

As detailed on the Master Development Plan Packet, the proposal includes the following features that carry out the notes on the NAP:

- R-4 and R-5 zoned lands in the general location identified in the NAP
- A variety of housing types (including detached and attached single family homes and apartments);
- A street and trail system that is consistent with the NAP
- Parks and open spaces to provide buffers and integrated activities for the residential area.
- The Master Development Plan achieves a density of 10.47 dwelling units per acre, conforming to all of the density requirements of the underlying zones.

The type and location of the planned uses and planned activities are consistent with Framework Plan and the NAP. Furthermore, the City has found that the NAP is consistent with the Great Neighborhood Principles and the project is consistent with the NAP, thus it follows that the proposed Master Development Plan is also consistent with the Great Neighborhood Principles. Furthermore, the Great Neighborhood Principles are addressed below and as detailed therein, the project is consistent with all of the applicable principles. Given the proposals compliance with the Framework Plan, the NAP and the Great Neighborhood Principles, the proposal conforms to this section.

D. An interconnected transportation network – streets, bicycle routes, and pedestrian trails – within the master plan area and to existing and planned City streets, routes and trails.

Applicant Response: Adopted documents that can assist with understanding conformance with this provision include the City of Redmond Transportation System Plan Map, the Framework Plan, and the NAP, along with City Development Code required street spacing and design standards. The City Transportation System Plan Map identifies Northwest Way as a “Minor Arterial” street and NW Spruce Avenue as a “Major Collector” Street. The Framework Plan identifies Northwest Way as a Boulevard with east/west through streets and NW Spruce Avenue and NW Quince Avenue, and the NAP identifies Northwest Way as a primary north/south connection in the area, through street connections at NW Spruce Avenue and NW Quince Avenue, along with trail connections along Northwest Way and NW Spruce Avenue.

As depicted on the Master Development Plan Exhibit, the proposal incorporates all features that are identified on the TSP, the Framework Plan and the NAP. The proposal includes full Arterial street improvements along Northwest Way, Collector Street

Improvements along NW Spruce Avenue, a well-connected grid of local streets, and trails as described on the Framework Plan and NAP.

In addition to the features depicted on the long term plans, the Master Development Plan includes a mix of internal streets, bicycle routes, sidewalks, and trails that conform the City of Redmond spacing and design standards. The transportation system connects to Northwest Way at 2 points (NW Spruce Avenue and NW Quince Avenue). The widths, locations, and designs depicted on the Master Development Plan are consistent with City of Redmond design standards for local, collector, and arterial streets. Furthermore, bicycle routes are proposed on Northwest Way and NW Spruce Avenue, and sidewalks are proposed along all local street rights-of way, in conformance with City street design standards. As designed, each of the transportation components of the Master Development Plan connect to a broader system, which connects to the remainder of the City as prescribed in the NAP, thus in conformance with this standard.

E. A range of housing choices for areas planned to have residential components.

Applicant Response: The currently proposed Master Development Plan is for a residential development; it is entirely within R-4 and R-5 zoned areas. As depicted on the submitted materials, the proposed Master Development Plan identifies areas for detached single-family homes, medium density products (attached cottages / townhouses), and multi-family apartment complexes. Furthermore, at least 40% of the development will be “Middle Housing” and at 10.47 units per acre, the design is consistent with the multiple density requirements that apply to the differing uses in the underlying zones. Overall, the planned product types provide for a variety of residential housing options allowed in the City of Redmond (in the R-4 and R-5 zones); therefore the proposal includes a wide range of housing options, as required by this section.

F. A range of open spaces and recreation facilities, as needed to facilitate the Framework Plan and an adopted Area Plan.

Applicant Response: Neither the Framework Plan, nor the NAP identify parks or open spaces upon the subject property, however they both identify trail locations along Northwest Way and NW Spruce Avenue. Even though park and open spaces are not established on the Framework Plan or the NAP, the design provides 9.04 acres of park/open space, including and approximately 2.3 acre neighborhood park south of NW Spruce Avenue and over 2 acres of park / open space north of NW Spruce Avenue. Furthermore, the design includes trails within open space buffers along Northwest Way and NW Spruce Avenue, in addition to a buffer and trail system in the north / northwest portion of the site, and one connecting to the southern park (from Northwest Way). The trail system and open spaces extend throughout the Master Development Plan area, and a trailhead in the northeast park is planned to facilitate a connection to the neighborhood. These items collectively exceed the items noted on the Framework Plan and conform to all design standards established in the Development Code; therefore the proposal conforms to the standards of this section.

G. Public and semi-public facilities and services.

Applicant Response: All public facilities and services that are needed to serve the planned development are proposed to be extended to the site at time of development, including water, sewer, storm water, and semi-public facilities. Improvements that are depicted on the Master Development Plan include the following:

Sewer – As detailed on the Public Facilities Plan, a 30-inch sewer main has been extended in NW Spruce Avenue, west to Northwest Way. The existing sewer system provides a gravity main at the edge of the subject property, which connects to a broader system that extends to the City's Wastewater Treatment Facility, consistent with the City of Redmond Public Facility Plan. As detailed on the Preliminary Utility Plan for this Master Development Plan, sewer mains and laterals are proposed to be extended throughout the site to serve each and every lot, and to extend to neighboring properties ("to and through" the property). A majority of the site will be able to be served via gravity sewer mains, however a portion of the western part of the property has topography that will necessitate a pump station (near the western edge of NW Spruce Avenue). As detailed on the Tentative Utility Plan, the pump station will transfer sewerage approximately one block to the east, where it will re-enter the gravity system. Overall, the wastewater needs of the area have been planned for in the City's Wastewater – PFP, the current project is consistent with the assumed density for the area, and development of the dwellings will result in substantial System Development Charge contributions (which fund prioritized improvements to the City system). By extending sewer mains and laterals consistent with the City of Redmond adopted design standards (at time of land division) and by making all required SDC contributions (at time of Building Permit issuance), the proposed development can be adequately served by the existing and planned system.

Water – As detailed on the Master Development Plan – Utility Plan, a 12-inch water main is located in Northwest Way, extending from NW Spruce Avenue to the northern point of the property. The existing system has a flow rate of 1574 GPM at Hydrant FH1863. As further detailed on the Public Facilities Plans for this Master Development Plan, the applicant plans to extend the 12-inch main south within the Northwest Way right-of-way, and additional water mains and laterals are proposed to be extended throughout the site, to serve each and every lot, and to extend to neighboring properties ("to and through" the property). Overall, the water needs of the area have been planned for in the City's Water – PFP, the current project is consistent with the assumed density for the area, and development of the homes will result in substantial System Development Charge contributions (which fund prioritized improvements to the City system). By extending water mains and laterals consistent with the City of Redmond adopted design standards (at time of land division) and by making all required SDC contributions (at time of Building Permit issuance), the proposed development can be adequately served by the existing and planned system.

Stormwater - The area is sufficiently sized to accommodate a mix of private lots and public rights-of-way. In accordance with City Standards it is anticipated that site development will be required to maintain storm water in accordance with all applicable City of Redmond requirements. All planned streets have been designed to conform to City requirements, ensuring that public storm water is sufficiently managed and maintained.

Semi Public – The applicant has coordinated with semi-public utility providers and has initiated a plan to extend services throughout the site. In association with future land divisions and site plans, development will be required to finalize the plans and provide and necessary will-serve letter documentation. The initial steps in addition to development requirements will ensure semi-public utilities are sufficiently extended to the site, prior to development.

The Public Facilities Map exhibit and extensions noted thereupon were proposed after extensive consultation with the City of Redmond Public Works Department. All extensions are proposed to be in accordance with City Standards at time of development. Semi-Public service extensions are proposed in accordance with utility provider specification and are planned to be located within rights-of-way and/or utility easements.

H. Preservation of historic buildings, scenic views, and natural resources to the greatest extent possible.

Applicant Response: The property contains buildings that are over 50 years old, however none of the existing buildings are listed on any local, state or federal lists of historical significance.

Regarding views, the subject property does not contain any adopted view corridors or view restrictions. As detailed on the Plan Set, the design extends Local Street B, NW Spruce Avenue, Local Street G, and NW Quince Avenue in east/west orientations, to the edge of the property. These street connections are intended to provide view corridors throughout the property. Furthermore, the design includes “Neighborhood Park (North)”, which extends from the central part of the property to the western property line; this corridor will maintain scenic views in the area. Also, the design include an approximately 2.3 acre park on the southern portion of the site. The size and location of this park is also anticipated to maintain scenic views from this central community area.

Regarding natural resources, the property does not include any city, state or federal protected resources. The property does include areas that are identified as wetlands on the Deschutes County DIAL map. However, all of these areas are associated with irrigation systems (canals or ponds), they are relatively small (less than an acre) and as detailed by the project Wetlands expert, the areas are not protected wetlands. All canals on the property will be piped and water rights have been (or will be) sold or transferred prior to final subdivision plat; with development of urban uses. Given that the areas identified as wetland are associated with irrigation systems, and because irrigation elements are not protected wetlands, it is understood that the areas are not protected. The site does not contain any other natural resources.

I. Transitions or buffers between urban development and rural areas.

Applicant Response: The property sits on the western edge of the Redmond UGB, in a developing area of the City of Redmond. The properties to the west and north are in Deschutes County, zoned EFU and “rural properties”.

As detailed on the Master Development Plan exhibit, along the western property line, of all the allowed uses in the zone, the design includes only the lowest density, detached single family homes; the design includes 42 lots along the western tier (6.13 acres), which results in only 6.9 units per acre. Rather than placing higher intensity uses (such as townhomes or multifamily complexes) and higher densities (up to 25 units per acre), the design locates the lowest density uses along this area, which is a reasonable and adequate buffer between urban areas (which are required to provide needed housing) and rural areas.

To the north, the proposal provides a City required grid system, and NW Upas Avenue will act as buffers and transition. The right-of-way and future street improvements will have required street trees and a 30 foot buffer along this right-of-way. The transition of allowed uses, streets, right-of way-improvements, and open space/park areas will create a natural and pleasing transition to the nearby rural properties.

J. Implementation of Redmond’s Comprehensive Plan, including adopted Area Plans and the Great Neighborhood Planning Principles described in 3(C)(13) below.

Applicant Response: The City Development Code has been adopted to implement the Comprehensive Plan. As detailed throughout this narrative, the Master Development Plan is consistent with the Framework Plan and the NAP; furthermore, it conforms to all standards and criteria of the Development Code, including the Great Neighborhood Principles. Therefore the Master Plan conforms to this approval criterion.

In addition to a Master Development Plan, the proposal includes a Comprehensive Plan Map Amendment and a Zone Change. As required for the Comprehensive Plan Map Amendment and Zone Change, a complete review of the applicable sections of the Comprehensive Plan is included below (Sections 8.0750-8.0770 below). As detailed in that section, the Comprehensive Plan Map Amendment and a Zone Change portion of the proposal conforms to all elements of the Comprehensive Plan, thus also conforms to this reference provision.

3. Procedures for Review.

A. General. Master Development Plans (MDP or PMDP) shall be approved through a quasi-judicial review process. Application procedures and related fees for approval may be streamlined in order to promote timely development of urban planning for land zoned UH-10. The Community Development Director, or designee, shall inform the applicant during the mandatory pre-application

stage if the proposed MDP area includes the necessary contiguous properties. The determination for the proposed plan area shall be based on utilizing the following factors:

Applicant Response: The applicant held Pre-Development meetings with the City on July 6, 2021 and April 14, 2022, along with many follow-up meetings prior to submittal. The applicant understand that the Master Development Plan will be reviewed via a Quasi-judicial review procedure and by attending the pre-application meeting, the applicant has a clear understanding how the plan interacts with other nearby properties; additional factors are addressed below.

- 1. Whether there are properties that abut or are surrounded by the plan boundary that would reasonably fit within the zoning concept for the area plan;**
- 2. Whether the extension of public services and infrastructure would be enhanced by the inclusion of abutting properties;**
- 3. Whether the total acreage of abutting or enclave properties is less than the acreage in the proposed plan area; and**
- 4. There is a community interest that would be served by including additional properties in the plan area.**

Applicant Response: The nearby property to the northeast would reasonably fit within the zoning concept for the area. The proposal provides a development plan and facility extensions to the area of the abutting property such that future development could be easily incorporated into the planned grid, if/when that property develops.

Regarding the property to the south, the currently proposed Master Development Plan is of a size/scale that can be planned, funded and developed within a reasonable planning horizon. Given the current market conditions and absorption rate, including the additional properties to the south are not viable, reasonable or expected. As detailed on the Plan Set, the proposed design provides right-of-way, street, facility and utility extensions that allow for development of the property to the south if/when market conditions are appropriate for development of that site.

Given that the area is sufficiently sized, it has distinct borders, it is (or will be) individually owned, and it sufficiently plans for the extension of facilities to surrounding properties, the proposal conforms to the provisions of this section. Therefore, the incorporation of additional lands into the Master Development Plan area is not necessary.

B. Review and approval criteria for Master Development Plans (MPD) or Partial Master Development Plans (PMDP).

- 1. General. In the review of any application for a Development Plan, the Planning Commission and City Council, if required, shall consider the following:**

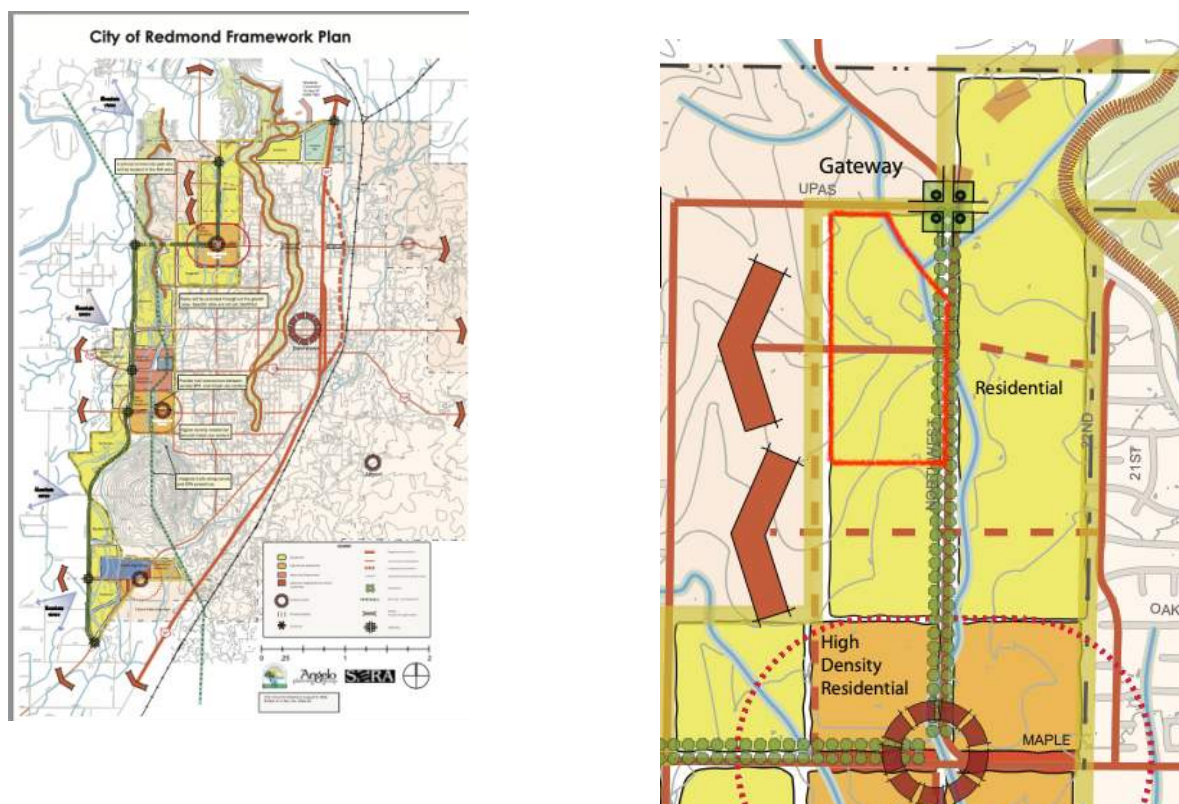
Applicant Response: The Comprehensive Plan identifies the property with 60.21 acres of R-4 Zoning and 16.61 acres of R-5 Zoning. The proposal slightly relocates the location of the R-4 and R-5 Zones, but maintains the same acreage in the same general area. The applicant anticipates that the proposal will be reviewed by both the Planning Commission and the City Council. Each of the items to be considered are addressed below.

- a. **Whether the proposed Plan is generally consistent with the Framework Plan, adopted Area Plan, and Comprehensive Plan in terms of land use, density, transportation systems and networks, adequacy of infrastructure and open space.**

Applicant Response: The Comprehensive Plan identifies the property with 60.21 acres of R-4 Zoning and 16.61 acres of R-5 Zoning. The proposal slightly relocated the location of the R-4 and R-5 Zones, but maintains the same acreage, in the same general area. Regarding the Framework Plan and NAP, as discussed above:

The property is detailed in the Framework Plan and it is within the Northwest Area Plan (NAP).

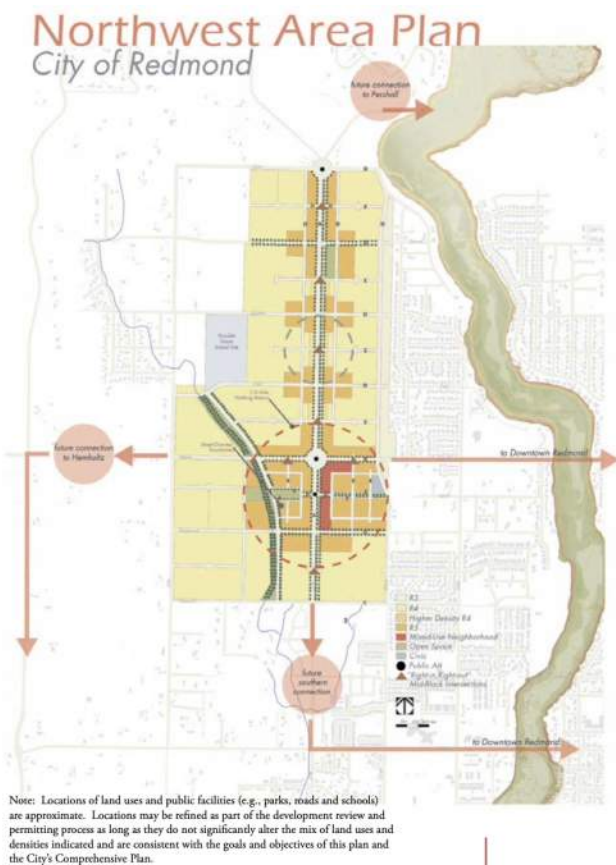
Below is an excerpt from the Framework Plan that focuses on the area of the subject property.



The Framework Plan establishes the following elements on the subject property:

- The property is identified as “Residential”
- A north/south “Boulevard” along the eastern property line (location of Northwest Way)
- An east/west “Community Connection” in the area of NW Upas Avenue
- An east/west “Community Connection” in the area of NW Spruce Avenue
- An east/west “Proposed Connection” in the area of NW Quince Avenue

Below is an excerpt from the Framework Plan that focuses on the area of the subject property.



The NAP establishes the following elements on the subject property:

- The property is identified as “Higher Density R4” and “R5”
- Labels similar to the Framework Plan “Boulevard” are identified along Northwest Way and NW Spruce Avenue, it is understood that these labels signify trails.
- A Right-in / Right-out Mid-Block Intersection is noted at the NW Quince Avenue / Northwest Way intersection.

As detailed on the Master Development Plan exhibit, the proposal includes the following features that carry out the items referenced on the Framework Plan:

- The proposal will maintain 60.21 acres of R-4 zoned land and 16.61 acres of R-5 zoned land.
- The proposal provides detached single family homes and attached cottages/townhomes on R-4 zoned land, and townhomes and multi-family complexes on R-5 zoned land. The planned residential uses are consistent with the R-4 and R-5 Zone requirements.
- Right-of-way improvements that conform to the City of Redmond Arterial Street standards (travel lanes, curbs, walkways, planter strips) are proposed along Northwest Way. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Right-of-way improvements that conform to the City of Redmond Collector Street standards (travel lanes, curbs, walkways, planter strips) are proposed along NW Spruce Avenue. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Internal grid and non-grid streets improvements that conform to the City of Redmond Street standards (travel lanes, curbs, walkways, planter strips) are proposed along the internal streets. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Trails are proposed along the Northwest Way and NW Spruce Avenue frontages.
- The Master Development Plan proposes an overall density of 10.47 units per acre, conforming to all of the applicable R-4 and R-5 density requirements.
- Water is planned to be provided to and through the site in conformance with City Standards.
- Wastewater is proposed to be provided to and through the site in conformance with City Standards.
- Irrigation canals that cross the property will be piped.

As detailed above, the proposal complies with all of the notes and the overall intent of the Comprehensive Plan, the 2006 Framework Plan, and the NAP; therefore the proposal complies with this section.

Transportation Systems

Adopted documents that assist with an analyze of conformance with this provision include the City of Redmond Transportation System Plan Map, the Framework Plan, and the NAP, along with City Development Code required street spacing and design standards. The Transportation System Plan Map identifies Northwest Way as a “Minor Arterial” street and NW Spruce Avenue as a “Major Collector” Street. The Framework Plan identifies Northwest Way as a Boulevard with east/west through streets at NW Spruce Avenue and NW Quince Avenue. The NAP identifies Northwest Way as a primary north/south connection in the area, through street connections at NW Spruce Avenue and NW Quince Avenue, along with trail connection along Northwest Way and NW Spruce Avenue.

As depicted on the Master Development Plan Exhibit, the proposal incorporates all of the features that are identified on the TSP, the Framework Plan and the NAP into the plan. The proposal includes full Arterial street improvements along Northwest Way, Collector Street Improvements along NW Spruce Avenue, a well-connected grid of local streets throughout the development, and trails that exceed those described on the Framework Plan and NAP.

In addition to the features depicted on the long term plans, the Master Development Plan proposal includes a mix of internal streets, bicycle routes, sidewalks, and trails that conform to the City of Redmond spacing and design standards. The transportation system connects to Northwest Way at 2 points (NW Spruce Avenue and NW Quince Avenue). The width, location and design of the planned streets, as depicted on the Master Development Plan, are consistent with City of Redmond design standards for local, collector, and arterial streets. Furthermore, bicycle routes and multi-use paths are proposed on Northwest Way and NW Spruce Avenue, and sidewalks are proposed along all local street rights-of way, in conformance with City street design standards. As designed, each of the planned transportation elements connect to a broader system, that connects to the remainder of the City as prescribed in the NAP, thus in conformance with this standard.

Adequacy of Public Facilities

All public facilities and services needed to serve the development are planned to be extended to the site at time of development, including water, sewer, storm water, along with semi-public facilities. Improvements that are depicted on the Master Development Plan include the following:

Sewer – As detailed on the Public Facilities Plan, a 30-inch sewer main has been extended in NW Spruce Avenue, west to Northwest Way. The existing sewer system provides a gravity main at the edge of the subject property, which connects to a broader City system that extends to the City’s Wastewater Treatment Facility, consistent with the City of Redmond Public Facility Plan. As detailed on the Preliminary Utility Plan for this Master Development Plan, sewer mains and laterals are proposed to be extended throughout the site to serve each and every lot, and to extend to neighboring properties (“to and through” the property). A majority of the site will be able to be served via gravity sewer mains, however a portion of the western part of the property has topography that will necessitate a pump station (near the western edge of NW Spruce Avenue). As detailed on the Tentative Utility Plan, the pump station will transfer sewerage approximately one block to the east, where it will re-enter the gravity system. Overall, the wastewater needs of the area have been planned for in the City’s Wastewater – PFP, the current project is consistent with the assumed density for the area, and development of the dwellings will result in substantial System Development Charge contributions (which fund prioritized improvements to the City system). By extending sewer mains and laterals consistent with the City of Redmond adopted design standards (at time of land division) and by making all required SDC contributions (at time of Building Permit issuance), the proposed development can be adequately served by the existing and planned system.

Water – As detailed on the Public Facilities Plan, a 12-inch water main is located in Northwest Way, extending from NW Spruce Avenue to the northern point of the property. The existing system has a flow rate of 1574 GPM at Hydrant FH1863. As further detailed on the Public Facilities Plan for this Master Development Plan, the applicant plans to extend the 12-inch main south within the Northwest Way right-of-way, and additional water mains and laterals are proposed to be extended throughout the site, to serve each and every lot, and to extend to neighboring properties (“to and through” the property). Overall, the water needs of the area have been planned for in the City’s Water – PFP, the current project is consistent with the assumed density for the area, and development of the homes will result in substantial System Development Charge contributions (which fund prioritized improvements to the City system). By extending water mains and laterals consistent with the City of Redmond adopted design standards (at time of land division) and by making all required SDC contributions (at time of Building Permit issuance), the proposed development can be adequately served by the existing and planned system.

Stormwater - The area is sufficiently sized to accommodate a mix of private lots and public rights-of-way. In accordance with City Standards it is anticipated that site development will be required to maintain storm water in accordance with all applicable City of Redmond requirements. All planned streets have been designed to conform to City requirements, ensuring that public storm water is sufficiently managed and maintained.

Semi Public – The applicant has coordinated with semi-public utility providers and has initiated a plan to extend services throughout the site. In association with future land divisions and site plans, development will be required to finalize the plans and provide and necessary will-serve letter documentation. The initial steps in addition to development requirements will ensure semi-public utilities are sufficiently extended to the site, prior to development.

The Public Facilities Map exhibit and extensions noted thereupon were proposed after extensive consultation with the City of Redmond Public Works Department. All extensions are proposed to be in accordance with City Standards at time of development. Semi-Public service extensions are proposed in accordance with utility provider specification and are planned to be located within rights-of-way and/or utility easements.

Open Space -

Neither the Framework Plan, nor the NAP identify parks or open spaces on the subject property, however they both identify trail locations along Northwest Way and NW Spruce Avenue. Even though park and open spaces are not required by the Framework Plan or the NAP, the design provides 9.04 acres of park/open space, including an approximately 2.3 acre neighborhood park south of NW Spruce Avenue and approximately 2 acres of park / open space north of NW Spruce Avenue. Furthermore, the design includes trails within open spaces, along Northwest Way and NW Spruce Avenue, in addition to a buffer and trail system in the north / northwest portion of the site, and a trails that connects to the southern park. The trail system and open spaces extend throughout the Master Planned

area, and a trailhead in the northeast park is planned to facilitate a connection to the neighborhood. These park/open space elements of the design collectively exceed the park/open space elements noted on the Framework Plan and NAP and conform to all design standards established in the Development Code, including Section 8.0300.3.C.13.i, which indicates that park space should be provided at a rate of 3000 square feet per 25 dwelling units.

As described above, the project is consistent with the Framework Plan, the NAP, and the Comprehensive Plan in terms of land use, density, transportation systems and networks, adequacy of infrastructure and open space; therefore the proposal conforms to this criterion.

b. Whether the proposed Plan is generally suitable for the area in which it is proposed, considering existing and planned neighborhoods, shopping and employment areas; and natural resources and hazards.

Applicant Response: Through the establishment of the City of Redmond Framework Plan and the NAP, a tremendous amount of work was undertaken by the City to plan for desired uses, so that they would be suitable for the area and compatible with nearby development. The Framework Planning process along with the NAP planning process established desired zones, areas, uses, and overall suitability for the entire Northwest Redmond area (including the subject property). When establishing the Framework Plan and the NAP, the City considered existing and planned neighborhoods, shopping needs and employment areas. The decisions made through the Framework Planning and NAP Planning processes have been formalized and adopted into Comprehensive Plan. In the general area of the subject property, the Framework Plan and the NAP have a number of design considerations, including neighborhood types, shopping areas, employment areas and connections. However, on the subject property, the desired uses are strictly residential. As detailed on the Master Development Plan Exhibit, and as documented through this narrative, the proposal achieves all of the design components that have been established in the adopted long range plans; the proposed design includes a mix of residential development, parks, open spaces and trails, consistent with the Framework Plan and the NAP. Regarding existing and surrounding uses, the property to the east is developing with the Dry Canyon Village development (a mix of residential uses). Properties to the north and west maintain their rural character (outside of the UGB), and the property to the south (within the UGB) also maintains a rural character.

The subject property and the Master Development Planned area will be separated from the nearby rural area to the north by planned right-of-way, a buffer, and future street, and to the west by a transition to lower density housing. Given the difference between existing and planned uses, the proposal provides a plan that accomplishes the planned and desired uses of the City (adopted in the Comprehensive Plan, Framework Plan, and NAP) in a way that adequately transitions and buffers the areas that have not yet redeveloped; in conformance with this section.

c. Whether the proposed Plan is functionally integrated with developed or planned areas.

Applicant Response: The way that the area is planned to be developed has been established by the City through the Comprehensive Plan, the Framework Plan and the Northwest Area Plan. The referenced long-range documents establishes zones, use areas, densities, amenities and transportation systems that result in a fully integrated planning area. The Master Development Plan is proposed to be consistent with the adopted long range plans.

In addition to the design and layout (consistent with the plans), the proposal will extend water and sewer facilities and all franchise utilities and throughout the site. By extending all required utilities and facilities “to and through” the property in a manner that is consistent with the adopted long range plans (Comprehensive Plan, Framework Plan, NAP), the proposal will sufficiently integrate public utilities and facilities into developed area to the east. As planned, the proposal is fully integrated to adopted plans and known developments, thus in conformance with the standards of this section.

d. The proposed plan meets the applicable Great Neighborhood Principles.

Applicant Response: The project is consistent with the NAP and as detailed in the NAP (Pages 2-4):

1.3 Consistency with Redmond Planning Requirements

This plan is consistent with current City and state plans and other requirements, including the following: ...

Great Neighborhood Principles. This plan will help implement these principles. Following is a brief summary of how elements of the plan relate to the Great Neighborhood Principles. Those principles also are cited in individual sections of the plan.

- **Walkable & Bikeable.** The NAP is designed with an integrated street and trail system that includes separate facilities for bikes and pedestrians, including connections to schools, parks, and employment areas; street and trail design features make these facilities feel safe for users.
- **Interconnected Streets.** The NAP includes an interconnected street network that adheres to the city’s standard block lengths and grid-street pattern and that connects existing neighborhood streets west and south of the planning area with the planned street network.
- **Variety of Housing Choices.** Most of the NAP is planned for higher density housing under the city’s R-4 and R-5 zones. Developments in the R-4 district must include a mix of housing types. Over one-third of the housing envisioned in the plan is expected to involve developments achieving 8 or more units per acre.
- **Diverse Mix of Activities.** In addition to residential areas, the NAP includes two neighborhood elementary school sites, two neighborhood park sites, a neighborhood retail service center, and a planned civic use site (library, fire station, etc).

- **Open Spaces.** Public open spaces are planned throughout the area and include two neighborhood parks, trail corridors, and signage directing bikes and pedestrians to Dry Canyon and other planned regional trails. Residential developments must include common open space in site plans.
- **Canals.** Central Oregon Irrigation Canals (COID) are integrated into the NAP design. Two canals will be relocated in easements dedicated to the district. A third largely will remain in its existing easement. All retain their water delivery capacity and have been planned with multiple use features. All irrigation system functions will be preserved, including laterals and sublaterals, for continued irrigation use where desired.
- **Public Art.** Locations for public art are shown on the plan and include the center of two roundabouts, within the recreation trail corridors, and within public areas in the mixed use neighborhood district.
- **Scenic Views.** Views are recognized through the predominant east-west orientation of public streets and especially in the park-block street layout along Larch Avenue that links the commercial district to the neighborhood park near 30th Street. Consideration of scenic views needs to be addressed in site planning.
- **Environmentally Friendly Design.** The east-west street orientation is designed to enable development to take advantage of passive and active solar design. Opportunities for “green- street” features to manage storm drainage are incorporated into street cross sections.
- **Urban-rural interface.** All areas of the NAP are adjacent to urban reserve areas so planned uses on the perimeter are consistent with planned urban expansion. A transition buffer on the plan’s eastern boundary using R-3 zoning helps transition existing R-2 zoning near Dry Canyon to planned higher density uses to the west.
- **Integrated Design Elements.** Integrating features include the local street network, location of civic, neighborhood center and park uses near higher density residential uses, and proposed site design standards that will support an integrated approach to development of these different elements. Specific features also include the Larch Avenue park-block design and the boulevard and trail design for 27th Street, which creates a central spine for the entire plan area.

To the extent that the project necessitates additional assessment of compliance with the Great Neighborhood Principles, a complete review is included in subsection 14 below. As detailed therein, the proposal complies with the applicable principles, thus the proposal also complies with this reference provision.

C. Master Development Plan (MDP) or Partial Master Development Plan (PMDP) Submittal Requirements and Approval Process.

An application for approval shall include the submittal requirements set forth in the City’s Land Use Review application form as well as the elements described below.

Applicant Response: The application includes all of the requirements identified on the Master Development Plan application form and the elements described in this section. The additional items of this section are addressed below.

1. **Narrative.** A narrative shall set forth the goals and objectives of the plan and describe the urban characteristics of the planned area.

Applicant Response: This document sets forth the goals and objectives of the Master Development Plan and highlights the urban characteristics of the area, as required by this section.

2. **Neighborhood Meeting.** Proof a neighborhood meeting was conducted to provide an opportunity for the applicant to meet with surrounding property owners discuss the proposal. See Section 8.0385 for meeting requirements.

Applicant Response: Two Neighborhood Meetings were held, one on June 20, 2023 and one on June 29, 2023. The meetings were held at St. Thomas Catholic Church, 1720 NW 19th Street in Redmond, which is less than a mile from the subject property. Prior to the June 20, 2023 meeting, notice was sent to neighboring property owners within 750 feet and a sign was posted on the property for over 7 days prior to the June 29, 2023 meeting. At the meetings, sign-in sheets were provided, project details were relayed, and the applicant hear questions and concerns from attendees. The meetings were held in conformance with RDC 8.0385; details of the meetings are included as an Exhibit.

3. **Development Plan Map.** A map of the plan area and surrounding vicinity shall indicate planned land uses for each land parcel in the area, including plans for park and open space and community facilities, if known. The plan shall show proposed comprehensive plan map designations and zoning. The plan shall include a list of all affected properties with tax lot numbers, current ownership, parcel size, and other information that is pertinent to the plan.

Applicant Response: Included as an Exhibit, the submittal contains a Master Development Plan Exhibit that includes all items required under this section.

4. **Land Use Diagram.** The land use diagram shall generally indicate the distribution and location of planned land uses for the master plan area, including plans for park and open space and community facilities, if known. The plan shall show proposed comprehensive plan designations, zoning, and density.

Applicant Response: Included as an Exhibit, the submittal contains a Master Development Plan Exhibit and a Comprehensive Plan / Zoning Map Exhibit which collectively document planned land uses for the Master Development Plan area, the location of parks, open spaces, and trails, proposed comprehensive plan designations, zoning and density as required by this section.

5. **Significant Resources Inventory.** An inventory of significant natural resources, scenic and historic resources, and open space areas including those identified on the City's adopted inventory and those that have the potential to qualify for protection under Redmond's Goal 5 resource protection program. When significant resources are present, the proposed plan shall include a management plan to protect resource sites;

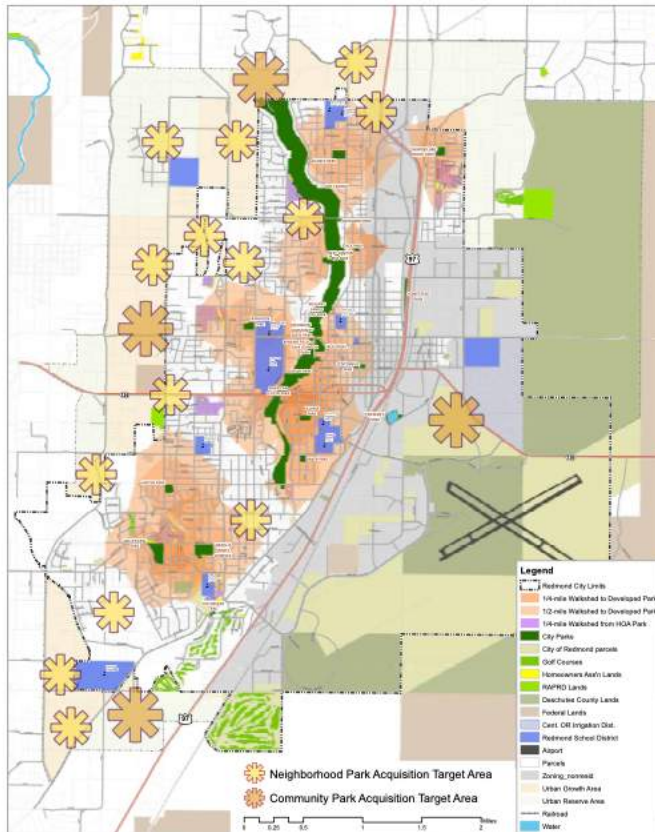
Applicant Response: The property contains buildings that are over 50 years old, however none of the buildings are listed on any local, state or federal lists of historical significance. Nonetheless, the applicant is analyzing the possibility of retaining one or more of the existing farm homes, to possibly be retained on one of the lots, park areas or open spaces. Preservation will occur if possible, which will be determined with future site development.

Regarding views, the subject property does not contain any adopted view corridors or view restrictions. As detailed on the Plan Set, the design extends Local Street B, NW Spruce Avenue, Local Street G, and NW Quince Avenue in east/west orientations, to the edge of the property. These street connections will provide view corridors throughout the property. Furthermore, the design include "Neighborhood Park (North)", which extends from the central part of the property to the western property line and will maintain scenic views in the area, and the design includes an approximately 2.3 acre park on the southern portion of the site. The size and location of this park is anticipated to maintain scenic views from this central community area.

Regarding natural resources, the property does not include any city, state or federal protected resources. The property does include areas that are identified as wetlands on the Deschutes County DIAL Interactive Map. However, all of these areas are associated with irrigation (canals or ponds). All canals on the property will be piped and water rights have been (or will be) sold or transferred prior to final plat and development with urban uses. The applicant's Wetlands Expert has indicated that the irrigation elements on the site are not protected wetlands. Given that the areas identified as wetland are associated with irrigation systems and because irrigation elements are not protected wetlands, the identified areas are not protected. The site does not contain any other natural resources.

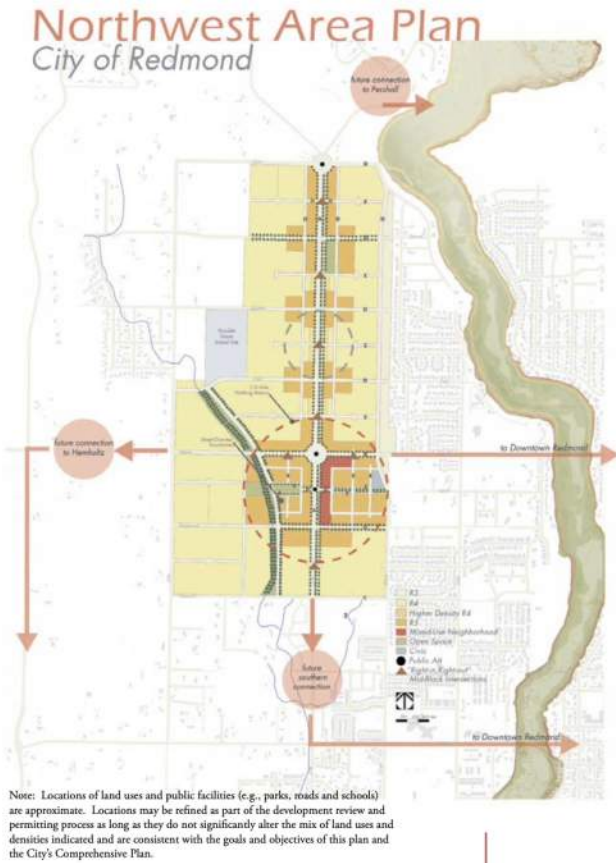
6. **Parks and Open Space.** Identify land suitable for park and recreation use in accordance with the needs analysis in the City of Redmond Park Master Plan (Park Plan) and an adopted Area Plan. In particular, where the Park Plan indicates there is a need for neighborhood or community park, the master plan shall identify sites that may be suitable for park development using the design and location criteria from the Park Plan or an adopted Area Plan. Density transfers, SDC credits, dedication, and other value consideration may be identified in the planning process to compensate property owners for land dedicated to public use;

Applicant Response: “Map 5: Target Acquisition Areas” of the Park Master Plan identifies a “Neighborhood Park Acquisition Target Area” in the Northwest Area Plan vicinity, however the exact location is on the east side of Northwest Way.



Map 5: Target Acquisition Areas

Also, the NAP identifies a park on the east side of Northwest Way:



As further detailed on Deschutes County DIAL, the City of Redmond has acquired a 4.2 acre park on the east side of Northwest Way, consistent with the Park Master Plan and the NAP. The Park Master Plan and the NAP do not identify any needed or required parks on the west side of Northwest Way and/or on the subject property. Nonetheless, as detailed on the Plan Set, the project will provide 9.04 acres of park/open space, including an approximately 2.3 acre neighborhood park south of NW Spruce Avenue and an approximately 2 acres of park / open space north of NW Spruce Avenue. Furthermore, the design includes trails within open space buffers along Northwest Way and NW Spruce Avenue, in addition to a buffer and trail system in the north / northwest portion of the site and a trail that connects to the southern park. The trail system and open spaces extend throughout the Master Planned area, and a trailhead in the northeast park is planned to facilitate a connection to the neighborhood. These items collectively exceed the items noted on the NAP and Framework Plan and conform to all design standards established in the Development Code, thus the proposal conforms to the standards of this section.

These items collectively exceed the items noted on the Framework Plan and NAP and conform to all design standards established in the Development Code, including Section 8.0300.3.C.13.i, which indicates that open space should be provided at a rate of 3000 square feet per 25 dwelling units.

7. **Air, Noise, and Water Resources.** Review air, noise and water resources that may be impacted by planned development and address how adverse impacts will be avoided or mitigated in compliance with applicable local, state, and federal regulations. The analysis may use City public facility plans, technical studies, and policies to meet this requirement when those plans address how urban development in the plan area can be served. In these instances, the Master Development Plan must show that the envisioned land uses in the plan area are consistent with the land use assumptions in the public facility plans. This requirement is particularly important for storm water management.

Applicant Response: The residential, park and open space uses that are planned on the subject property are consistent with the Comprehensive Plan, as detailed on the Framework Plan and the NAP. The currently adopted Public Facility Plans (including storm management plan) are based upon the Comprehensive Plan use designations, thus the proposed uses are consistent with the City planned uses. Given that all proposed uses are consistent with the City planned uses, potential adverse impacts have been initially considered (through the Framework Planning process and the NAP), and significant impacts are not anticipated. Prior to development, the applicant will be required to submit all necessary Land Division and/or Site Plan applications. In accordance with Development Code requirements, concurrent with development, public facilities will need to be extended to the and through the development areas, ensuring that capacity is accomplished and provided, (transportation impacts are addressed separately below).

8. **Natural Hazard Areas.** Inventory areas subject to natural hazards, particularly steep slopes, and program urban development that is suitable for the identified hazard areas;

Applicant Response: Potential Natural Hazards are mapped by the Oregon Department of Geology and Mineral Industries ("DOGMI") in their Oregon HazVu Geohazards Viewer. The referenced Map/Viewer provides natural hazard potential related to:

- State Owned and Public Buildings
- Radon Potential
- Flood Hazard
- Cascadia Earthquake Hazard
- Coastal Erosion Hazard
- Volcano Hazard
- Earthquake Hazard
- Landslide Hazard
- Landslide Inventory

Upon review of the Oregon HazVu Geohazards Viewer, the property has:

- No state owned or public buildings
- "Low" radon potential
- "Moderate" Cascadia Earthquake Shaking Hazard
- No flood hazard
- No mapped volcano hazard
- 1-2 small areas of "Moderate" landslide hazard areas.

All of these ratings are similar to the majority of the City and the majority of the residential lands that have recently been developed in the area.

Additional hazards considered by the City of Redmond include wildfire risks and winter storm risks. Being located in the same general area, with similar topography and vegetation, as other recently developed the residential properties, the project has similar wildfire and winter storm hazard risks as the majority of the west side of the UGB area.

Also, an assessment of Natural Hazards has been conducted by the project engineer; there have not been any natural hazard areas identified on the property.

Overall, the hazards of the site are similar to the majority of the City of Redmond. There is nothing that has been found related to natural hazards that would or should limit development.

9. **Residential Uses.** Identify areas planned for housing development, if any, and the proposed zoning districts to be applied. The housing plan must identify a mix of housing types and densities so that the overall density in the area meets or exceeds the housing density objectives for the area that are identified in the Redmond Urban Framework Plan, adopted Area Plans, and the Comprehensive Plan. The Framework Plan and adopted Area Plans provide general guidance on housing densities that need to be achieved in order to meet future housing needs. Where proposed residential land uses differ from those shown in the Redmond Urban Framework Plan or adopted Area Plans, the master plan shall demonstrate how it meets the overall housing objectives of the Redmond Urban Framework Plan or adopted Area Plans. Applicants may propose new zoning districts when the proposed district(s) in total achieve the housing densities envisioned in the Redmond Urban Framework Plan or adopted Area Plans.

Applicant Response: As detailed on the Master Development Plan Exhibit, the proposal includes areas planned for single-family home development, medium density housing options, and multi-family complexes, consistent with the Comprehensive Plan, the Framework Plan and the NAP. Acreage and planned number of units are detailed on the Area Plan component of the Exhibit. Overall, the design achieves a density of 10.47 units

per acre and, as detailed in a review of the R-4 and R-5 Zone Code sections, the design achieves the specific densities for the differing uses in the zones.

The R-4 and R-5 zones are proposed to be applied to the site, which is consistent with the NAP, the Framework Plan, and the Comprehensive Plan diagrams and requirements. As designed and detailed throughout this narrative, the proposal is consistent with the NAP and the Framework Plan and it does not propose a new zoning district; therefore additional assessment is not needed.

- 10. Employment Uses. Identify areas planned for employment use and/or mixed uses and the proposed zoning for these areas. Applicants may propose new zoning districts in cases where existing districts are not suitable for the planned development provided the proposed district(s) achieve similar land improvement values and/or employment densities envisioned in the Redmond Urban Framework Plan or adopted Area Plans.**

Applicant Response: The Framework Plan and the NAP do not identify any areas that are planned for employment use and/or mixed use on the subject property. This section does not apply.

- 11. Transportation Analysis and Diagram. Prepare a Transportation Impact Analysis (TIA) including a grid street plan that is consistent with street spacing and connectivity guidelines in the Redmond Transportation System Plan (TSP) and adopted Area or Framework Plans. The TIA shall identify and show:**
 - a. The proposed classification for all streets.**
 - b. The location of approved TSP improvement projects.**
 - c. Any capital improvements that may need to be added to the TSP in order to serve the plan area.**
 - d. Proposed bicycle pedestrian, and trail routes.**
 - e. Demonstrate how planned transportation facilities will connect to transportation facilities in adjacent urban areas**

Applicant Response: A Transportation Diagram is included in the Master Development Plan Exhibit, along with street and trail cross sections. As depicted on the submitted materials, the street plan is proposed to be consistent with the street spacing and connectivity guidelines of the Redmond TSP and Development Code.

In addition to the submittal materials, the applicant has met with City and Oregon Department of Transportation (ODOT) staff, and conducted a Traffic Impact Statement to assess traffic impacts from Development of the Master Development Planned area. Findings of the TIA are included below:

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Transportation Impact Analysis prepared for the proposed Northwest Area Plan Lands – Hayden Homes development identified the following:

- The proposed 76.82-acre site will consist of a total of approximately 457 new dwelling units supported by over 8 acres of open space. The units will consist of a mix of single-family detached homes, detached cottage units, attached cottage units, and apartments.
- Access to the development will be provided by mostly local streets in a grid-like pattern. Two primary access connections are provided onto NW Northwest Way at NW Quince Avenue and NW Spruce Avenue. A private driveway access to the multifamily site is also anticipated, though no specific plans are yet available for this layout.
- Secondary access is proposed to NW Upas Avenue. While 1/2 street right-of-way will be provided with this development, any new public connections to NW Upas Avenue should be gated until full ROW is available to improve the road to the City's urban standards between the access and NW Northwest Way. In addition to 1/2 street right-of-way dedication, a fee in-lieu payment is recommended for this streetscape, with improvements occurring following annexation of a full road into the City of Redmond.
- The proposed development has 60.39 acres designated as *General Residential* (R-4) and 16.43 acres designated as *High Density Residential* (R-5) development. The proposal slightly modifies the location of the R-4 and R-5 lands but maintains the same overall acreage of each. The change is consistent with the TPR. The land is located within the City's Urban Growth Boundary but outside City limits, and is currently finalizing an annexation agreement that will formally bring these lands into the City.
- The development is estimated to generate 3,634 weekday daily trips of which 320 trips (197 in, 120 out) are expected to occur during the weekday p.m. peak hour.
- The area safety review shows that the SW 27th Street/SW Highland Avenue (OR 126) intersection has been listed on the state's Safety Priority Index System. An elevated crash rate is also present at NW Northwest Way/NW Upas Avenue, and at SW Black Butte Boulevard/SW 9th Street.
- No sight distance issues were identified at the proposed new street connections to Northwest Way. At the NW Northwest Way/Upas intersection there are sight line constraints due to adjacent vegetation both north and south of the intersection, and it is recommended that this vegetation be trimmed/removed within the ROW, or within property under control of Hayden Homes.
- Per City Council direction, the study area was expanded to include those intersections also required for analysis as part of the Vollertsen Master Plan development. This allowed the TIA to consider the cumulative impacts of both projects on the system.
- Within the study area, the traffic operations analysis shows that the SW 27th Street/SW Highland Avenue intersection exceeds State operation standards under existing conditions.
- In the future, the planned extension of NW 27th Street to NW Northwest Way will further increase travel along the SW 27th Street to NW Northwest Way route, also requiring improvements to the NW 27th Street/NW Antler Avenue intersection (signalization) as identified within the adopted TSP.
- The future traffic operations analysis show that all study intersections are expected to meet City and State operation standards with buildout of the site in year 2030 with the continued exception of the SW 27th Street/SW Highland Avenue intersection. No

improvements were identified for the SW 27th Street/SW Highland Avenue intersection in the TSP given its physical constraints. The TSP notes that the City and State will collaborate in adopting alternative mobility targets to address future traffic volumes as needed.

- In lieu of capacity improvements at the signalized intersection, it is recommended that mitigation be provided through improved connections to the Dry Canyon Trail system (with enhanced pedestrian crossings of NW Northwest Way), transit coordination and placement of a new bus stop near Spruce Avenue.
 - Broader system mitigation could also occur through investments in parallel routes such as SW 35th Street and SW Helmholtz Way, as identified in the City's TSP. The cost of improving these intersections is prohibitively expensive for any single project and would be best addressed through some form of City-established pro-rata contribution, which could serve as a local match in pursuing ODOT STIP funds.
- The year 2035 planning analysis showed that all intersections are expected to meet City and State standards with the continued exception noted above. While meeting City standards, additional operational issues are forecast at the following intersections within the build-out scenario:
 - NW 6th Street/NW Maple Avenue – Intersection is forecast to operate at its carrying capacity.
 - SW 27th Street/W Antler Avenue – Northbound shared through-right lane is expected to operate with long delays. Improvements are identified in the TSP.
- Left-turn lanes are warranted based on ODOT methodologies at the following intersections in 2030 with site traffic from the Vollertsen Master Plan and Hayden Homes developments:
 - Northwest Way/NW Spruce Avenue: northbound left-turn lane
 - Northwest Way/NW Quince Avenue: northbound left-turn lane

It is recommended that these left-turn lanes be installed when the connection is made/improved to NW Northwest Way.

- NW 22nd Street/NW Maple Avenue: eastbound left-turn lane

No improvements are recommended. The planned extension of new east-west streets between NW Northwest Way and the neighborhoods to the east will reduce the consolidated turns at this intersection. Regardless, widening of NW Maple Avenue to a three-lane section should be considered throughout the corridor (where possible).

- SW Canyon Drive/SW Black Butte Boulevard: westbound left-turn lane warranted in 2030 with or without the proposed developments.

As the project does not contribute any trips to this turning movement no mitigation is recommended.

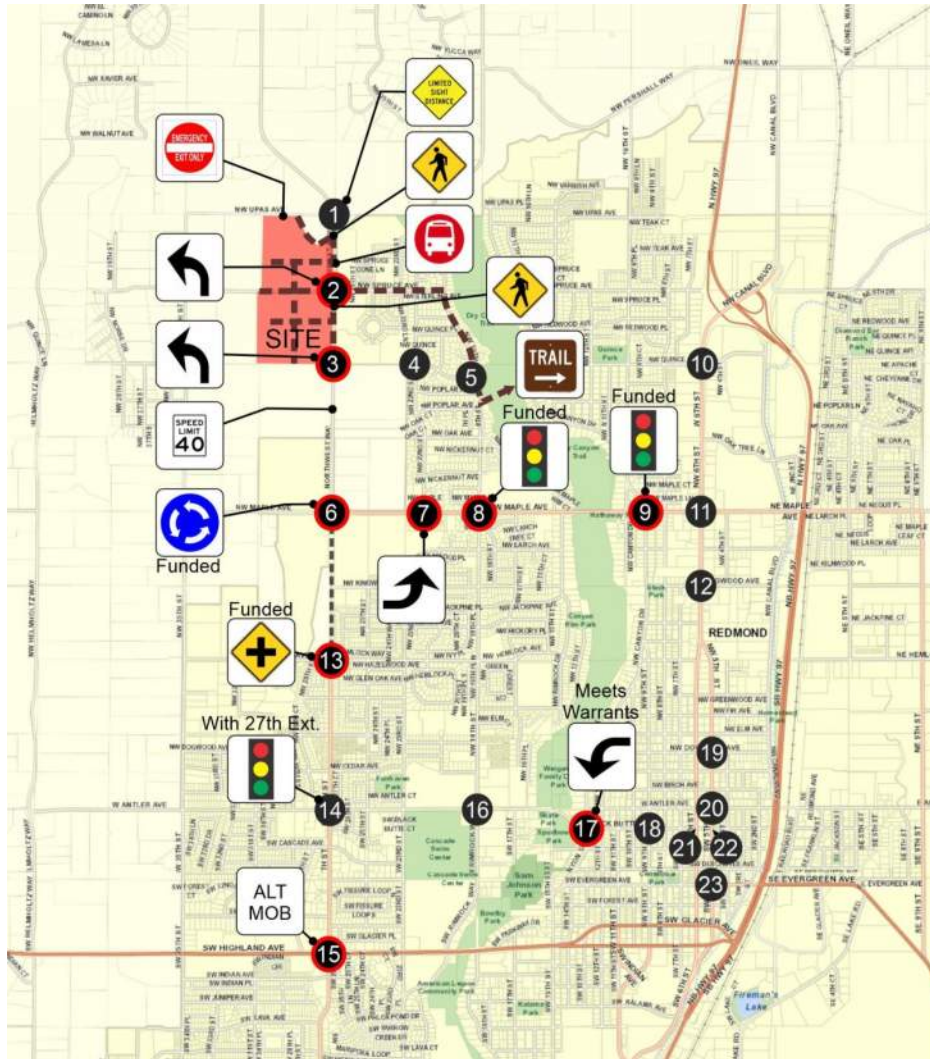
- A northbound right-turn deceleration lane is warranted at the Northwest Way/NW Quince Avenue intersection in 2030 with or without site development (primarily due to the Vollertsen property). It is recommended that the City consider the streetscape vision for

this corridor, as additional right-turn lanes will serve to maintain the high speeds and create conflicts with the planned bicycle lanes.

- Volume-based MUTCD signal warrant criteria are currently met at the SW 19th Street/SW Maple Avenue intersection and are expected to continue to meet these criteria at the time funding is available in 2023/2024.
- Frontage improvements will be required on Northwest Way to provide a three-lane section and multi-use trail. Improvements will also include dedication of an additional 20 feet of right-of-way to comply with City standards. Right-of-way dedication and frontage improvements will also be required on NW Upas Avenue and NW Quince Avenue to meet the City's *Local Street* standards, and NW Spruce Avenue, which bisects the site, will require additional right-of-way and improvement to the City's *Major Collector* standards. Review of the roadway striping dimensions on the major streets should be further discussed with City staff given the inclusion of multiuse pathways that create a low-stress off-street cycling system.
- The project will contribute to the City's long-range transportation needs through payment of Transportation System Development Charges. With a 2023 transportation SDC fee of \$4,678 per weekday p.m. peak hour trip this equates to about \$1.5M in transportation improvements beyond the projects that will be constructed.

These items are summarized within Figure 35 below.

Figure 38. Summary of Area Mitigation Needs



Further discussions with the City, Deschutes County, and ODOT will be required to finalize a mitigation strategy for the OR 126/SW 27th Street intersection, coordinate with Cascades East Transit on an ideal stop location, and finalize the proposed roadway cross-sections and discussions related to NW Upas Avenue. Pending staff's initial review of these materials our team will also work on developing a mitigation/phasing plan to allocate improvements to specific phases of the development. Thank you for the opportunity to work with you on this project, please let me know if you have any questions related to the findings of this Transportation Impact Analysis at (503) 997-4473 or at joe@transightconsulting.com.

The applicant plans to complete all recommended items; therefore the transportation system will be safe and will have adequate capacity. Furthermore, the applicant will pay all required sewer Systems Development Charges (SDC) for the planned development at the time of Building Permit issuance. Given that there is adequate capacity and that the proposal will conform to City Standards; the proposal conforms to the requirements of this section.

12. **Public Facilities Analysis and Diagram.** The plan shall include a conceptual layout of public facilities, (including sanitary sewer, water, and storm drainage) needed to support the planned uses. The Public Facilities Analysis must be consistent with the city's adopted Public Facility Plan (PFP) and related facility master plans, including improvements related to the adopted Area Plan that may require amending the PFP.

Applicant Response: The Master Development Plan Exhibit includes a diagram that depicts all public facilities that are needed to accommodate the Master Development Planned area. All public facilities and services needed to serve the development are proposed to be extended to the site at time of development, including water, sewer, storm water, along with semi-public facilities. Improvements that are depicted on the Master Plan include the following:

Sewer – As detailed on the Public Facilities Plan, a 30-inch sewer main has been extended in NW Spruce Avenue, west to Northwest Way. The existing sewer system provides a gravity main at the edge of the subject property, which connects to a broader City system that extends to the City's Wastewater Treatment Facility, consistent with the City of Redmond Public Facility Plan. As detailed on the Preliminary Utility Plan for this Master Development Plan, sewer mains and laterals are proposed to be extended throughout the site to serve each and every lot, and to extend to neighboring properties ("to and through" the property). A majority of the site will be able to be served via gravity sewer mains, however a portion of the western part of the property has topography that will necessitate a pump station (near the western edge of NW Spruce Avenue). As detailed on the Tentative Utility Plan, the pump station will transfer sewerage approximately one block to the east, where it will re-enter the gravity system. Overall, the wastewater needs of the area have been planned for in the City's Wastewater – PFP, the current project is consistent with the assumed density for the area, and development of the dwellings will result in substantial System Development Charge contributions (which fund prioritized improvements to the City system). By extending sewer mains and laterals consistent with the City of Redmond adopted design standards (at time of land division) and by making all required SDC contributions (at time of Building Permit issuance), the proposed development can be adequately served by the existing and planned system.

Water – As detailed on the Public Facilities Plan, a 12-inch water main is located in Northwest Way, extending from NW Spruce Avenue to the northern point of the property. The existing system has a flow rate of 1574 GPM at Hydrant FH1863. As further detailed on the Public Facilities Plan for this Master Development Plan, the applicant plans to extend the 12-inch main south within the Northwest Way right-of-way, and additional water mains and laterals are proposed to be extended throughout the site, to serve each and every lot, and to extend to neighboring properties ("to and through" the property). Overall, the water needs of the area have been planned for in the City's Water – PFP, the current project is consistent with the assumed density for the area, and development of the homes will result in substantial System Development Charge contributions (which fund prioritized improvements to the City system). By extending water mains and laterals consistent with

the City of Redmond adopted design standards (at time of land division) and by making all required SDC contributions (at time of Building Permit issuance), the proposed development can be adequately served by the existing and planned system.

Stormwater - The area is sufficiently sized to accommodate a mix of private lots and public rights-of-way. In accordance with City Standards it is anticipated that site development will be required to maintain storm water in accordance with all applicable City of Redmond requirements. All planned streets have been designed to conform to City requirements, ensuring that public storm water is sufficiently managed and maintained.

Semi Public – The applicant has coordinated with semi-public utility providers and has initiated a plan to extend services throughout the site. In association with future land divisions and site plans, development will be required to finalize the plans and provide and necessary will-serve letter documentation. The initial steps, in addition to development requirements will ensure semi-public utilities are sufficiently extended to the site, prior to development.

The Public Facilities Map exhibit and extensions noted thereupon are being proposed after extensive consultation with the City of Redmond Public Works Department. All extensions are proposed to be in accordance with City Standards at time of development. Semi-Public service extensions are proposed in accordance with utility provider specification and are planned to be located within rights of way and/or utility easements. Prior to development, Site Plan and/or Land Divisions will be needed. It is understood that concurrent development the identified infrastructure will need to be install in accordance with City requirements.

13. North Redmond US 97 Interchange Area Management Plan (IAMP) Compliance....

Applicant Response: The property is not situated within the North Redmond US 97 Interchange Area Management Plan; therefore this section does not apply.

14. Great Neighborhood Principles. Master Development Plans shall address applicable Redmond Great Neighborhood Principles described below. In instances where the property proposed for a Master Development Plan is located within the boundary of an adopted Area Plan, the Master Development Plan shall also address the Great Neighborhood Principles according to the specificity provided in the Area Plan.

Applicant Response: The property is located within the area of the adopted Northwest Area Plan, but not within the boundary of an approved Master Development Plan. As detailed in the NAP (summarized below), the project is consistent with the NAP and as detailed in the NAP (Pages 2-4).

1.3 Consistency with Redmond Planning Requirements

This plan is consistent with current City and state plans and other requirements, including the following: ...

Great Neighborhood Principles. This plan will help implement these principles. Following is a brief summary of how elements of the plan relate to the Great Neighborhood Principles. Those principles also are cited in individual sections of the plan.

- **Walkable & Bikeable.** The NAP is designed with an integrated street and trail system that includes separate facilities for bikes and pedestrians, including connections to schools, parks, and employment areas; street and trail design features make these facilities feel safe for users.
- **Interconnected Streets.** The NAP includes an interconnected street network that adheres to the city's standard block lengths and grid-street pattern and that connects existing neighborhood streets west and south of the planning area with the planned street network.
- **Variety of Housing Choices.** Most of the NAP is planned for higher density housing under the city's R-4 and R-5 zones. Developments in the R-4 district must include a mix of housing types. Over one-third of the housing envisioned in the plan is expected to involve developments achieving 8 or more units per acre.
- **Diverse Mix of Activities.** In addition to residential areas, the NAP includes two neighborhood elementary school sites, two neighborhood park sites, a neighborhood retail service center, and a planned civic use site (library, fire station, etc).
- **Open Spaces.** Public open spaces are planned throughout the area and include two neighborhood parks, trail corridors, and signage directing bikes and pedestrians to Dry Canyon and other planned regional trails. Residential developments must include common open space in site plans.
- **Canals.** Central Oregon Irrigation Canals (COID) are integrated into the NAP design. Two canals will be relocated in easements dedicated to the district. A third largely will remain in its existing easement. All retain their water delivery capacity and have been planned with multiple use features. All irrigation system functions will be preserved, including laterals and sublaterals, for continued irrigation use where desired.
- **Public Art.** Locations for public art are shown on the plan and include the center of two roundabouts, within the recreation trail corridors, and within public areas in the mixed use neighborhood district.
- **Scenic Views.** Views are recognized through the predominant east-west orientation of public streets and especially in the park-block street layout along Larch Avenue that links the commercial district to the neighborhood park near 30th Street. Consideration of scenic views needs to be addressed in site planning.
- **Environmentally Friendly Design.** The east-west street orientation is designed to enable development to take advantage of passive and active solar design. Opportunities for "green- street" features to manage storm drainage are incorporated into street cross sections.
- **Urban-rural interface.** All areas of the NAP are adjacent to urban reserve areas so planned uses on the perimeter are consistent with planned urban expansion. A transition buffer on the plan's eastern boundary using R-3 zoning helps transition existing R-2 zoning near Dry Canyon to planned higher density uses to the west.

- **Integrated Design Elements.** Integrating features include the local street network, location of civic, neighborhood center and park uses near higher density residential uses, and proposed site design standards that will support an integrated approach to development of these different elements. Specific features also include the Larch Avenue park-block design and the boulevard and trail design for 27th Street, which creates a central spine for the entire plan area.

Additional comments of conformance with the Great Neighborhood Principles are included below.

- a. Transportation. Connect people and places through a complete grid street network and trail system that invites walking and bicycling and provides convenient access to parks, schools, neighborhood service centers, and possible future transit stops.**

Applicant Response: Adopted documents that can assist with an analyze of conformance with this provision include the City of Redmond Transportation System Plan Map, the Framework Plan, and the NAP, along with City Development Code required street spacing and design standards. The Transportation System Plan Map identifies Northwest Way as a “Minor Arterial” street and NW Spruce Avenue as a “Major Collector” Street. The Framework Plan identifies Northwest Way as a Boulevard with east/west through streets at NW Spruce Avenue and NW Quince Avenue, and the NAP identifies Northwest Way as a primary north/south connection in the area, through street connections at NW Spruce Avenue and NW Quince Avenue, along with trail connections on Northwest Way and NW Spruce Avenue.

As depicted on the Master Development Plan Exhibit, the current proposal incorporates the features that are identified on the TSP, the Framework Plan and the NAP. The proposal includes full Arterial street improvements along Northwest Way, Collector Street Improvements along NW Spruce Avenue, a well-connected grid of local streets, and trails as described on the Framework Plan and NAP.

In addition to the features depicted on the long term plans, the Master Development Plan proposal includes a mix of internal streets, bicycle routes, sidewalks, and trails that conform the City of Redmond spacing and design standards. The transportation system connects to Northwest Way at 2 points (NW Spruce Avenue and NW Quince Avenue). The width, location and design depicted on the Master Development Plan are consistent with City of Redmond design standards for local, collector, and arterial streets (details on transportation components of the Master Development Plan). Furthermore, bicycle routes are proposed on Northwest Way and NW Spruce Avenue and sidewalks are proposed along all local street rights-of way, in conformance with City street design standards.

Given that the design invites walking and bicycling, and that it provides convenient access to parks, schools, neighborhood service centers, and possible future transit stops as described in the NAP, it can be found that each of the transportation components connect

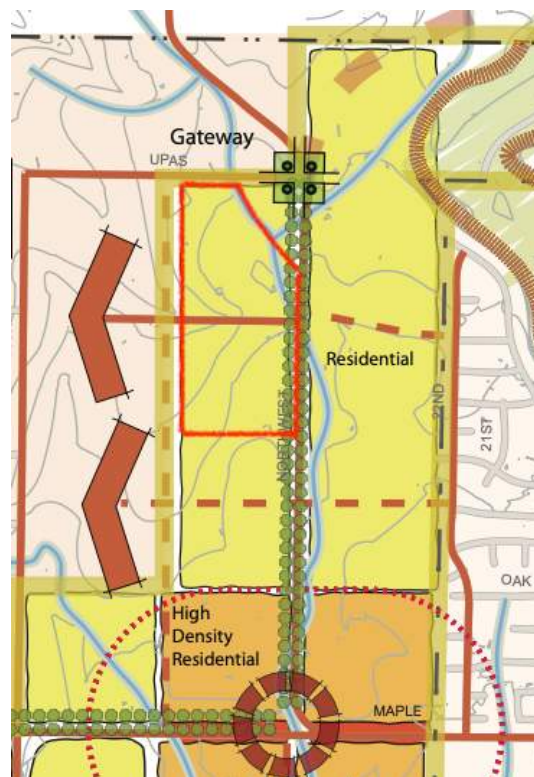
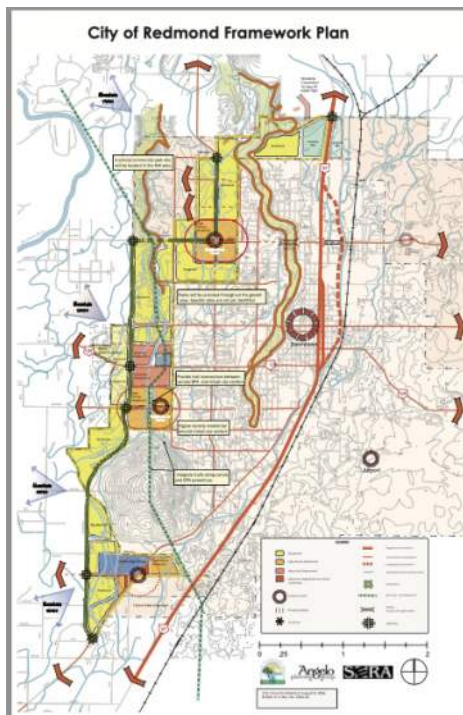
to a broader system that connects to the remainder of the City as prescribed in the NAP, thus in conformance with this standard.

b. Housing. A mix of housing types and densities should be integrated into the design of new neighborhoods.

Applicant Response: The Comprehensive Plan identifies the property with 60.21 acres of R-4 Zoning and 16.61 acres of R-5 Zoning. The proposal slightly relocates the placement of the R-4 and R-5 Zones, but maintains the same acreage in the same general areas. Regarding the Framework Plan and NAP, as discussed above:

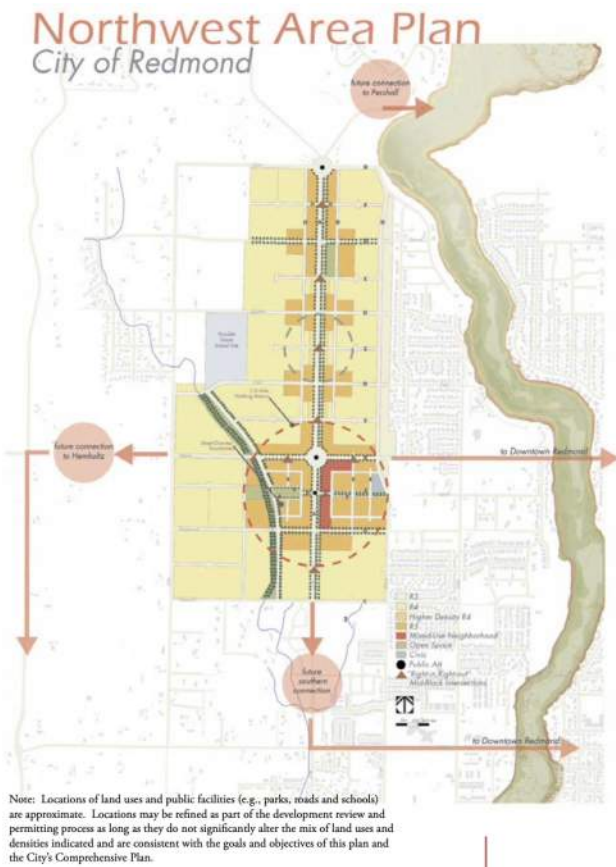
The property is detailed in the Framework Plan and it is within the Northwest Area Plan (NAP).

Below is an excerpt from the Framework Plan that focuses on the area of the subject property.



The Framework Plan establishes the property is identified as “Residential”

Below is an excerpt from the NAP that focuses on the area of the subject property.



The NAP establishes the property as “Higher Density R4” and “R5”

As detailed on the Master Development Plan exhibit, the proposal includes the following features that carry out the items referenced on the Framework Plan:

- The proposal will maintain 60.21 acres of R-4 zoned land and 16.61 acres of R-5 zoned land.
- The proposal provides detached single family homes and attached cottages/townhomes on the R-4 zoned land, and attached cottages/townhomes and multi-family complexes in the R-5 zoned land. The planned residential uses are consistent with the R-4 and R-5 Zone requirements.
- The Master Development Plan proposes a density of 10.47 units per acre, conforming to all R-4 and R-5 density requirements.

As detailed above, the proposal complies with the all of the housing notes and the overall intent of the Comprehensive Plan, the 2006 Framework Plan, and the NAP; therefore the proposal complies with this section.

Minimum Density - Overall R-4 – As detailed on the Master Development Plan Set, the R-4 Zoned area will provide 326 units on 35.42 net developable acres, which

calculates to a density of 9.2 units per acre and exceeds the minimum requires 5 units per acre.

Minimum Density - Overall R-5 – As detailed on the Master Development Plan Set, the R-5 Zoned area will provide 130 units on 8.12 net developable acres, which calculates to a density of 16 units per acre, and exceeds the minimum requires 8 units per acre.

Maximum Density - Single Family – Single Family detached housing is only proposed in the R-4 Zoned area. As detailed in the Plan Set, the design provides 174 detached single family units on 24 net acres of land, which equates to 7.2 units per acre and is less than the maximum allowed 8 units per acre.

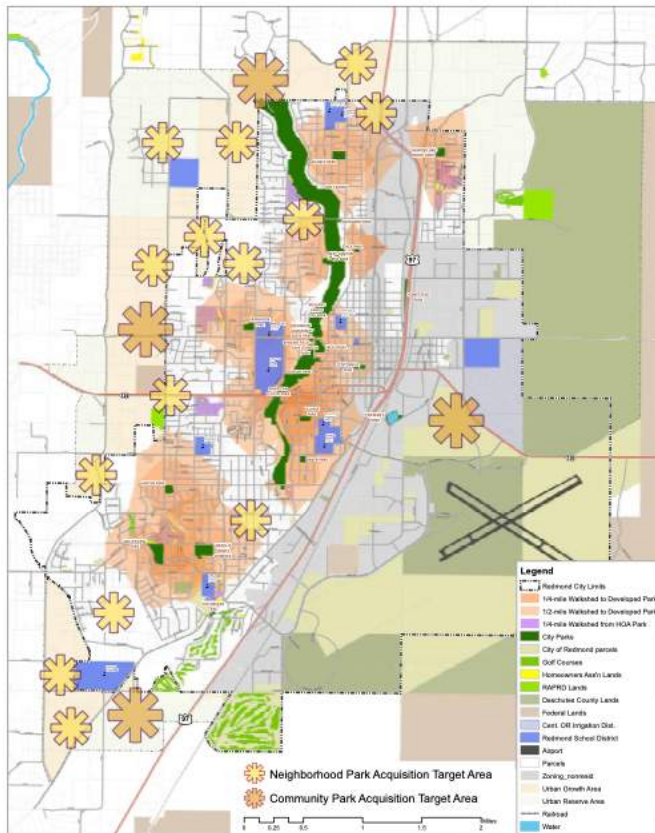
Maximum Density - Townhouses – Within both the R-4 and R-5 Zones, townhouses are allowed up to a maximum of 25 units per acre. As detailed on the Plan Set, in the R-4 zoned land the design provide 152 units on 11.42 net acres, resulting in 13.3 units per acre. In the R-5 zoned land, the design provide 30 units on 2 net acres, resulting in 12 units per acre. As detailed on the Plan Set the townhouse density is less than 25 units per acres and in conformance with the allowed density for the dwelling unit type.

Maximum Density - Multi-family Complex 5+ - Multi-family complex housing is only proposed in the R-5 Zoned area. As detailed in the Plan Set, the design provides approximately 100 multi- family housing units on 6.12 net acres of land, which equates to 16.3 units per acre and is less than the maximum allowed 17.4 units per acre.

As detailed on the plans and described above, the proposed density conforms to the specific density requirements that apply to the unity types that are proposed.

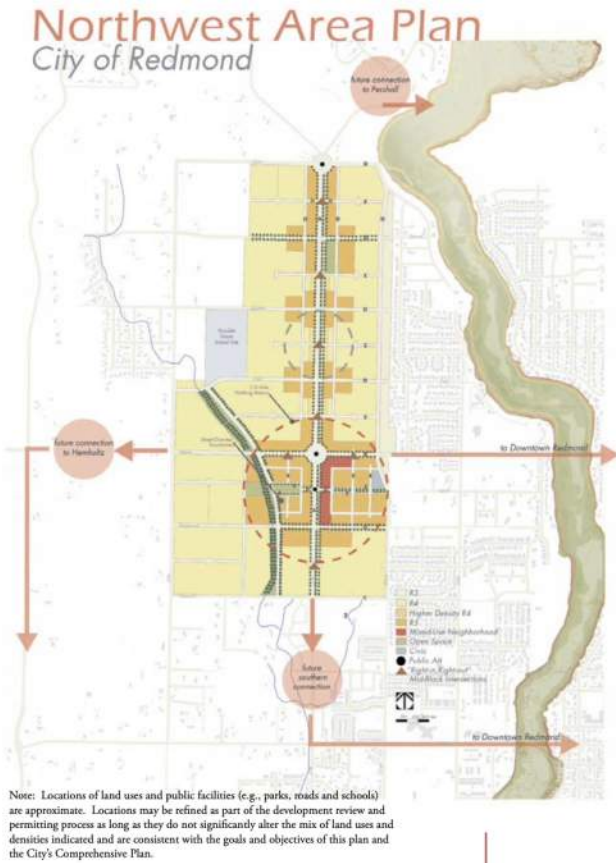
- c. **Open spaces, greenways, recreation.** All new neighborhoods shall provide useable open spaces with recreation amenities that are integrated to the larger community. Central parks and plazas shall be used to create public gathering places. Incorporate significant geological features such as rock outcroppings, stands of clustered native trees, etc. into the design of new neighborhoods. Neighborhood and community parks shall be shown in appropriate locations consistent with policies in Redmond's Parks Master Plan.

Applicant Response: "Map 5: Target Acquisition Areas" of the Park Master Plan identifies a "Neighborhood Park Acquisition Target Area" in the Northwest Area Plan vicinity, however the exact location is located on the east side of Northwest Way.



Map 5: Target Acquisition Areas

The NAP identifies a park on the east side of Northwest Way:



As further detailed on Deschutes County DIAL, the City of Redmond has acquired a 4.2 acre park on the east side of Northwest Way, consistent with the Park Master Plan and the NAP. The Park Master Plan and the NAP do not identify any needed or required parks on the subject property. Nonetheless, as detailed on the Plan Set, the project will provide 9.04 acres of park/open space, including an approximately 2.3 acre neighborhood park south of NW Spruce Avenue and approximately 2 acres of park / open space north of NW Spruce Avenue. Furthermore, the design includes trails within open space buffers along Northwest Way and NW Spruce Avenue, in addition to a buffer and trail system in the north / northwest portion of the site and a trail connecting to the southern park. The trail system and open spaces extend throughout the Master Planned area, and a trailhead in the northeast park is planned to facilitate a connection to the neighborhood. These items collectively exceed the park/open space design elements noted on the Framework Plan and the NAP, and conform to all design standards established in the Development Code, thus the proposal conforms to the standards of this section.

These items collectively exceed the items noted on the Framework Plan and the NAP, and conform to all design standards established in the Development Code, including Section 8.0300.3.C.13.i, which indicates that open space should be provided at a rate of 3000 square feet per 25 dwelling units.

- d. **Integrated design elements. Streets, civic spaces, signage, and architecture shall be coordinated to establish a coherent and distinct character for the Master Development Plan. Plans may integrate design themes with adjacent developed or planned areas.**

Applicant Response: The location of streets, parks and civic spaces are detailed on the Master Development Plan Exhibit. Furthermore, the attached design Exhibits, address signage and architectural themes of the Master Development Plan. As detailed in the submittal material, Contemporary and Northwest Craftsman architectural styles will be used throughout the development. Colors are planned to be earth tones and sustainable designs will be encouraged. Furthermore, development will encourage the preservation and integration of significant vegetation where practical (to be reviewed with subsequent Subdivision and/or Site Plan review), to maintain views, resources, and sufficient interface to a reasonable extent. The design will coordinate signage, correlating to the architectural theme, and encourage the enhancement of usable areas by extending parks and open spaces and/or providing art.

The planned design features will be incorporated into CC&Rs and will be recorded with Subdivisions and/or Site Plan applications, prior to development, which will provide a distinct and coherent character, as required by this section.

The way that the area is planned to be developed has been established by the City through the Comprehensive Plan, the Framework Plan and the Northwest Area Plan. The referenced long-range planning documents establishes zones, use areas, densities, amenities and transportation systems that result in fully integrated planning areas. The currently proposed Master Development Plan will be consistent with the adopted long range plans.

In addition to the design, the proposal will extend water and sewer facilities, along with all franchise utilities to and throughout the site. By extending all required utilities and facilities to and through the property in a manner that is consistent with the adopted long range plans (Comprehensive Plan, Framework Plan, NAP), the proposal will sufficiently integrate them into the surrounding area. As planned, the proposal is fully integrated to adopted plans and known developments, thus in conformance with the standards of this section.

- e. **Diverse mix of activities. A variety of uses is encouraged in order to create vitality and bring many activities of daily living within walking and biking distance or a short drive of homes.**

Applicant Response: The proposed Master Development Plan is consistent with the Framework Plan and the NAP which establish an intent for the following activities on the property:

Framework Plan

- The property is identified as “Residential”
- A north/south “Boulevard” along the eastern property line (location of Northwest Way)
- An east/west “Community Connection” in the area of NW Upas Avenue
- An east/west “Community Connection” in the area of NW Spruce Avenue
- An east/west “Proposed Connection” in the area of NW Quince Avenue

Northwest Area Plan

- The property is identified as “Higher Density R4” and “R5”
- Labels similar to the Framework Plan “Boulevard” are identified along Northwest Way and NW Spruce Avenue, it is understood that these labels signify trails.
- A Right-in / Right-out Mid-Block Intersection is noted at the NW Quince Avenue / Northwest Way intersection.

As detailed on the Master Development Plan exhibit, the proposal includes the following features that carry out the items referenced on the Framework Plan:

- The proposal will maintain 60.21 acres of R-4 zoned land and 16.61 acres of R-5 zoned land.
- The proposal provides detached single family homes and attached cottages/townhomes on R-4 zoned land, and townhomes and multi-family complexes on R-5 zoned land. The planned residential uses consistent with the R-4 and R-5 Zone requirements.
- Right-of-way improvements that conform to the City of Redmond Arterial Street standards (travel lanes, curbs, walkways, planter strips) are proposed along Northwest Way. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Right-of-way improvements that conform to the City of Redmond Collector Street standards (travel lanes, curbs, walkways, planter strips) are proposed along NW Spruce Avenue. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Internal grid and non-grid streets improvements that conform to the City of Redmond Street standards (travel lanes, curbs, walkways, planter strips) are proposed along the internal streets. At time of development (Land Division and/or Site Plan as warranted), the improvements will be constructed to City Standards.
- Trails are proposed along the Northwest Way and NW Spruce Avenue frontages.
- The Master Development Plan proposes an overall density of 10.47 units per acre, conforming to all of the applicable R-4 and R-5 density requirements.
- Water is planned to be provided to and through the site in conformance with City Standards.
- Wastewater is proposed to be provided to and through the site in conformance with City Standards.
- Irrigation canals that cross the property will be piped.

As detailed above, the proposal complies with the all of the notes and the overall intent of the Comprehensive Plan, the 2006 Framework Plan, and the NAP; therefore the proposal complies with this section.

Neither the Framework Plan, nor the NAP identify other activity areas, parks, or open spaces on the subject property, however they both identify trail locations along Northwest Way and NW Spruce Avenue. As noted throughout the submittal materials, trails are proposed as previously planned. Even though park and open spaces are not required by the Framework Plan or the NAP, the design provides 9.04 acres of park/open space, including an approximately 2.3 acre neighborhood park south of NW Spruce Avenue and approximately 2 acres of park / open space north of NW Spruce Avenue. Furthermore, the design includes trails within open spaces, along Northwest Way and NW Spruce Avenue, in addition to a buffer and trail system in the north / northwest portion of the site and a trail that connects to the southern park. The trail system and open spaces extend throughout the Master Planned area, and a trailhead in the northeast park is planned to facilitate a connection to the neighborhood. These items collectively exceed the items noted on the Framework Plan and NAP and conform to all design standards established in the Development Code, including Section 8.0300.3.C.13.i, which indicates that open space should be provided at a rate of 3000 square feet per 25 dwelling units.

As described above, the project is generally consistent with the Framework Plan, the NAP, and the Comprehensive Plan in terms of providing a specific mix of activities; the proposed mix of uses conforms to the standards of this section.

- f. Public art or artistic feature. Places for the installation of public art or artistic feature is required to provide focal points, preferably, at the gateways to neighborhoods, in and around the center of neighborhoods, or trailheads.**

Applicant Response: The proposal will provide entry signage. The signage locations and park/open space areas could accommodate public artwork if needed, which could be installed with future development.

- g. Scenic views. Identify and preserve scenic views and corridors of the Cascade Range, Ochoco Mountains, and Smith Rock. Streets and common or public open spaces should be located and oriented to capture and preserve scenic views for the public. Minimize visual clutter within scenic corridors.**

Applicant Response: The property has scenic views of the Cascade Mountains to the west, however, the subject property does not contain any adopted view corridors or view restrictions. The proposal includes the preservation of these views to the greatest extent practical given the Framework Plan desired uses and existing development pattern. As detailed on the Plan Set, the design extends Local Street B, NW Spruce Avenue, Local Street G, and NW Quince Avenue in east/west orientation, to the edge of the property.

These street connections will provide view corridors throughout the property an area. Furthermore, the design include “Neighborhood Park (North)”, which extends from the central part of the property to the western property line; this corridor will maintain scenic views in the area. Also, the design include an approximately 2.3 acre park on the southern portion of the site. The size and location of this park are also anticipated to maintain scenic views from this central community area.

The proposed design conforms to the provisions to a reasonable extent.

- h. Urban – rural interface. Urban development shall interface with rural areas through open space buffers at least 100 feet wide and the length of the urban development, excluding public streets, or shall be transitioned from higher density development to lower density development at the urban - rural interface, or utilize other appropriate and equivalent transitional elements.**

Applicant Response: The property sits on the western edge of the UGB, in a developing area of the City of Redmond. The properties to the west and north are in Deschutes County, zoned EFU and therefore “rural properties”.

As detailed on the Master Development Plan exhibit, along the western property line, of all the allowed uses in the zone, the design includes only the lowest density, detached single family homes; the design along the western tier of lots is only 6.9 units per acre. Rather than placing higher intensity uses (such as townhomes or multifamily complexes) and higher densities (up to 25 units per acre), the design locates the lowest density use along this area, which is a reasonable and adequate buffer, between the urban and areas.

To the north, the current proposal provides a City required grid system; NW Upas Avenue will act as buffers and transition. The right-of-way and future street improvements will have required street trees. Furthermore, the Master Development Plan includes a buffer along this right-of-way. The transition of allowed uses, streets, right-of way-improvements, and open space/park areas will create a natural and pleasing transition to the nearby rural properties.

The proposed design conforms to this criterion.

- i. Pocket parks/tot lots. Fully developed “pocket parks” or “tot lots” shall be incorporated into medium and high density zoned residential subdivisions and site plans. These areas shall be developed for every twenty-five lots/units, a minimum of 3,000 square feet and privately maintained. Examples of amenities include: turf areas, benches, deciduous shade trees, irrigation, shrubs, natural or decorative features, and adequate trash receptable(s) and lighting.**

Applicant Response: The development includes 456 dwelling units. To meet the, the standards of this section, 54,720 square feet (1.26 acres) of park would be required. As shown on the plan set, the design includes an approximately 2.3 acre park south of NW Spruce Avenue and approximately 2.7 acres of park space north of NW Spruce Avenue. The design also includes non-park open spaces and trails; a total of 9.04 acres. The proposed design far exceeds the pocket park requirements of this section.

- j. **Canal trails. If canals or laterals are present, multi-use trails at least 10 feet wide shall be provided, subject to the Central Oregon Irrigation District's review and approval. Pedestrian amenities such as benches and trash receptacles shall be provided at appropriate locations (e.g., every 500 feet, at trailheads or intersections with public streets).**

Applicant Response: The proposal includes piping canals that cross the property. With the piping, canals and/or laterals will not exist on the property; therefore this standard will not apply to development. As detailed on the Master Development Plan Exhibit, the proposal includes connector trails throughout the Site, consistent with the Framework Plan and the NAP. The proposed design sufficiently provides non-vehicular connectivity.

- k. **Green Design. Energy-efficient design through solar access setbacks, xeriscaping, and planting of drought-resistant trees to minimize water usage and provide shade.**

Applicant Response: This section generally applies to site development elements. The proposal does include Master Development Plan themes and concepts that are included as Exhibits to this application. Future building and site designs will be reviewed for their conformance to Development Code requirements, which will implement this provision.

- D. **Implementation. Upon approval of a Master Development Plan, all subsequent development located within the area master plan boundaries shall be consistent with the approved master plan.**

Applicant Response: The applicant understands that subsequent development will be required to be consistent with the approved Master Development Plan. In future land use submittals, the applicant anticipates Land Divisions and Site Plans, both of which will be designed to be in conformance with the Master Development Plan.

- E. **Amendment/Modification to Master Development Plan. Any modifications to the approved master development plan shall be subject to the standards and procedures in Article II, "Modifications", and subject to the review criteria contained in this section.**

Applicant Response: This is a provision that would apply to future amendments and/or modifications. The Applicant understands this provision, however it does not apply at this time.

- F. Expiration of Master Development Plan.** An approved Master Development Plan or Partial Master Development Plan shall be subject to the requirements of Section 8.1605 of this Code concerning expiration, unless a specific timeline is approved through the land use review process.

Applicant Response: The applicant understands the approval timeframes that are prescribed in the Redmond Development Code. The applicant intends to initiate development as quickly as possible subsequent to approval. A subdivision application has been prepared and it is anticipated that the subdivision application will be submitted for City Review while this Master Plan application is being processed.

SUPPLEMENTARY PROVISIONS

- 8.0305 Establishment of Clear Vision Areas...**
8.0340 Fences...

Applicant Response: The proposal is for a Master Development Plan, a Comprehensive Plan Map Amendment and a Zone Change. Development is not proposed at this time. Clear vision areas, along with fence standards apply to development; therefore this section does not apply to the current proposal, but instead will be reviewed in association with subsequent development applications.

8.0385 Neighborhood Meeting.

- 1. Purpose and Intent.** The purpose of the neighborhood meeting is to provide a forum for the applicant, surrounding neighbors, and interested members of the community to meet and consider a proposed land use application, and to discuss issues/concerns regarding the proposal prior to application submittal. Neighborhood meetings encourage citizen participation early in the development process, and an opportunity to revise the land use application to address the issues prior to application submittal.

Applicant Response: This section establishes a purpose. It does not contain any measurable development standards or approval criteria.

- 2. Applicability.** Neighborhood meetings are encouraged prior to submitting any land use application. The following application types or development proposals shall be subject to the neighborhood meeting requirements:

A. Master Development Plans.

- B. **Residential or mixed use development proposals that generate 200 or more daily trip ends, or 20 or more p.m. peak hour trip ends, where a Transportation Impact Analysis (TIA) is required.**

C. **Wireless and Broadcast Communications Facilities.**

Applicant Response: The project is a Master Development Plan and a residential development that will generate over 200 ADT and 20 p.m. peak hour trips; therefore a Neighborhood Meeting is required. The applicant held 2 Meetings, one on June 20, 2023 and one on June 29, 2023.

- 3. **Requirements and Procedures. The neighborhood meeting must be held after a predevelopment meeting with City Staff, but before submittal of a land use application. The applicant shall be required to hold only one meeting prior to submitting an application for a specific site but may hold more if desired. If the development proposal is revised after the neighborhood meeting, and a major modification is requested, a second neighborhood meeting with a new notice shall be required before the revised application is submitted.**

- A. **Location and Time. Neighborhood meetings shall be held in person at a location in reasonable proximity to the subject site. The meeting shall be held at a location open to the public., City Staff, and at a facility that is ADA accessible. The meeting shall be held on a weekday evening, or weekends at any reasonable time. Applicants may provide a virtual component for participants to join in the meeting. The virtual component shall not be done in lieu of the inperson requirements. ADA accommodations when requested by attendee must be provided.**

Applicant Response: The meetings were held at St. Thomas Catholic Church / 1720 NW 19th Street, Redmond, which is less than 1 mile from the development site and conforms to the requirement of this section.

- B. **Notice – Mail. Mailed notice of the meeting shall be provided by the applicant to the neighboring property owners (within 750 feet outside city limits and 250 feet within city limits) and the Community Development Department between ten and 30 calendar days prior to the meeting. Notices must be sent first class and shall include the date, time, and location of the meeting, as well as a brief description of the development proposal and property location. The description shall take into consideration information provided by City staff at the pre-development meeting, include project contact information, a copy of the tax map or a GIS map that clearly identifies the location of the proposed development, and a conceptual site plan.**

Applicant Response: As detailed on the attached Exhibits, Notice was mailed at least 10 days prior to the June 20, 2023 meeting. The notice was mailed to 155 property owners,

which included all property owners within 750 feet of the subject properties, as established in DIAL – Deschutes County Records. The notice included the date, time and location of the meeting as well as a description of the proposal and the property location. The notice was completed as prescribed in this section.

- C. Notice – Signage.** The applicant shall also post notice of the neighborhood meeting on the subject site or on an access easement to the site within clear view of a public street at least seven days in advance of the meeting. The sign must display the meeting date, time, and address as well as project contact information.

Applicant Response: Notice for the June 29, 2023 meeting was posted on the site on June 20, 2023. As detailed on the attached Exhibit, the notice included meeting date, time, and address as well as project contact information. The provided notice conforms to the requirements of this section.

- D. Meeting Requirements.** The developer must provide a sign-in sheet for attendees to provide their name, address, telephone number, and email address. At the meeting, the applicant shall provide a conceptual site plan and describe the major elements of the proposal. Depending on the type and scale of the particular application, the applicant should be prepared to discuss proposed land uses and densities; traffic impacts; proposed building size and height; proposed access and parking; and proposed landscaping, buffering and/or protection of natural resources as applicable. Attendees will have an opportunity to speak at the meeting and may identify any issues that they believe should be addressed. If no one arrives within 30 minutes of the scheduled start time for the meeting, the applicant may close the meeting and this requirement will be considered met upon the applicant's submittal of the documentation to that effect.

Applicant Response: The sign-in sheets, along with meeting materials that were presented at the meetings are included as Exhibits. As detailed in Exhibits, the applicant showed a conceptual site plan and described the major elements of the proposal. Furthermore, the applicant discussed land uses and densities; traffic impacts; conceptual building sizes and heights; access and parking; and landscaping, buffering and/or protection of natural resources as applicable. Attendees were provided the opportunity to speak at the meeting and many did identify any issues that they had concerns with and/or should be addressed.

- E. Materials Submitted with Application.** The neighborhood meeting notes that identify the major points discussed about the development, list of parties notified, signed affidavits of mailing and posting notices, copies of all materials provided by the applicant, and a signature sheet of attendees shall be included with the development application upon submittal.

Applicant response: All elements described in this section are included as an Exhibit to this submittal.

- F. Validity Period.** The land use application shall be submitted to the City within 180 days of the neighborhood meeting. If an application is not submitted in this timeframe, the applicant shall be required to hold a new neighborhood meeting.

Applicant Response: The meetings were held on June 20, 2023 and June 29, 2023 and this application is being submitted in July 2023. The application is being submitted within 180 days of the Neighborhood Meetings; therefore the proposal complies with the requirement

- G. Denial.** Failure of the applicant to hold a neighborhood meeting in accordance with these provisions prior to submittal of a land use application shall result in an incomplete application and the application may be rejected.

Applicant Response: As detailed in the attached Exhibits, the application conducted Neighborhood Meetings as required by the Code; therefore this section does not apply.

OFF-STREET PARKING & LOADING REQUIREMENTS

8.0500 Off-Street Parking...

Applicant Response: The proposal is for a Master Development Plan, a Comprehensive Plan Map Amendment and a Zone Change. Development is not proposed at this time. Parking standards apply to development, therefore this section does not apply to the current proposal, but instead will be reviewed in association with subsequent development applications.

AMENDMENTS

8.0750 Authorization to Initiate Amendments. An amendment to the text of this chapter (Redmond Development Code), to the Comprehensive Plan, or an amendment to the Comprehensive Plan Map may be initiated by City Council, Planning Commission, or Community Development Director. A property owner may initiate a request for a map or text amendment by filing an application with the Community Development Department.

Applicant Response: The property owner has initiated a request for a map amendment to swap impacting 7 acres of land (3.5 acres of R-4 to R-5 and 3.5 from R-5 to R-4) in the same general location a currently mapped. In association with this application, the applicant has submitted the appropriate forms, thus has complied with this section.

8.0760 Criteria for Amendments. The burden of proof is upon the applicant. The applicant shall show the proposed change is:

1. In conformity with all applicable State statutes;

Applicant Response: This criterion only applies to the applicant's proposal to swap 7 acres of land between R-4 and R-5 designations; this section does not apply the Master Development Plan element of the submittal. As they relate to Land Use proceedings, State Statutes (Oregon Revised Statutes - ORS) are carried out through rules (Oregon Administrative Rules –OAR) which are developed by the Department of Land Conservation and Development (DLCD). Local jurisdictions (including the City of Redmond) develop a land use planning program based upon the adopted OARs. Local land use planning programs include the development and maintenance of a Comprehensive Plan, along with implementing ordinances, such as zoning ordinances, procedures, and land division ordinances, along with Public Facilities Plans and other implementing documents and provisions. DLCD reviews all Comprehensive Plans and implementing ordinances, and “acknowledges” those that are found be consistent with the OAR and Statewide Planning Goals. The City of Redmond has an “acknowledged” Comprehensive Plan, along with “acknowledged” implementing ordinances. The project is being reviewed for compliance with the acknowledged Comprehensive Plan, as implemented through the adopted and acknowledged Development Code; therefore conformity with applicable state statutes is achieved.

City of Redmond Code standards (the Amendment provisions of sections 8.0750 to 8.0770, along with the procedural elements of 8.1010 through 8.1035, and 8.1300 through 8.1380) were developed in compliance with the applicable State Statutes regarding noticing and public hearings. The applicability of the Statewide Planning Goals is addressed in greater detail below. It is anticipated by the applicant that notice of the proposed amendment will be provided to DLCD and all required public hearings will be noticed in the local newspaper (public notice) as required by the City of Redmond Code, as well as the applicable State Statutes.

With regard to the Statutory public hearing requirements, the proposal is subject to Sections 8.1300 through 8.1380 of the Redmond Development Code. These sections implement the quasi-judicial Statutory requirements are anticipated to be followed by the City. It is further anticipated that the Planning Commission and City Council's public hearing and review processes will conform to the Statutory requirements for the purpose of the review.

Should the City or any party to the record suggest that a State Statute directly applies to the proposal, the applicant will further respond.

2. In conformity with the State-wide planning goals whenever they are determined to be applicable;

Applicant Response: There are 19 Statewide Planning Goals that express Oregon's land use policies. Each local government throughout Oregon, including the City of Redmond, must adopt a comprehensive plan to implement these Statewide Planning Goals. The City of Redmond has an adopted and acknowledged Comprehensive Plan, and as detailed below, the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment conform to all applicable policies of the Comprehensive Plan. Additionally, the City of Redmond has adopted other local land use regulations, including the Redmond Development Code and Public Facility Plans that have been developed to implement the policies of the Comprehensive Plan. As documented throughout this Burden of Proof narrative, the proposal conforms to the approval criteria of the Development Code and is consistent with the relevant policies of the Comprehensive Plan; therefore the proposal is consistent with the relevant Statewide Planning Goals.

After consultation with the City of Redmond Planning Staff, the applicant understands that of the 19 Statewide Planning goals, Goals 1, 2, 10, 11, and 12 are relevant for discussion in this Comprehensive Plan Map Amendment and Zoning Map Amendment proposal. All other goals have been determined to either not apply to this application, or are clearly satisfied through the City's acknowledged Comprehensive Plan, local land use regulations, and/or functional plans.

Goal 1 - Citizen Involvement, "To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process."

Applicant Response: A discussion of Goal 1 is relevant because the proposal includes a planning review; thus ensuring the opportunity for citizen involvement is necessary. Conformance with Goal 1 is achieved in Redmond through *Chapter 1 - Citizen Involvement* of the Redmond Comprehensive Plan and through the implementation procedures that have been adopted in the Redmond Development Code. Chapter 1 of the Comprehensive Plan identifies the Redmond Planning Commission as the official Citizen Involvement Committee for the City. The Redmond City Council, upon the recommendation of the Planning Commission, adopted the procedures in the Development Code, and those procedures have been acknowledged by the Land

Conservation and Development Commission (LCDC). The adopted Development Code contains provisions to ensure an appropriate level of citizen involvement is achieved; in this case, in addition to a Neighborhood Meeting, a review with a hearing before both the Planning Commission and the City Council. The applicant expects that the Development Code's adopted citizen involvement procedures will be followed in the City's review of this application.

Citizen involvement is ensured via Development Code adopted notification and review procedures, including the pre-submittal Neighborhood Meeting and post-submittal Public Hearings; subject to the notice requirements of the Development Code. The Public Hearing notification procedures ensure that citizens are informed in three different ways about the public hearings: published notice, posted notice, and individual mailed notice. The notices inform citizens about the hearings and indicate that all interested parties may participate by submitting written or verbal testimony. The applicant submitted the required application, and understands that public hearings, before the Planning Commission and the City Council, will be noticed and held in conformance with the public involvement procedures in the Redmond Development Code. The procedures in the adopted Development Code ensure conformity with Statewide Planning Goal 1.

Goal 2 – Land Use Planning, “To establish a land use planning process and policy framework as a basis for all decision and actions related to use of land and to assure an adequate factual base for such decisions and actions.”

Applicant Response: A discussion of Goal 2 is relevant because the proposal includes a land use planning review, which must be based on a factual basis.

The proposal includes a plan to amend the Comprehensive Plan Map and Zoning Map by “swapping” the precise location of 7 acres of land between R-4 and R-5 designations. The proposal will be reviewed in accordance with the planning processes and policy framework that have been established in the adopted Redmond Development Code (an acknowledged local land use regulation). Because the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment will follow the established local planning process, and it will neither alter the process for administration of the Development Code, nor the acknowledged procedural requirements (which ensure a factual base for all decisions). Therefore, the review will be consistent with Statewide Planning Goal 2.

Goal 3, Agricultural Lands

Goal 4, Forest Lands

Goal 5, Natural Resources, Scenic and Historic Areas, and Open Spaces

Applicant Response: Goals 3, 4, and 5 are not applicable because the subject property is not zoned for agriculture or forest use, and it does not contain any inventoried open spaces, scenic areas, historic resources or natural resources.

Goal 6, Air, Water and Land Resources

Applicant Response: Goal 6 is not directly applicable to the Map Amendment, because the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment only modifies the location of zones on a map, it will not have any impacts on air, water or land resources. Also, air and water quality are regulated by the Oregon Department of Environmental Quality, procedures that fall outside of the local land use review process.

Goal 7, Areas Subject to Natural Hazards

Goal 8, Recreational Needs

Applicant Response: Goals 7 and 8 are not applicable to the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment because the subject property is neither within an identified natural hazard area, nor within an area identified for recreational use.

Goal 9 – Economic Development

Applicant Response: Goal 9 is not relevant because the property does not contain any lands that are designated for economic or employment purposes.

Goal 10 – Housing, “To provide for the housing needs of Citizens of the state.”

Applicant Response: Goal 10 ensures that steps are taken, including inventories and plans, to encourage the availability of needed housing units at price ranges and levels that are commensurate with the financial capabilities of Oregon households. The proposed Comprehensive Plan Map Amendment and Zoning Map amendment, will “swap” 7 acres of R-4 and R-5 designated land, for a more efficient alignment, which can carry out the associate Master Development Plan submittal. The proposed swap will not alter the net acreage in any zone and it will allow for a more efficient design, while maintaining the same general location of the R-4 and R-5 zoned areas, such that land can be developed within the Redmond UGB, as established by the Comprehensive Plan, the Framework Plan and the NAP. The property will provide for approximately 456 units (10.47 units per acre) allowing the Master Development Plan to implement the housing program that has been established in the City of Redmond long range plans. Allowing the “swap” and the ultimate development of the Master Development Plan is therefore consistent with Goal 10.

Goal 11- Public Facilities and Services, “To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.”

Applicant Response: OAR 660-11 implements Goal 11, and notes, “Cities or counties shall develop and adopt a public facility plan for areas within an urban growth boundary containing a population greater than 2,500 persons...” The City of Redmond exceeds 2,500 people and has adopted water, wastewater, and transportation master plans. The PFPs detail long-range infrastructure needs, along with a path to completion and financing mechanisms. The water and sewer extensions that are planned with the associated

Master Development Plan (which includes the R-4/R-5 swap) are consistent with the City PFPs.

Collectively, the adopted local land use regulations (PFPs, the Development Code, and City Standards and Specification) provide a framework that ensures that a timely, orderly, and efficient arrangement of public facilities and services are achieved throughout the City. The provisions establish that needed public facilities improvements are made concurrent with development. Because with the swap, the planned improvements will be consistent with the PFPs, additional improvements or right of way dedications are not needed at this time; ensuring conformance with the adopted Development Code regulations will provide consistency with Goal 9.

Goal 12 – Transportation, “To provide and encourage a safe, convenient and economic transportation system.”

Applicant Response: Goal 12 is implemented through the Transportation Planning Rule and OAR 660-12-0060, in addition to local land use regulations. As detailed in the Traffic Report, the swap of 7 acres of land between R-4 and R-5 will not significantly impact any transportation facility and the proposal is consistent with the TPR. Furthermore, the current proposal includes a Traffic Impact Study, detailed findings of which are included in the attachment (also discussed immediately above).

The proposed swap will not alter impacts to the transportation system, therefore the swap is consistent with Goal 12.

Goal 13 – Energy Conservation, “To conserve energy.”

Applicant Response: Goal 13 is not directly applicable because the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment will not have any direct impacts on energy. This Goal encourages efficient use of lands. Through the Framework Plan and the NAP, the City of Redmond has determined how land will be most efficiently used with R-4 and R-5 residential uses. The proposal is consistent with the Comprehensive Plan as detailed on the Framework Plan and the NAP, thus the proposal conforms to this Goal to the extent applicable at this time. A complete review the applicable Comprehensive Plan provisions are included below.

Goal 14 – Urbanization - To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities.

Applicant Response: Goal 14 applies the creation and/or expansion of Urban Growth Boundaries. The property subject to the current application is located within the City of Redmond Urban Growth Boundary; the current proposal will only slightly change the location (but not the acreage) of the Comprehensive Plan Designation and Zoning of the property. Because the proposal will not alter the area of the UGB, and it conforms to the

uses intended by the City, through the Framework Plan and NAP (elements of the Comprehensive Plan), this Goal is not relevant to the current review.

Goal 15 – Willamette River Greenway

Goal 16 – Estuarine Resources

Goal 17 – Coastal Shorelands

Goal 18 – Beaches and Dunes

Goal 19 – Ocean Resources

Applicant Response: Goals 15-19 are not applicable to the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment because the subject property is not within or contain the Willamette River Greenway, an Estuary, a Coastal Shoreland, a Beach, a Dune, or an Ocean.

3. In conformity with the Redmond Comprehensive Plan, land use requirements and policies; and

Applicant Response: Applicant has reviewed past land use decisions and consulted with the Redmond Planning Department in the design of the project and the preparation of this application, including the identification of the relevant Comprehensive Plan Policies³. As described below, the proposed Comprehensive Plan Map Amendment and Zoning Map Amendment to swap 7 acres of land between R-4 and R-5 conform to all relevant Comprehensive Plan policies. This section does not apply the Master Development Plan element of the submittal, in the event that Staff or another interested party believes that additional policies, goals, or overview sections are relevant, the Applicant will supplement the record with written documentation of conformance, as needed.

Relevant sections of the Comprehensive Plan are denoted in blue font below.

Statewide Planning Goal 2 – Land Use Planning and Procedures.

GOALS AND POLICIES

GOAL 1 COORDINATION

Ensure that Redmond's Comprehensive Plan, implementation tools, and administration procedures build on the community's vision for the future and align with regional, state, and federal plans and regulations.

POLICY 2-1-6 Maintain a Plan that designates a range of land uses based on findings with respect to:

- **Natural resource capacity and environmental quality;**
- **Projected population and economic growth;**
- **Location, capacity and level of services;**
- **Existing land use patterns;**
- **Projected land use and community needs; and**

³ It is again noted that this section only applies to the R-5 / R-5 swap of 7 acres.

- **Energy conservation and resources.**

Applicant Response: The proposal swaps 7 acres of R-4 and R-5 land. The proposal does not modify the net amount of R-4 or R-5 zoned land within the City, and the location of the R-4 and R-5 areas are generally consistent with the original designation. The proposal only modifies the locations to align with the proposed Master Development Plan design, which will allow for an efficient street layout, design, and general aesthetic of the development. The proposal does alter impacts to natural resource capacity or environmental quality, it does not change the carrying capacity of the land, thus will accommodate the same population. Furthermore, the planned design integrates with the existing and planned land use pattern (as described in the NAP), it will accommodate community land needs, and it will not alter the potential impacts to energy or resources. The proposed swap is consistent with this policy.

POLICY 2-1-7 Identify and assign land uses in a way that encourages the best relationship between places where people live, work, shop and recreate.

Applicant Response: The proposed swap of 7 acres of land between the R-4 and R-5 designations will slightly change the manner in which land uses are laid out. As detailed on the Plan Set, the design slightly reduces the R-5 land along Northwest Way, placing it more internal to the Master Development Planned area, along NW Spruce Avenue and along NW Quince Avenue. The design allows for a slightly greater number of the higher density dwelling units to be “within” the development, as opposed to being on the perimeter. The locations allow the higher density R-5 areas to be closer to parks, open spaces and internal trails, while still being primarily on higher order streets. With the proposed unit types, locations, street layout, park plan and trail system, the proposed design achieves a better layout than the existing R-4 and R-5 locations would provide. As designed, the proposed R-4 / R-5 land swap conforms to this policy.

STATEWIDE PLANNING GOAL 5 - OPEN SPACES, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES

GOALS AND POLICIES

GOAL 1 OPEN SPACE RESOURCES

Conserve open space and protect natural and scenic resources.

POLICY 5-1-2 Utilize canals, rights-of-way and easements as recreation linkages for bike paths, hiking and jogging trails throughout the urban area.

POLICY 5-1-3 Develop a bicycle and pedestrian network that, including both on-street and off-street trails, bicycle lanes and Quiet Streets. Emphasize facilities physically separated from the street, to interconnect schools, concentrations of populations, service nodes, employment, parks and open spaces.

Applicant Response: The subject property is identified on the Framework Plan, along with the Northwest Area Plan. Both of these documents indicate the desired locations of streets, trails, walkways and parks across the northwest area (including the elements desired on the subject property). As detailed on the Master Development Plan Set, the

design includes streets and sidewalks (throughout the site), along with multi-use trails along Northwest Way, NW Spruce Avenue, along Local Road F and the southern park, and along the existing canals (to be piped) in the north / northeastern portion of the site. Furthermore, the design includes bike lanes along the higher order streets (Northwest Way and NW Spruce Avenue). The planned design exceeds the open space items on the Framework Plan and the NAP, and the proposed swap does not impact the amount of open space that can be provided; therefore the R-4/R-5 swap is consistent with these policies.

STATEWIDE PLANNING GOAL 6 - AIR, WATER AND LAND RESOURCES QUALITY

GOALS AND POLICIES

GOAL 2 IMPROVE QUALITY

Improve the quality of air, water and land resources.

POLICY 6-2-3 Ensure compatibility between land uses by separating and buffering pollutant emitting land uses and sensitive populations through land use designation, zoning and site design.

Applicant Response: Both the R-4 and the R-5 designations are residential. The design does not change the net acreage of either of the zones on the property, it just slightly relocates the location of 7 acres of R-4 and R-5 zoned land. Given the lands are designated for residential uses and all areas around the re-zone area are also residentially designated, the design maintains compatibility throughout the area, and will not introduce any pollutant emitting uses. The proposed R-4 / R-5 designation swap is therefore consistent with these goals and policies.

STATEWIDE PLANNING GOAL 8

RECREATIONAL NEEDS

GOALS AND POLICIES

GOAL 2 SECURE LANDS FOR THE FUTURE

Redmond provides a comprehensive system of parks, natural resource areas and recreation amenities that serves current and future needs.

POLICY 8-2-1 Plan for and acquire additional parklands necessary to adequately serve the City's current and future population based on adopted service levels and community needs.

POLICY 8-2-2 Plan for the location of parks in the proximity of under- served neighborhoods and/or high-density developments.

GOAL 3 CREATE GREAT PARKS AND PUBLIC SPACES

Redmond's parks meet local needs for active and passive recreation, enhance the environmental and visual quality of the community, and healthy living.

POLICY 8-3-1 Design and develop park sites and facilities to maximize recreational value and experience, while minimizing maintenance and operational costs and negative environmental or community impacts.

POLICY 8-3-2 Strive to reduce barriers to participation and improve safety by providing universal access to parks and amenities.

POLICY 8-3-3 Establish and operate specialized recreational facilities (e.g. sport facilities, off leash dog areas, skateparks, community gardens) to respond to identified public needs, as appropriate.

Applicant Response: The Goals and Policies of these sections apply to City of Redmond Parks, thus are not directly applicable to the project or the R-4/R-4 land swap. Furthermore, the area of the R-4 and R-5 swap will not impact any planned park areas.

GOAL 4 CONNECT TRAILS AND NEIGHBORHOODS Redmond's parks, and open spaces are connected with safe and accessible trails, bikeways and pedestrian linkages.

POLICY 8-4-1 Develop a network of shared-use recreational, pedestrian and bicycle trails to enable connections within parks and between parks, neighborhoods and public amenities.

POLICY 8-4-2 Design and construct trails to serve a variety of users at varying skill levels.

Applicant Response: As detailed on the Plan Set, trails are planned throughout out the development site, including the areas where the R-4 and R-5 zone will be swapped. Even with the swap, the project establishes trails as noted on the Framework Plan and the NAP; therefore the project provides adequate connections and linkages, as referenced in this section.

STATEWIDE PLANNING GOAL 10 HOUSING

GOALS AND POLICIES

GOAL 1 LAND AVAILABILITY

Plan for a 20-year supply of suitable land for Redmond to meet housing needs within the existing urban growth boundary.

POLICY 10-1-1 Ensure that there is sufficient land in each residential plan designation to meet the land needs identified in the Housing Needs Analysis.

Applicant Response: As noted throughout this document, the Comprehensive Plan Map Amendment and Zone Change will impact 7 acres of land. The change will swap R-4 and R-5 lands and not impact the overall acreage of either of the zones in the City. The project therefore will not change the amount of land in any residential plan designation and development of the site, in a manner that is consistent with the Code requirements, will ensure that development is consistent with the land needs identified in the Housing Needs Analysis. The proposed swap is consistent with these Goals and Policies.

STATEWIDE PLANNING GOAL 13

ENERGY CONSERVATION

GOALS AND POLICIES

POLICY 13-1-2 Locate land use activities with adequate density and intensity so as to reduce energy-consuming travel and development patterns.

Applicant Response: The proposal will slightly relocate R-4 and R-5 zoned lands. The relocations are relatively minor, all higher intensity uses (R-5) are still primarily located along higher order streets, thus the density and/or potential alterations to energy consuming travel and/or development patterns will be limited. The proposal is consistent with these Goals and Policies.

STATEWIDE PLANNING GOAL 14

URBANIZATION

GOALS AND POLICIES

GOAL 1 GROWTH MANAGEMENT

Guide growth and development in a manner that implements the Redmond 2040 Vision.

POLICY 14-1-1 Promote the efficient use of land, including appropriate in-fill, redevelopment and new development. Encourage the city to grow its existing neighborhoods, amenities, town center and industrial areas into one connected well planned city.

Applicant Response: The R-4 / R-5 swap will allow for efficient development of the site, consistent with the Framework Plan and the NAP. Carrying out the design elements of the NAP, the project (with the proposed swap) will adequately connect with the surrounding area and the proposed swap is consistent with these Goals and Policies.

4. That there is a change of circumstances, further studies justifying the amendment or mistake in the original zoning.

Applicant Response: The reason for the minor 7 acre swap of R-4 and R-5 zoned lands is because Hayden Homes has acquired the land and developed a comprehensive set of plans to implement the NAP, with an established suite of housing products. Given the topography of the site, the necessary street and walkway layouts, the water and sewer design, desired project types, and intent to bring some of the higher density closer to the interior of the site, the proposed design is the best fit for the owner. While the original design (in the Framework Plan and the NAP) was a high level assessment, the current project is more granular and detailed. The process of thoroughly assessing a property and developing it with product types of a particular developer, constitutes a change of circumstances, which is sufficient for compliance with this approval criterion.

8.0765 Tentative Approval. Based on the facts presented at the hearing and the recommendation of the Planning Commission, if the Hearings Body determines that the applicant has met all applicable criteria for the proposed change, the Hearings Body shall give tentative approval of the proposed change. Such approval shall include any conditions, stipulations or limitations which the Hearings Body determines to be necessary to meet the criteria. An appeal of the Hearings Body's decision shall be processed and decided in the manner provided for in Article II of these standards. Upon completion of hearings process, the council shall, by order, effect the zone reclassification of the property. Provided, however, if the applicant fails to abide by the conditions attached to the rezoning the Council may, at a later date, rezone the affected property to its original zoning by order.

Applicant Response: The applicant understands the procedural provisions established in this section.

8.0770 Public Hearing on Amendments. If a map change is initiated by the Planning Commission or City Council, or if an amendment to the text of these standards is to be considered, the City Council shall hold a public hearing on the proposed change. Notice of the hearing shall be published in a newspaper of general circulation in the City the week prior to the hearing. Before establishing a map change, the Council shall make findings that the proposed change meets the criteria set forth in Section 8.0760. Any change affected under this section shall be by ordinance.

Applicant Response: The current request has been initiated by a private landowner, not the Planning Commission or the City Council, therefore this section does not apply.

8.0775 Limitations on Re-Applications. No application of a property owner for an amendment to the text of these standards or to the zoning map shall be considered by the Hearings Body within the six month period immediately following a previous denial application; if in the opinion of the Hearings Body, new evidence or a change of circumstances warrant it, however, the Hearings Body may permit a new application.

Applicant Response: The applicant understands the procedural provisions established in this section.

V. Conformance with the Policies of the Northwest Area Plan

As detailed on the submittal materials and throughout this narrative, the proposed design is consistent with the design elements that are noted on the NAP. The section below further details the projects conformance with the relevant policies of the Northwest Area Plan.

Chapter 2 – Neighborhood Land Use Plan

Policies – Land Use

The following policies are intended to supplement policies in the City’s existing Comprehensive Plan and support implementation of this Area Plan.

- 1. Apply zoning designations within the planning area as land is annexed for properties that have signed annexation agreements, consistent with the proposed Comprehensive Plan designations and land use maps included in this Plan. Parcels that do not have signed annexation agreements may remain in the Urban Holding - 10 Zone until such agreements are reached,**
- 2. Integrate planning for adjacent areas with proposed land uses in the NAP area to ensure a compatible, supportive land use framework within the larger surrounding area, including transitional buffers where planned land uses in the NAP differ significantly from existing land uses in the city.**
- 3. Adopt and apply new and/or amended zoning regulations proposed in this Plan to implement Plan objectives related to housing and employment.**
- 4. Assess and address land use development and compatibility issues as development proposals are reviewed and approved.**

Applicant Response: As detailed on the Master Development Plan, the design is consistent with the overall NAP, it includes all design elements noted on the NAP Map and is consistent and compatible with the surrounding area. As designed, the Master Development Plan is consistent with these policies.

Policies – Housing

The following policies are intended to supplement policies in the City’s existing Comprehensive Plan and support implementation of this Area Plan.

- 1. Create opportunities and incentives to develop housing that is affordable to people with a wide range of incomes, including those with very low, low, and moderate incomes, consistent with related existing Comprehensive Plan policies.**
- 2. Allow for and encourage development of a range of housing types, including single-family, multi-family, cluster cottage housing and townhomes.**
- 3. Disperse different types of housing throughout the planning area.**

Applicant Response: As detailed on the Master Development Plan will accommodate multiple housing types, which area planned to be dispersed throughout the Master

Development Plan area. The proposed design and layout provides opportunities for a variety of housing types, consistent with these policies.

- 5. Locate medium-and higher-density residential developments near commercial services, employment and public open space, consistent with the land use map for this Area Plan and the City's Comprehensive Plan.**
- 6. Ensure connectivity of residential areas to commercial areas and parks and open space by implementing the street and trails network identified in this plan.**

Applicant Response: The policies of this section are implemented by the NAP Map. The currently proposed Master Development Plan is consistent with the NAP map, except that it slightly relocates 7 acres of R-4 and R-5 zoned land. No commercial, employment or public spaces are noted on the NAP Map, however the proposed swap will relocate R-5 zoned land closer to parks and trails, which is consistent with these policies.

Chapter 3 – Transportation and Public Facility Improvements

Policies – Street System

The following policies are intended to supplement policies in the City's existing Comprehensive Plan and support implementation of this Area Plan.

- 3. Require local street and circulation plans to be consistent with the street network recommended in this plan.**
- 4. Encourage use of alleys to serve residential development in the planning area.**
- 5. Ensure the street system provides for safety, mobility and access, consistent with Comprehensive Plan policies and project objectives.**
- 6. Incorporate opportunities for future transit use into the design of the street system.**

Applicant Response: The street locations are consistent with the NAP and City Development Code requirements. As detailed on the Plan Set, the design provides safe and efficient connections, it serves the residential uses and includes vehicular travel lanes, bike lanes, and sidewalks as required by the Code. Furthermore, the design provides City required right-of widths, which themselves are sufficiently sized to accommodate future transit, if/when established. The proposed design is consistent with these policies.

Policies – Trails and Pathways

The following policies are intended to supplement policies in the City's existing Comprehensive Plan and support implementation of this Area Plan.

1. Use the trail and sidewalk system to provide connections to and between important community destinations such as parks, schools, commercial areas and other community trails.
3. Provide a minimum 5-foot buffer between the trail and roadway to address potential conflicts between motorists and trail users.
4. Provide signage and other needed amenities for trail users, consistent with recommendations in this plan.
5. Provide for safe trail crossings of arterial and collector streets through use of marked, signalized or grade-separated crossings, as appropriate and consistent with guidelines included in this Plan as well as other City standards and regulations.

Applicant Response: As detailed on the Plan Set, the design provides a trail and sidewalk system throughout the site, and all trails noted on the NAP Map have been incorporated into the design. As noted on the plans, the trail and sidewalk system will connect all lots to the public park and trail amenities, along with the higher order streets in the areas. The proposed sidewalk and trail design conform to City Standards and therefore conform to the policies of this section.

Policies – Water, Sewer and Stormwater Facilities

The following policies are intended to supplement policies in the City’s existing Comprehensive Plan and support implementation of this Area Plan.

1. Provide facilities consistent with updated water, sewer and stormwater master plans.
2. Work with property owners and developers to identify opportunities to extend facilities ahead of schedule if funding is available to provide for services before or concurrent with development.
3. Use sustainable design and construction practices, such as “green streets” to detain and treat stormwater runoff.
4. Encourage property owners and developers to use low-water use vegetation for landscaping and other water-conservation measures to reduce future water use.

Applicant Response: The project will extend water and sewer systems to and through the site. The proposed design conforms to City Standards and to the City PFPs. The street designs conform to the adopted Code standards and the applicant understands that low water use vegetation is encouraged. Detailed design will be established with future site development. The proposed design is consistent with these policies to the extent applicable.

Policies – Schools and Parks

The following policies are intended to supplement policies in the City’s existing Comprehensive Plan and support implementation of this Area Plan.

3. Incorporate safe routes to school in designing transportation facilities within the planning area.
4. Design the proposed parks in the NAP to meet the needs of residents, consistent with the City's Park and Recreation Master Plan; involve residents and property owners in the design process.
5. Incorporate recreational opportunities for young people in the design of park and trail facilities.
6. Integrate trail, sidewalk and bicycle pathway connections into the design of new parks.
7. Orient housing located adjacent to the park blocks to face them.

Applicant Response: The NAP does not identify a park or school need on the site, however it does identify trail locations. As detailed on the Plan Set, the design provides all identified trails. The design also include additional trails, along with parks and open spaces throughout the site. Final design of the parks will occur with subsequent Site Plan review and, at that time, opportunities for young people will be considered in the designs. The proposed design is consistent with the relevant policies of this section.

Policies – Public Art and Other Community Amenities

The following policies are intended to supplement policies in the City's existing Comprehensive Plan and support implementation of this Area Plan.

3. Incorporate recreational opportunities for young people in the design of park and trail facilities.

Applicant Response: The NAP does not identify a park or school need on the site, however, the design provides parks and open spaces throughout the site. Final design of the parks will occur with subsequent Site Plan review and, at that time, opportunities for young people will be considered in the designs. The proposed design is consistent with the relevant policy of this section.

VI. Summary and Conclusion:

Based on the discussion above as well as the exhibits included with this application, the Applicant has documented that the proposal conforms to the applicable approval criteria for a Master Development Plan, a Comprehensive Plan Map Amendment and Zoning Map Amendment. Because the proposal conforms to all applicable criteria and standards, the applicant respectfully requests that the City approve the Master Development Plan, Comprehensive Plan Map Amendment and Zoning Map Amendment as proposed.

Burden of Proof Statement
Spruce Northwest Master Development Plan
Subdivision

Applicant: Hayden Homes
Megan Norris
2464 SW Glacier Place, Suite #110
Redmond, OR 97756

Owner: HLM, Inc.
1513050000600 963 SW Simpson Avenue #110
Bend, OR 97702

Owner: TeAmo Despacio, LLC
1513050000804 963 SW Simpson Avenue #110
Bend, OR 97702

Owner: Northwest Way Land JV, LLC
1513050000800 963 SW Simpson Avenue #110
Bend, OR 97702

Engineer: Know Ledge Engineering, LLC
Adam Erlandson
901 NW Carlon Avenue, Suite 3
Bend, OR 97702

Traffic Engineer: Transight Consulting, LLC
Joe Bessman
61271 Splendor Lane
Bend, OR 97702

Planning Consultant: Blackmore Planning and Development Services, LLC
Greg Blackmore
19454 Sunshine Way
Bend, OR 97702

Location: The development area contains multiple properties that are located in the northwest corner of the Redmond Urban Growth Boundary (UGB); west of Northwest Way, north of the NW Quince Avenue extension, and south of NW Upas Avenue. The central portion of the property is located at the intersection of Northwest Way and NW Spruce Avenue and the Dry Canyon Village development is located east of the site.

The properties have been assigned the following addresses and tax map and lot numbers.

Address	Tax Map and Lot Number
2917 NORTHWEST WAY	1513050000600
2515 NORTHWEST WAY	1513050000800
2902 NW SPRUCE AVE	1513050000804

Request: Phased subdivision of a 76.82-acre area. The subdivision will create the lots and tracts, dedicate right-of-way, and establish easements needed to implement the Spruce Northwest Master Development Plan, which is intended to accommodate approximately 456 dwellings units (174 detached single family homes, 182 townhomes and approximately 100 multi-family), over 9 acres of parks / open space, and all public utilities and facilities needed to serve the development.

I. Applicable Criteria, Standards, and Procedures:

The following are the applicable sections from The City of Redmond Development Code:

Article I - Zoning Standards

- Section 8.0115, General Residential R-4 Zone
- Section 8.0120, High density Residential R-5 Zone
- Section 8.0135, Table A, Residential Zones, Uses Permitted
- Section 8.0140, Table B Minimum Standards
- Section 8.0141, Single Family Detached Dwellings and Plexes Development and Design Standards
- Section 8.0142, Townhouse Development and Design Standards
- Section 8.0350, Design Standards for all Residential Structures and Sites Fronting both Public or Private Streets or Alleys
- Section 8.0385, Neighborhood Meeting Requirements

Article III - Land Division Standards

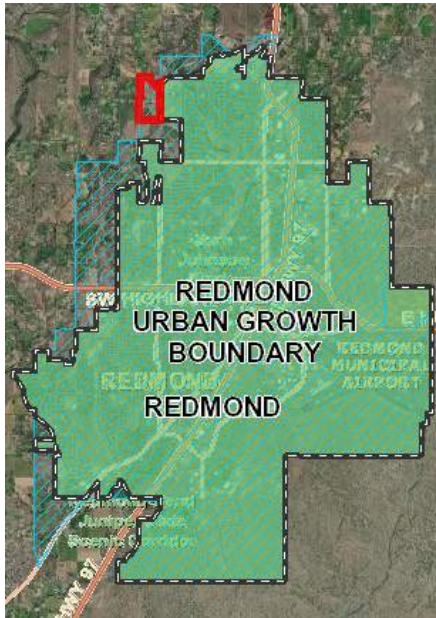
- Sections 8.2200-8.2245, Subdivision Application Procedure
- Sections 8.2700-8.2720, Design Standards and Improvements
- Sections 8.2800-8.2840, Supplementary Provisions

II. General Facts:

1. LOCATION: The application area contains multiple properties that are located in the northwest corner of the Redmond Urban Growth Boundary (UGB); west of Northwest Way, north of the NW Quince Avenue extension, and south of NW Upas Avenue. The central portion of the property is located at the intersection of Northwest Way and NW Spruce Avenue and the Dry Canyon Village development is located east of the site.

The properties have been assigned the following addresses and tax map and lot numbers.

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2. ZONING AND COMPREHENSIVE PLAN DESIGNATIONS: With the associated Comprehensive Plan Map Amendment, Zone Change, and Master Development Plan submittals, the lands of the subdivision are designated R-4 and R-5 on the Redmond Comprehensive Plan Map. The properties are located within the Redmond UGB and will be brought into the Redmond City Limits, through an annexation process.

3. SITE DESCRIPTION & SURROUNDING USES: The area subject to the application is 76.82 acres in size. The topography generally slopes to the west, it has over 30 feet of elevation change over the property, and has canals and ridges transect the property. The property has been developed with 3 dwellings and a number of farm buildings. The site has historically been irrigated, containing hay fields, and it has been used for livestock grazing. The northernmost tax lot has the greatest amount of topographic variation, ridges, and Juniper trees amongst the unirrigated area, along with trees and vegetation, in addition to the farm house. The southern tax lots primarily consist of irrigated fields and farm houses, with trees around the farm houses and a few unirrigated ridge areas.

The property is abutted by Northwest Way to the east and NW Upas Avenue to the north.

- Northwest Way is classified as a *Minor Arterial*. It has a varying ROW width ranging from 60- to 80-feet. Along the site frontage, Northwest Way has two travel lanes and bicycle lanes. Also, a striped median is provided along a portion of the site frontage. Frontage improvements for the Dry Canyon PUD have been built along a portion of the east side of the road, which include curb, landscape strip, and a paved multi-use path.
- NW Upas Avenue is a *Local Street* on the northern edge of the site. It connects to NW 35th Street to the west and terminates at a T-intersection with Northwest Way. NW Upas Avenue is a two-lane rural road with gravel shoulders. While the road contains a public access easement, private property ownership extends to the roadway centerline.

East of the site, a 30-inch sewer main has been extended within NW Spruce Avenue, extending west to Northwest Way. The existing sewer system provides a gravity main at the edge of the subject property, which connects to a broader system that extends to the City's Wastewater Treatment Facility, consistent with the City of Redmond Public Facility Plan. A 12-inch water main is located in Northwest Way, extending from NW Spruce Avenue to the northern point of the property. The existing system has a flow rate of 1574 GPM at Hydrant FH1863. The existing water system connects to a broader system that serves the City, consistent with the City of Redmond Public Facility Plan.

The property is located at the rural/urban interface. Properties to the north and west are located outside of the Redmond UGB; they are zoned Deschutes County – Exclusive Farm Use and used for small agricultural and rural residential uses. Properties to the east are located within the Redmond UGB and the Redmond City Limits; they are zoned R-4 and R-5, and they are experiencing rapid urban development, including clearing and site preparation for detached single-family homes, townhouses, and multi-family developments.

4. PROPOSAL: Phased subdivision of a 76.82-acre area. The subdivision will create the lots and tracts, dedicate right-of-way and establish easements needed to implement the Spruce Northwest Master Development Plan, which is intended to accommodate approximately 456 dwellings units (174 detached single family homes, 182 townhomes and approximately 100 multi-family), over 9 acres of parks / open space, and all public utilities and facilities needed to serve the development.

5. EXHIBITS: In addition to this burden of proof statement, the applicant submits the following exhibits in support of this proposal:

- Application Forms & Fees
- Title Report
- Traffic Impact Analysis / TPR Analysis
- Master Development Plan Packet
 - Master Development Plan
 - Existing Conditions
 - Master Development Plan
 - Uses and Densities
 - Street Layout
 - Parks/Open Space
 - Trails and Amenities
 - Transportation Plan
 - Street Sections
 - Public Facilities Plans
 - Preliminary Grading and Drainage Plans
 - Draft CC&Rs
- Tentative Subdivision Plan

6. NEIGHBORHOOD MEETING: Two Neighborhood Meetings were held, one on June 20, 2023 and one on June 29, 2023. The meetings were held at St. Thomas Catholic Church, 1720 NW 19th Street in Redmond, which is less than a mile from the subject property. Prior to the June 20, 2023 meeting, notice was sent to neighboring property owners within 750 feet and a sign was posted on the property for over 7 days prior to the June 29, 2023 meeting. At the meetings, sign-in sheets were provided, project details were relayed, and the applicant heard questions and concerns from attendees. The meetings were held in conformance with RDC 8.0385; details of the meetings are included as an Exhibit.

7. PUBLIC NOTICE: The applicant understands that the City of Redmond Planning Division will send and publish notice of the application as required by the Redmond Development Code and Statutory requirements.

III. Compliance with the Redmond Development Code

RESIDENTIAL USE ZONES

8.0115 General Residential R-4 Zone.

8.0120 High Density Residential R-5 Zone.

Applicant Response: While these sections are listed; the Code does not provide any standards under these section hearings.

8.0130 Urban Holding UH-10 Zone. The City shall administer the provisions of Title 20 Redmond Urban Area Zoning Ordinance of the Deschutes County Code for this County zoning district.

- 1. Master Development Plans.** The development and approval of an Urban Area Master Plan subject to the provisions of RDC 8.0270 is required as a condition of annexation, prior to or concurrent with rezoning from UH-10 to City zoning districts.

Applicant Response: With the associated Master Development Plan and Annexation, the property will be brought into the City Limits and zoned R-4 and R-5. The provisions of this section do not apply to this subdivision review.

- 2. Exception to Master Development Plans Requirement.** Approval of a development plan may be granted without going through a Master Development Plan process according to the following requirements:

Non-Residential Properties...

Applicant Response: The proposal is for a residential development; therefore, this section does not apply.

Residential Properties...

- I. The parcel is 3 acres or less in size; and,...**

Applicant Response: The applicant has submitted a Master Development Plan application in association with this subdivision review. The property exceeds 3 acres in size and therefore is not eligible for an exception; an exception to the Master Development Plan requirements is not requested.

8.0135 Table A, Residential Zones, Uses Permitted. The following uses are allowed outright or conditionally in each of the Residential zones as follows:

Residential Uses:			RESTRICTIONS AND REQUIREMENTS:
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Accessory Building:			
Detached sheds, shops, garages			Must be located within the property and not in the yard setback areas. Moveable shipping containers, or similar, are not allowed.
Guest House			No kitchen; uses main houses' sewer & water
Accessory Dwelling Unit / Accessory Suite			Uses main houses' sewer & water or individual City Services; may have kitchen
Accessory Use			Includes Home Occupations
Apartments			See Multi-Family Complex / Dwelling
Bed and Breakfast			
Boarding or Rooming House			
Cottage Development			
Manufactured Home			See Single Family Detached Dwelling
Manufactured Home Park			See Section 8.0375
Manufactured Home Subdivision			Subject to compliance w/ applicable ORS
Multi Family Complex (5 + units)			
Single Family Detached Dwelling, Duplex, Triplex, Quadplex, Townhouse, Cottage Cluster			
Nursing, Convalescent, and Assisted Living Facility			More than 15 people
Planned Unit Development			
Residential Care Facility			Defined in and regulated by ORS
Residential Care Home			Defined in and regulated by ORS
Non Residential Uses			RESTRICTIONS AND REQUIREMENTS:
Child Care Facility:			
Child Care Center			
Child Care Home			
Church, Religious Institution			
Community Center (private)			
Community Pool (private)			
Farm Use, Farming			
Mini Storage			
Multi-Use Trail			
Park			

Livestock			Subject to livestock provisions, section 8.0365
Office			Conditional in conjunction with a master plan or PUD
Retail			Conditional in conjunction with a master plan or PUD
School (private)			
Tennis Court (private)			Non-commercial use only
Public Facility or Emergency Management Services			
City Owned Utility Facility			
Private Utility Facility			

All “R” zones are subject to density transfer provisions. See 8.0020, “Definitions”, Density Transfer, and 8.0367, “OSPR / ‘R’ Zone Density Transfer Provisions.”

Applicant Response: Consistent with the Spruce Northwest Master Development Plan, the Tentative Plan includes R-4 and R-5 zoned areas and the design is planned to accommodate 3 housing types, parks, trails and open spaces, all of which are permitted in both the R-4 and R-5 Zones.

Planned Housing and Development Types

- Detached single-family homes (174)
- Attached cottage/townhomes (182)
- Multi-family complexes (approximately 100 units)
- Parks and open spaces (9.03 acres)

Pursuant to Table A all of the planned uses of the Master Development Plan area, which will be implemented by this subdivision are permitted outright in the zones within which they are planned in. Thus, the proposal adequately provides and divides lands that can be developed with uses that are permitted in the R-4 and R-5 zones. Details of the uses will be finalized in association with subsequent land use and/or development applications, including Site Plan Review and/or Building Permit submittals.

8.0140 Table B, Minimum Standards. The following minimum standards apply in each of the Residential zones as follows:

Standard:	R-4	R-5
Minimum Lot size - Square Feet		
Single Family, Duplex, Triplex	5,500	5,500
Quadplex, Cottage Clusters	7,000	7,000
Townhouse	1,500	1,500
Multi-family Complex: 5+ units	No Minimum Lot Size Must Meet Density Standards	
Density – Units/Net Acre		
Minimum Density: All	5	8
Maximum Density: Single Family	8	8

Maximum Density: Duplex, Triplex, Quadplex, Cottage Cluster	No Maximum Density Must Meet Minimum Lot Size	
Maximum Density: Townhouses	25	25
Maximum Density: Multi-family Complex 5+ units	14.5	17.4
Standard	R-4	R-5
Minimum Setback Distance - Feet		
Front Façade, excluding garage	10	10
Interior Side	5	5
Street Side	10	10
Rear	15	5
Attached Garage, access from alley or street	20	20
ADUs: Specified in Section 8.0325		
Detached Accessory Structures: Specified in Section 8.0323		
Cottage Clusters: Specified in Section 8.0143		
Cottage Developments: Specified in Section 8.0285 et seq.		
Multi-family Complexes: Specified in Section 8.3035.4E. Table A.		
Townhouses: Specified in Section 8.0142		
Maximum Building Height - Feet	45	45
Minimum Street Frontage - Feet		
Standard Street	50	40
Cul-de-sac	30	30
Flag Lot	20	20
Townhouse	20	20

Applicant Response: Each of the applicable standards of this section are addressed below:

Minimum Lot Size: The proposed Tentative Plan will carry out the Spruce Northwest Master Development Plan, which has been designed for single-family dwellings in the R-4 Zone, townhomes in the R-4 and R-5, and Multi-Family in the R-5.

Detached Single Family – This unit type is only proposed in the R-4 Zone. The provisions of this section require a minimum lot size of 5,500 square feet. As detailed on the Tentative Plan, all lots that are planned for detached single family homes have been sized to be at least 5,500 square feet in size, which conforms to the requirements of this section.

Townhouse - These unit types are planned in both the R-4 and R-5 Zones. In both R-4 and R-5 Zone, the minimum lot size for townhomes is 1,500 square feet.

As detailed on the Tentative Plan, all lots that are planned for townhomes have been sized to be at least 1,500 square feet in size, which conforms to the requirements of this section.

Multi-family Complex: 5+ units – This unit type is only planned in the R-5 Zone. The Code does not establish a minimum lot size for this unit type.

Density

Minimum Density - Overall R-4 – Consistent with the Spruce Northwest Master Development Plan, the R-4 Zoned area will provide lots for 326 units on 35.42 net developable acres, which calculates to a density of 9.2 units per acre. The proposed design is consistent with the Master Development Plan and exceeds the minimum required 5 units per acre.

Minimum Density - Overall R-5 – Consistent with the Spruce Northwest Master Development Plan, the R-5 Zoned area will provide lots and Development Tracts to accommodate approximately 130 units on 8.12 net developable acres, which calculates to a density of 16 units per acre. The proposed design is consistent with the Master Development Plan and exceeds the minimum requires 8 units per acre.

Maximum Density - Single Family – Consistent with the Spruce Northwest Master Development Plan, single-family detached housing is only proposed in the R-4 Zoned area. As detailed in the Plan Set, the design provides lots that can accommodate 174 detached single family units on 24 net acres of land, which equates to 7.2 units per acre and is less than the maximum allowed 8 units per acre.

Maximum Density - Townhouses – Within both the R-4 and R-5 Zones, townhouses are allowed up to a maximum of 25 units per acre. Consistent with the Spruce Northwest Master Development Plan, in the R-4 Zoned land, the design provides lots that are planned to accommodate 152 units on 11.42 net acres, resulting in 13.3 units per acre. In the R-5 Zoned land, the design provides 30 units on 2 net acres, resulting in 15 units per acre. As detailed on the Plan Set and consistent with the Master Development Plan, the lots for the townhouses will result in a density of less than 25 units per acres, which is consistent with the Master Development Plan and in conformance with the allowed density for the unit type.

Maximum Density - Multi-family Complex 5+ - Multi-family complex housing is only proposed in the R-5 Zoned area. As detailed in the Plan Set and consistent with the Spruce Northwest Master Development Plan, the design provides lots and Development Tracts that can accommodate approximately 100 multi- family housing units on 6.12 net acres of land, which equates to 16.3 units per acre and is less than the maximum allowed 17.4 units per acre.

As detailed on the plans and described above, the proposed density conforms to the Spruce Northwest Master Development Plan and the specific density requirements that apply to the unit types that are proposed.

Setbacks: The current application is for a subdivision. While the applicant understand the setback standards of this section, and has conceptually designed the project to conform to all applicable setback requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and setbacks will be reviewed at that time.

Height: The current application is for a subdivision. While the applicant understands the height standards of this section, and has conceptually designed the project to conform to all height requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and building heights will be reviewed at that time.

Minimum Street Frontage:

The proposed Tentative Plan will carry out the Spruce Northwest Master Development Plan, which has been designed for single-family dwellings in the R-4 Zone, townhomes in the R-4 and R-5 Zone, and multi-family in the R-5 Zone.

Standard Street – This Code section establishes a minimum frontage of 50 feet in the R-4 Zone and 40 feet in the R-5 Zone for uses other than townhomes. As detailed on the Tentative Plan, all of the non-townhouse lots are proposed to be 50 feet or greater in the R-4 zone and 40 feet or greater in the R-5 Zone

Townhouse - In both the R-4 and R-5 Zones, the minimum lot frontage is 20 feet. As detailed on the Tentative Plan, for the lots that will accommodate townhouses, the lots are proposed to be 20 feet or greater.

The Tentative Plan documents that the design complies with the design standards described in this section.

8.0141 Single Family Detached Dwellings and Plexes Development and Design Standards...

Applicant Response: The current proposal is for a Tentative Plan that anticipates single-family dwellings. The proposal does not include any structural design review, thus does not include detailed design at this time. Subsequent to Tentative Plan approval, the applicant anticipates proceeding with the process of detailed design. The standards of this section will apply to subsequent detailed design, which will be reviewed in association with Building Permits for the single-family dwellings that are developed within the Master Development Plan and Tentative Plan area.

8.0142 Townhouse Development and Design Standards

1. **Procedure.** New townhouses shall be reviewed for conformance with the requirements listed in this section
2. **Table A: Minimum Standards.**

Standard:	R-4	R-5
Maximum Density (Units/Net Acre)	25	25
Minimum Lot Size (Square Feet)	1,500	1,500
Maximum Building Height (Feet)	45	45
Minimum Street Frontage (Feet)	20	20
Minimum Setback Distance (Feet)...		

Applicant Response: Each of the standards of this section are addressed below:

Density: The proposed Tentative Plan is consistent with the Spruce Northwest Master Development Plan, which was designed for townhomes in the R-4 and R-5 zones.

Maximum Density - Townhouses – Within both the R-4 and R-5 Zones, townhouses are allowed up to a maximum of 25 units per acre. As detailed on the Plan Set, and consistent with the Master Development Plan, in the R-4 Zoned land, the design provides 152 units on 11.42 net acres, resulting in 13.3 units per acre. In the R-5 Zoned land, the design provides 30 units on 2 net acres, resulting in 15 units per acre. As detailed on the Plan Set, the townhouse density is less than 25 units per acres and in conformance with the allowed density for the unit type.

Minimum Lot Size: The Spruce Northwest Master Development Plan is designed for townhomes in the R-4 and R-5 Zones.

Attached Cottage / Townhouse - These unit types are planned in both the R-4 and R-5 Zones. In both R-4 and R-5 Zones, the minimum lot size is 1,500 square feet. As detailed on the Tentative Plan, all lots that are planned for townhouses have a size of 1,500 square feet or greater.

Height: The current application is for a Tentative Plan. While the applicant understands the height standards of this section, and has conceptually designed the project to conform to all height requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and building heights will be reviewed at that time.

Minimum Street Frontage: The Tentative Plan is consistent with the Spruce Northwest Master Development Plan, which has been designed for townhomes in the R-4 and R-5 Zones. In both R-4 and R-5 Zones, the minimum lot frontage is 20 feet for townhomes.

As detailed on the Tentative Plan, all lots that will accommodate townhomes have frontages that are greater than or equal to 20 feet.

Setbacks: The current application is for a Tentative Plan. While the applicant understands the setback standards of this section and has conceptually designed the project to conform to all setback requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and setbacks will be reviewed at that time.

3. Off-Street Parking...

Applicant Response: The current application is for a Tentative Plan. While the applicant understands the parking standards that apply to townhouses and has conceptually designed the project to conform to all parking requirements, specific buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and parking requirements will be reviewed at that time.

4. Areas Owned in Common. For townhouse projects, common areas must be maintained by a homeowners association or other legal entity. A homeowners association may also be responsible for exterior building maintenance. A copy of any applicable covenants, restrictions and conditions must be recorded and provided to the City prior to issuance of a building permit.

Applicant Response: No townhouse areas are planned to be owned in common at this time. In the event that the final townhouse designs result in areas owned in common, any needed legal entity / agreements will be established prior to issuance of a building permit, as required by this section.

5. Design Standards...

Applicant Response: The current application is for a Tentative Plan. While the applicant understands the design standards that apply to townhouses and has conceptually designed the project to conform to all design requirements, specific townhouse buildings are not proposed or reviewed at this time. Instead, specific buildings will be proposed and reviewed with subsequent development applications (Building Permits and/or Site Plan review, where required) and all design requirements will be reviewed at that time.

8.0143 Cottage Cluster Development and Design Standards....

Applicant Response: The project does not include a cottage cluster development; therefore this section does not apply.

MASTER DEVELOPMENT PLANS & PLANNED UNIT DEVELOPMENTS

8.0270 Master Development Plans. A Master Development Plan is required as a condition of annexation, or after annexation, but prior to or concurrent with rezoning from Urban Holding-10 to other City zoning districts. The specific requirements for a Master Development Plan are:

- 1. Applicability.** This section applies to properties proposed for annexation or rezoning from Urban Holding-10, except that in the event that an applicant has applied for a Planned Unit Development application prior to or concurrent with rezoning from Urban Holding-10, the Master Development Plan approval criteria shall be those used for the Planned Unit Development application and the Great Neighborhood Principles...

Applicant Response: The project is within the Spruce Northwest Master Development Plan area. Master Development Plan provisions were addressed in a separate narrative and are not applicable to the Subdivision element of the overall submittal.

SUPPLEMENTARY PROVISIONS

- 8.0305 Establishment of Clear Vision Areas...**
- 8.0330 Exterior Lighting...**
- 8.0340 Fences...**
- 8.0350 Design Standards for all Residential Structures and Sites fronting both public or private streets and alleys.**

Applicant Response: The proposal is for a Tentative Plan that will carry out the Spruce Northwest Master Development Plan. Structural development is not proposed at this time. Clear vision areas, exterior lighting, and fence standards apply to specific site development; therefore this section does not apply to the current proposal, but instead will be reviewed in association with subsequent structural development applications.

8.0385 Neighborhood Meeting.

- 1. Purpose and Intent.** The purpose of the neighborhood meeting is to provide a forum for the applicant, surrounding neighbors, and interested members of the community to meet and consider a proposed land use application, and to discuss issues/concerns regarding the proposal prior to application submittal. Neighborhood meetings encourage citizen participation early in the development process, and an opportunity to revise the land use application to address the issues prior to application submittal.

Applicant Response: This section establishes a purpose. It does not contain any measurable development standards or approval criteria.

2. **Applicability.** Neighborhood meetings are encouraged prior to submitting any land use application. The following application types or development proposals shall be subject to the neighborhood meeting requirements:
 - A. **Master Development Plans.**
 - B. **Residential or mixed use development proposals that generate 200 or more daily trip ends, or 20 or more p.m. peak hour trip ends, where a Transportation Impact Analysis (TIA) is required.**
 - C. **Wireless and Broadcast Communications Facilities.**

Applicant Response: The Tentative Plan portion of the project is for a residential development that will generate over 200 ADT and 20 p.m. peak hour trips; therefore a Neighborhood Meeting is required. The applicant held 2 Meetings, one on June 20, 2023 and one on June 29, 2023.

3. **Requirements and Procedures.** The neighborhood meeting must be held after a predevelopment meeting with City Staff, but before submittal of a land use application. The applicant shall be required to hold only one meeting prior to submitting an application for a specific site but may hold more if desired. If the development proposal is revised after the neighborhood meeting, and a major modification is requested, a second neighborhood meeting with a new notice shall be required before the revised application is submitted.
 - A. **Location and Time.** Neighborhood meetings shall be held in person at a location in reasonable proximity to the subject site. The meeting shall be held at a location open to the public., City Staff, and at a facility that is ADA accessible. The meeting shall be held on a weekday evening, or weekends at any reasonable time. Applicants may provide a virtual component for participants to join in the meeting. The virtual component shall not be done in lieu of the inperson requirements. ADA accommodations when requested by attendee must be provided.

Applicant Response: The meetings were held at St. Thomas Catholic Church / 1720 NW 19th Street, Redmond, which is less than 1 mile from the development site and conforms to the requirement of this section.

- B. **Notice – Mail.** Mailed notice of the meeting shall be provided by the applicant to the neighboring property owners (within 750 feet outside city limits and 250 feet within city limits) and the Community Development Department between ten and 30 calendar days prior to the meeting. Notices must be sent first class and shall include the date, time, and location of the meeting, as well as a brief description of the development proposal and property location. The description shall take into consideration information provided by City staff at the pre-

development meeting, include project contact information, a copy of the tax map or a GIS map that clearly identifies the location of the proposed development, and a conceptual site plan.

Applicant Response: As detailed on the attached Exhibits, Notice was mailed at least 10 days prior to the June 20, 2023 meeting. The notice was mailed to 155 property owners, which included all property owners within 750 feet of the subject properties, as established in DIAL – Deschutes County Records. The notice included the date, time and location of the meeting as well as a description of the proposal and the property location. The notice was completed as prescribed in this section.

- C. Notice – Signage. The applicant shall also post notice of the neighborhood meeting on the subject site or on an access easement to the site within clear view of a public street at least seven days in advance of the meeting. The sign must display the meeting date, time, and address as well as project contact information.**

Applicant Response: Notice for the June 29, 2023 meeting was posted on the site on June 20, 2023. As detailed on the attached Exhibit, the notice included meeting date, time, and address as well as project contact information. The provided notice conforms to the requirements of this section.

- D. Meeting Requirements. The developer must provide a sign-in sheet for attendees to provide their name, address, telephone number, and email address. At the meeting, the applicant shall provide a conceptual site plan and describe the major elements of the proposal. Depending on the type and scale of the particular application, the applicant should be prepared to discuss proposed land uses and densities; traffic impacts; proposed building size and height; proposed access and parking; and proposed landscaping, buffering and/or protection of natural resources as applicable. Attendees will have an opportunity to speak at the meeting and may identify any issues that they believe should be addressed. If no one arrives within 30 minutes of the scheduled start time for the meeting, the applicant may close the meeting and this requirement will be considered met upon the applicant's submittal of the documentation to that effect.**

Applicant Response: The sign-in sheets, along with meeting materials that were presented at the meetings are included as Exhibits. As detailed in Exhibits, the applicant showed a conceptual site plan and described the major elements of the proposal. Furthermore, the applicant discussed land uses and densities; traffic impacts; conceptual building sizes and heights; access and parking; and landscaping, buffering and/or protection of natural resources as applicable. Attendees were provided the opportunity to speak at the meeting and many did identify any issues that they had concerns with and/or should be addressed.

- E. Materials Submitted with Application.** The neighborhood meeting notes that identify the major points discussed about the development, list of parties notified, signed affidavits of mailing and posting notices, copies of all materials provided by the applicant, and a signature sheet of attendees shall be included with the development application upon submittal.

Applicant response: All elements described in this section are included as an Exhibit to this submittal.

- F. Validity Period.** The land use application shall be submitted to the City within 180 days of the neighborhood meeting. If an application is not submitted in this timeframe, the applicant shall be required to hold a new neighborhood meeting.

Applicant Response: The meetings were held on June 20, 2023 and June 29, 2023 and this application is being submitted in July 2023. The application is being submitted within 180 days of the Neighborhood Meetings; therefore the proposal complies with the requirement

- G. Denial.** Failure of the applicant to hold a neighborhood meeting in accordance with these provisions prior to submittal of a land use application shall result in an incomplete application and the application may be rejected.

Applicant Response: As detailed in the attached Exhibits, the application conducted Neighborhood Meetings as required by the Code; therefore this section does not apply.

OFF-STREET PARKING & LOADING REQUIREMENTS

8.0500 Off-Street Parking...

Applicant Response: The proposal is for a Tentative Plan. Specific site development is not proposed at this time. Parking standards apply to site development, therefore this section does not apply to the current proposal, but instead will be reviewed in association with subsequent development applications.

SUBDIVISION APPLICATION PROCEDURE

- 8.2200 Pre-Application Meeting.** Prior to submitting a tentative subdivision plat each applicant or their representative is required to meet with the Community Development Director or a designated staff member(s) to review the proposal.

Applicant Response: The applicant held a Development Review / Pre-application meeting with the City and had informal correspondence with City Staff prior to this submittal.

8.2205 Application Submission. Any person, authorized agent or representatives, proposing a subdivision, shall include with an application and filing fee for a subdivision, a tentative plat together with improvement plans and other supplementary material as may be required.

Applicant Response: The application materials provided with the submittal packet include an application form, a filing fee, a tentative plat, improvement plans; all associated documents are referenced in the "Exhibits" Title of Section II above. The packet is being submitted to the Community Development Department; thus the application packet is being submitted in accordance with this procedural provision.

8.2210 Scale of Tentative Subdivision Plat. The tentative plat of a proposed subdivision shall be drawn on a sheet at an engineer's scale not greater than one inch per 100 feet, or as approved by the Community Development staff.

Applicant Response: As depicted on the Tentative Plan, the scale of the Subdivision Plan Set is less than 1"=60'; in conformance with this section. Should the City need a different scale to review the plans and/or other revisions, the applicant is willing and able to accommodate reasonable requests.

8.2215 Informational Requirements. The following information shall be shown on the tentative plat or provided in accompanying materials. No tentative plat shall be considered complete unless all such information is provided:

1. General information required:

- A. Proposed name of the subdivision.**
- B. Names, address, and phone numbers of the owner of record, authorized agents or representatives, engineer or surveyor, and any assumed business names filed or to be filed with the Oregon Secretary of State Corporation Division by the applicant. If the application is filed by anyone other than the owner of record, a letter or other evidence of the owner's permission to file the application.**
- C. Date of plat preparation, north and magnetic north and south, scale and gross area of the proposed subdivision.**
- D. Appropriate identification of the drawing as a tentative plat for a subdivision. Location and tract designation sufficient to define its location and boundaries, and a legal description of the tract boundaries in relation to existing plats and streets.**

- E. Certified copy of the recorded instrument under which the applicant claims an ownership interest, or copy of a land sales contract, which binds the applicant in the event of tentative approval.**
- F. Title report or subdivision guarantee, issued within the last ninety (90) days, and supporting documentation of all easements identified on the property.**

2. Information concerning existing conditions:

- A. Location, names, and widths of existing improved and unimproved public or private streets and roads within and adjacent to the proposed subdivision.**
- B. Location of any existing features such as section lines, section corners, City and special district boundary lines, and survey monuments.**
- C. Location of existing structures, irrigation canals and ditches, pipelines, waterways, railroads, and any natural features such as rock outcroppings, marshes, wooded areas, and natural hazards.**
- D. Location and direction of water courses, and the location of areas subject to flooding and high water tables.**
- E. Location, width and use or purpose of any existing easement or right-of-way within and adjacent to the proposed subdivision.**
- F. Existing sewer lines or septic tanks and drain fields, water mains, wells, fire hydrants, culverts, and other underground and overhead utilities within and adjacent to the proposed subdivision together with pipe sizes, grades, and locations.**
- G. Contour lines related to some established benchmark or other engineering acceptable datum and having minimum intervals of two feet for slopes of less than five percent, five feet for slopes of five to fifteen percent, ten feet for slopes of fifteen to twenty percent, and twenty feet for slopes greater than twenty percent.**
- H. Zoning classification of land within and adjacent to the proposed subdivision.**
- I. Names and addresses of all adjoining property owners.**
- J. The structures, trees, rock outcroppings or other shade producing objects, if the object will cast shade from or onto the subdivision.**
- K. Existing covenants, conditions, and restrictions.**
- L. Conditions specified on the approved Transportation System Analysis prepared in accordance with Section 8.2815.**

3. Information Concerning Proposed Subdivision:

- A. Location, names, width, typical improvements, cross sections, bridges, culverts, approximate grades, curve radii and centerline lengths and reserve strips of all proposed streets, and the relationship to all existing and projected streets.**

- B. Location, width, and purpose of all proposed easements or rights-of-way and relationship to all existing easements and rights-of-way.
- C. Location of at least one temporary bench mark within the proposed subdivision boundary.
- D. Location, approximate area and dimensions of each lot, and proposed lot and block numbers.
- E. Location, approximate area and dimensions of any lot or area proposed for public use, the use proposed, and plans for improvements or development thereof.
- F. Proposed use, location, approximate area, and dimensions of any lot intended for non-residential use.
- G. An outline of the area proposed for partial recording, if contemplated or proposed.
- H. Source, method, and preliminary plans, prepared by a licensed civil engineer, for domestic and other water supplies, sewage disposal, solid waste disposal, and all utilities.
- I. Description and location of any proposed community facility.
- J. Storm water, drainage facility and grading plans.
- K. Proposed deed restrictions including access restrictions or protective covenants if such are proposed to be utilized for the proposed subdivision.
- L. Statement from each utility company proposed to serve the proposed subdivision stating that each company is able and willing to serve the proposed subdivision as set forth in the tentative plan, and the conditions and estimated costs of such service.
- M. Proposed fire protection or fire hydrant system for the proposed subdivision and written approval thereof by the appropriate serving fire protection agency.
- N. Solar Access. Demonstration of how solar access will be provided.
- O. Location and type of street trees.

4. Information addressing the applicable Great Neighborhood Principles in Section 8.0300(3)(C)(13) and adopted Area Plans.

Applicant Response: The submittal packet includes the Exhibits referenced in Section II above, in addition to this written narrative. Collectively, the submittal packet provides for all of the items listed in this section. Furthermore, the project will implement the Spruce Northwest Master Development Plan, which (as documented in a separate narrative) is entirely consistent with the Northwest Area Plan and the Great Neighborhood Principles.

8.2220 Phased Development Plan. An overall phased development plan shall be submitted for all developments for which phased development is contemplated. The phased development plan shall include but not be limited to, the following elements:

- 1. Overall development plan, including phase or unit sequence.**

- A. For development that includes a commercial component, a surety may be required when the commercial component is not sequenced in the initial phases.**
- 2. Show compliance with all applicable land division standards and policies as described in this Article.**
- 3. Schedule of improvements initiation and completion.**
- 4. Overall transportation and traffic pattern plan showing compliance with grid street standards, and for land within the North Redmond US 97 Interchange Area Management Plan (IAMP), compliance with the Local Street Connectivity Plan (Comprehensive Plan Addendum Chapter 9 Transportation Element figure 1).**
- 5. General program for phasing timetable projection.**
- 6. Development plans for any common elements or facilities.**
- 7. If the proposed subdivision is believed to have an additional impact upon adjacent lands or lands within the general vicinity, the Hearings Body may require an additional impact analysis for various aspects of the development thought to cause such impacts.**
- 8. Street tree plan.**
- 9. Program for addressing applicable Great Neighborhood Principles in Section 8.0330(3)(C)(13) and adopted Area Plans.**

Applicant Response: The proposal includes a multiple phase land division, which is detailed on the Plan Set. As shown on the Plan Set, the design provides all water, sewer, transportation, and franchise utilities that are need to serve each phase of the development, and such facilities will be provided prior to final plat. One unique infrastructure element of the development is the pump station, which is needed to serve the western portion of the site. The applicant plans on beginning development on the eastern portion of the site, where gravity sewer can serve the site, and then extending to the west, once the pump station is installed. Therefore the design considers 2 primary phase items (gravity sewer and pump station sewer) and then provides more traditional phasing in each of the primary phase areas. The project is anticipated to be built out over a 7-8 year time period, however the applicant is entitling the entire project at this time and will make a concerted effort to record the final plats within the allowed duration (2 years for the 1st phase and 3 years for the subsequent phases). The applicant understands that additional planning reviews may be needed if the Code allowed durations are not initially met.

It is further noted that the phasing plan is tentative and, with a project of this size, multiple phases could be combined and/ or the order could be revised, so long that each phase is adequately connected and served. The applicant would like to ensure that phasing can change without review by the Planning Commission and/or City Council¹.

8.2225 Approval of Phased Development Plan. The Hearings Body shall review a phased development plan at the same time a tentative plat for the first phase is reviewed. A phased development plan may be approved before the tentative plat for the first phase is submitted. The Hearings Body may approve, modify, or disapprove the phased development plan and shall set forth findings for such decision. The Hearings Body may also attach conditions necessary to bring the plan into compliance with all applicable land use standards and policies. Any tentative plat submitted for the plan area shall conform to the phased development plan unless approved otherwise by the City.

Applicant Response: The development is for a multiple phase subdivision. The applicant anticipates that the phases will be reviewed in association with this application, as referenced by this section.

8.2230 Development Following Approval. Once a phased development plan is approved by the City, the plan shall be binding, upon both the City and the developer. The Hearings Body may attach conditions to any changes proposed that are deemed necessary to insure compliance with the Comprehensive Plan and implementing regulations. After five (5) years from the date of approval of the plan, the City may initiate a review of the plan for conformance with applicable City regulations. If necessary, the City may require changes in the plan to bring it into conformance with new applicable city regulations.

Applicant Response: This section of the Code addresses procedural provisions. The applicant anticipates that the City will follow the procedures addressed herein.

8.2235 Required Findings for Tentative Subdivision Approval.

1. The Hearings Body shall approve no application for a subdivision unless the following requirements are met:

A. Proposal is in compliance with ORS Chapter 92, the Comprehensive Plan, the Transportation System Plan (TSP) and applicable zoning.

Applicant Response: ORS Chapter 92 is implemented through review procedures, criteria, and standards of the Redmond Development Codes, along with Deschutes County surveyor requirements. As detailed throughout this narrative, the proposal

¹ This noted is being added because the subdivisions is being reviewed concurrent with the Master Development Plan and a Comprehensive Plan Map Amendment and Zone Change, which require Planning Commission and City Council Review.

complies with all applicable elements of the Redmond Development Code, including those addressing the zoning provisions. Furthermore, throughout the review and platting process, the applicant plans to comply with all platting provisions enforced by the City and the Deschutes County surveyor. Compliance with local procedural requirements will ensure consistency with ORS Chapter 92.

Regarding the TSP, the Tentative Plan is entirely consistent with the Spruce Northwest Master Development Plan, which (as noted in the associated narrative) is consistent with the TSP.

Given that the Tentative Plan provides lots and tracts in the Spruce Northwest Master Plan area for residential development, and because it is entirely consistent with the Master Development Plan, the proposal conforms to this approval criterion.

B. Proposal does not conflict with acquired public access easements within or adjacent to the subdivision.

Applicant Response: Existing easements are depicted on the Tentative Plan. The proposal divides the subject property into 356 lots (single family homes and townhomes), 2 Development Tracts (multi-family development), 19 Common Area Tracts, and a City Utility Tract. The proposal will not alter, impact, or conflict with existing public access easement in the area. Furthermore, the proposal includes the creation of rights-of-way that extend throughout the site and public access easements where needed to ensure public access to the site amenities. The proposed design, including rights-of-way and public access easements, along with the planned multi-use trails, are consistent with the City of Redmond Framework Plan, the Northwest Area Plan, and the associated Spruce Northwest Master Development Plan. As proposed, the design is consistent with approved plans and does not conflict with any public access easement within or adjacent to the subdivision area; therefore the proposal complies with this approval criterion.

C. Each lot is suited for the use intended or offered.

Applicant Response: The development is situated within the Spruce Northwest Master Development Plan Area. The Master Development Plan identified various development areas, including, high-density apartment complex areas along Northwest Way and NW Spruce Avenue, park sites, and open space areas throughout the development. The planned areas are consistent with City of Redmond Framework Plan, the Northwest Area Plan, and Comprehensive Plan. The Spruce Northwest Master Development Plan was also assessed for consistency with the Great Neighborhood Principles. As detailed in that separate narrative, the Spruce Northwest Master Development Plan was found to be suitable for the planned uses. The proposed subdivision creates lots that conform to Development Code size requirements, and all lot sizes, locations and design elements are consistent with the associated Spruce Northwest Master Development Plan. Given that the planned uses and sizes are consistent with the associated Master Plan and Development Code Standards, the proposal conforms to this approval criterion.

- D. The subdivision will not exceed the operational capacity of public facilities and services as identified in the city's Comprehensive Plan, the Transportation System Plan (TSP) and applicable zoning, which are required to serve the development, or a determination that sufficient capacity can be provided.**

Applicant Response: The associated Spruce Northwest Master Development Plan submittal included a comprehensive assessment of the development's impact on public facilities. As detailed in the associated Master Development Plan assessment, the overall development (with planned improvements) will provide needed improvements and will ensure that adequate capacity is available to serve the entire subdivision area. As detailed on the Plan Set, the Tentative Plan will provide all improvements that have been identified in the Master Development Plan. Therefore, the proposal complies with this approval criterion

The Tentative Plan and utility extensions have been designed after consultation with the City of Redmond Public Works Department. All extensions are proposed to be in accordance with City Standards and Semi-Public utility provider specifications. Facilities are also planned to be located within rights-of-way and/or utility easements; thus the design conforms to the provisions of this section.

- E. A water rights division plan has been approved by the applicable irrigation district.**

Applicant Response: While not finalized at this time, the applicant has been in contact with the Central Oregon Irrigation District. Prior to final plat, the applicant plans to sell and/or transfer all water rights from the subject property, thus a water rights division plan is not applicable.

- F. The subdivision contributes to orderly development and land use patterns in the area, and provides for the preservation of natural features and resources such as streams, lakes, natural vegetation, special terrain features.**

Applicant Response: All items of this approval criterion are also included in the Spruce Northwest Master Development Plan. The Master Development Plan narrative analyzed how the project contributes to orderly development and land use patterns in the area, and provides for the preservation of natural features and resources such as streams, lakes, natural vegetation, special terrain features. This Tentative Plan will implement the Master Development Plan, and given that the Master Development Plan is consistent with these provisions, this subdivision is also consistent with these items, and this approval criterion.

- 2. Access Management proposals comply with the standards set forth in Section 8.2820 and all other applicable standards.**

Applicant Response: A complete review of Section 8.2820 is included below. As detailed in that section, the proposal complies with the access requirements of Section 8.2820 to the extent applicable at this time; therefore the proposal also complies with this reference provision.

8.2236 Subdivisions may be created following two tracks: Track 1 (General) and Track 2 (Clear and Objective Standards)...

2. Track 2 – Subdivision, Tentative Plan Approval Criteria ('Needed Housing' & Clear and Objective Standards). The planning division shall approve, approve with conditions, or deny a proposed subdivision. Approval, or approval with conditions, shall be based on compliance with the following criteria:

A. The applicant has demonstrated that the proposed housing is needed housing as defined by State statutes.

Applicant Response: As used in ORS 197.286 (Definitions for ORS 197.286 to 197.314 and 197.475 to 197.490) to 197.314 (Required siting of manufactured homes), "needed housing" means all housing on land zoned for residential use or mixed residential and commercial use that is determined to meet the need shown for housing within an urban growth boundary at price ranges and rent levels that are affordable to households within the county with a variety of incomes, including but not limited to households with low incomes, very low incomes and extremely low incomes, as those terms are defined by the United States Department of Housing and Urban Development under 42 U.S.C. 1437a. "Needed housing" includes the following housing types:

(a) Attached and detached single-family housing and multiple family housing for both owner and renter occupancy;

The Subdivision will create lots and tracts in the R-4 and R-5 Zones that will accommodate detached single-family homes, townhouses and multi-family housing². The proposal is for needed housing; therefore the proposal complies with this approval criterion.

B. The proposed land uses and densities are consistent with the comprehensive plan, in this code, and as refined in any applicable area plan, master plan, or framework plan.

Applicant Response: The Tentative Plan will carry out the Spruce Northwest Master Development Plan, which has been shown to provide land uses and densities that are consistent with the Redmond Comprehensive Plan, the 2006 Framework Plan, and the Northwest Area Plan. Therefore the proposal complies with this approval criterion.

C. The proposed subdivision complies with all of the following, unless specifically exempt from compliance through a code provision

² Consistent with the Annexation Agreement, no less than 40% of the development will be Middle Housing (townhouses and multi-family units).

applicable to a special area zone or overlay zone. The proposed subdivision will:

1. Not create risk of fire, flood, geological hazards, or other public health and safety concerns;
 2. Provide adequate transportation systems, water supply, sewage disposal, drainage, and other public utilities consistent with City Standards and Specifications.
- D. The proposed subdivision provides direct bicycle and pedestrian access to any adjacent residential areas, transit stops, neighborhood activity centers, commercial areas, and employment areas.

Applicant Response: The Tentative Plan will carry out the Spruce Northwest Master Development Plan, which has been shown to comply with all elements of these sections. Therefore the proposal complies with these approval criteria.

- E. The proposed subdivision is designed and sited such so roads, infrastructure, utilities, and future development of proposed lots will minimize impacts to the natural landscape by addressing the following:
1. **Tree Preservation.** The proposed project shall be designed and sited to preserve trees having the following characteristics:
 - a. Healthy trees that have a reasonable chance of survival considering the base zone or special area zone designation and other applicable approval criteria;
 - b. Trees located within vegetated corridors and stands rather than individual isolated trees subject to windthrow;
 - c. Trees that fulfill a screening function, provide relief from glare, or shade expansive areas of pavement;
 - d. Trees that provide a buffer between potentially incompatible land uses;
 - e. Trees located along the perimeter of the lot(s) and within building setback areas;
 - f. Trees and stands of trees located along ridgelines and within view corridors;
 - g. Trees with significant habitat value;
 - h. Trees adjacent to public parks, open space, and streets.
 - i. Trees along water features.
 - j. Heritage trees.

Applicant Response: The site is sparsely populated with Juniper Trees. All trees are noted on the Existing Conditions Map. The applicant has considered the existing trees, in addition to grid street alignments, utility/facility needs, and lot layout. Trees that are located in the right-of-way areas will need to be removed, however other trees on the site will be considered at a closer level, once final structural designs are established on each

lot. If needed, tree removal would occur with the development of the associated phase, as opposed to a mass grading of the site at the beginning of the project.

2. Restoration or Replacement.

- a. **For areas not included on the City's acknowledged Goal 5 inventory, the proposal mitigates, to the greatest degree attainable or feasible, the loss of significant natural features described in criteria (a) above, through the restoration or replacement of natural features such as:**
 - i. **Planting of replacement trees within common areas;**
or
 - ii. **Re-vegetation of slopes, ridgelines, and pedestrian corridors; or**
 - iii. **Restoration of native plant habitat.**

Applicant Response: With final development of each phase, tree preservation and the need for mitigation will be considered, in conformance with the provisions of this section.

- b. **For areas included on the City's acknowledged Goal 5 inventory, any loss of natural features shall be consistent with the acknowledged level of protection provided for the resource. Street Trees. If the proposal includes removal of any street tree(s), removal of those street tree(s) has been approved or approved with conditions by the City.**

Applicant Response: The property does not contain any City acknowledged Goal 5 resources; therefore this criterion does not apply.

- F. **On any Residential zoned property, if the subdivision results in a lot greater than twice the minimum lot size in the underlying zone, the application shall indicate the location of lot lines and other details of layout that show future division of the lot may be made without the requirements of this code and without interfering with the orderly extension of adjacent streets, bicycle paths, and accessways.**

Applicant Response: The proposal will carry out the Spruce Northwest Master Development Plan. The proposal will provide lots and tracts for single family homes, townhouses, and multi-family developments. The proposal does not include any lots that are greater than twice the minimum lot size for the planned uses; therefore future land division plans are not needed.

- G. **Lot side lines shall run at right angles to the street upon which the lots face, except that on curved streets they shall be radial to the curve.**

Applicant Response: As detailed on the Tentative Plan, all side lot lines are at or near 90 degree angles, which conforms to this criterion.

- H. There shall be no proposed grading on portions of the development site that meet or exceed 15% slope.**

Applicant Response: The site is relatively level; no portions of the site have a slope that is 15% or greater.

- I. The proposed subdivision complies with the Transportation System Analysis review provisions per Section 8.2815.**
- J. The proposed subdivision street layout shall disperse motor vehicle traffic onto more than one public local street unless approved by the City Engineer.**

Applicant Response: A comprehensive review of the TSP, street layout, traffic impacts and other elements related to the transportation system we reviewed in the associated Spruce Northwest Master Development Plan. This Tentative Plan is consistent with the Spruce Northwest Master Development Plan and the project will carry out all design elements of the Master Plan; therefore the project complies with these standards.

- K. Urban development shall interface with rural areas (rural areas are those that lie within areas outside of the UGB or UAR) through landscaped open space buffers at least 100 feet wide and the length of the urban development, excluding public streets, or shall be transitioned from higher density development to lower density development at the urban - rural interface, or utilize other appropriate and equivalent transitional elements.**

Applicant Response: As detailed in the Spruce Northwest Master Development Plan submittal, the property sits on the western edge of the UGB, in a developing area of the City of Redmond. The properties to the west and north are in Deschutes County, zoned EFU and therefore “rural properties”.

As detailed on the Master Development Plan exhibit, along the western property line, of all the allowed uses in the zone, the design includes only the lowest density, detached single family homes; the design along the western tier of lots is only 6.9 units per acre. Rather than placing higher intensity uses (such as townhomes or multifamily complexes) and higher densities (up to 25 units per acre), the design locates the lowest density use along this area, which is a reasonable and adequate buffer, between the urban and areas.

To the north, the current proposal provides a City required grid system; NW Upas Avenue will act as buffers and transition. The right-of-way and future street improvements will have required street trees. Furthermore, the Spruce Northwest Master Development Plan includes a buffer along this right-of-way. The transition of allowed uses, streets, right-of

way-improvements, and open space/park areas will create a natural and pleasing transition to the nearby rural properties.

The proposed design conforms to this criterion.

- L. Fully developed “pocket parks” or “tot lots” shall be incorporated into medium and high density zoned residential subdivisions and site plans. These areas shall be developed for every twenty-five lots/units, a minimum of 3,000 square feet and privately maintained. Examples of amenities include: turf areas, benches, deciduous shade trees, irrigation, shrubs, natural or decorative features, and adequate trash receptable(s) and lighting.**

Applicant Response: As detailed in the Spruce Northwest Master Development Plan narrative, the development includes 456 dwelling units. To meet the, the standards of this section, 54,720 square feet (1.26 acres) of park would be required. As shown on the plan set, the design includes an approximately 2.3 acre park south of NW Spruce Avenue and approximately 2.7 acres of park space north of NW Spruce Avenue. The design also includes non-park open spaces and trails; a total of 9.04 acres. The proposed design far exceeds the pocket park requirements of this section.

The subdivision will create lots and tracts that will carry out the Master Development Plan; therefore the proposal conforms to this provision.

- M. No site grading of the site shall occur until the City has approved the subdivision application.**

Applicant Response: No grading has occurred to date and the applicant does not intend on conducting any grading activities until the Tentative Plan is approved.

- O. The proposed subdivision does not contain any Through/Double Frontage lots or parcels.**

Applicant Response: As detailed on the Plan Set, no through / double frontage lots are proposed³.

8.2240 Improvement Requirements (For Track 1 and Track 2 Subdivisions).

- 1. In the approval of a subdivision, the Community Development Director, or Hearings Body, shall consider the need for street and other improvements. All streets in new subdivisions, except for private streets, shall be dedicated to the public without reservation or restriction.**

³ In some areas open space buffers are used to separate properties from streets, forgoing through/double frontage lots.

Applicant Response: As indicated throughout this narrative, the property is situated within the Spruce Northwest Master Development Plan area. The Master Development Plan include a Transportation Plan and this residential Land Division provides for the design, development and construction of roads and alleys to serve the lots. The proposed land division carries out the Transportation Plan of the Spruce Northwest Master Development Plan and all streets are proposed to be public rights-of-way. Furthermore, the streets are proposed to be constructed to City Standards and dedicated to the Public through the final platting process. As proposed, the design conforms to this requirement.

2. Private Alley Access. The Community Development Director, or Hearings Body, may require the applicant to improve a private alley access easement serving two or more lots according to the adopted City of Redmond Public Works Standards and Specifications, as amended.

A. Such access easements shall include provisions for permanent, long-term maintenance, including: maintenance measures to be employees; responsible parties; funding; design; timing; and enforceability. These provisions shall be included as recorded Covenants, Conditions and Restrictions (CCR's) appurtenant to the affected properties.

Applicant Response: The design includes alleys. The applicant understands that the City requires the planned alleys to be private and that access easements and maintenance provisions will be required. The applicant intends to record CC&Rs with the final plats. The CC&Rs will include provisions required under this section.

3. The subdivider shall record the required (including but not limited to) land division agreement, public improvement agreement, shared access agreement or shared well agreement, as may be applicable, with the Deschutes County Clerk's office at the time of recording of the final subdivision plat.

Applicant Response: The proposal does not include shared access, shared wells or other private agreements. Regarding public requirements, the applicant agrees to record a land division agreement and/or public improvement agreement, if required by the City.

4. Paved access is guaranteed to each lot.

Applicant Response: While site access is not planned/reviewed at this time (with subdivision review), each lot meets or exceeds the minimum lot frontage requirements for the uses in the zones; therefore each lot is afforded access. Paved access will be finalized with subsequent public infrastructure permitting and/or site development.

5. Each lot is to be connected to the City water and sewer system pursuant to Section 4.007 of the Code of the City of Redmond.

Applicant Response: As depicted on the Utility Plan of the Plan Set, water and sewer mains are proposed to extend throughout the site, consistent with the Spruce Northwest Master Development Plan. Furthermore, water and sewer service laterals are proposed to be extended to each of the lots, which will be reviewed with subsequent infrastructure permitting. A complete review of Section 4.007 will occur with the infrastructure permitting process. As detailed herein, the proposal complies with this section.

6. All required public utilities are available.

Applicant Response: As detailed in the submittal materials, public utilities are proposed to be extended to and throughout the site, serving each lot, consistent with the Spruce Northwest Master Development Plan. Because the design provides public utilities to every lot, the proposal complies with this provision.

FINAL SUBDIVISION PLAT

8.2300 Submission of Final Plat....

Applicant Response: Subsequent to approval of the Tentative Plat, the applicant anticipates following the Final Plat filing procedures of this section.

8.2305 Submission of Final Plats for Phased Development.

- 1. If a tentative plat is approved for phased development, the final plat for the first phase shall be filed within two (2) years of the approval date for the tentative plat. However, the Community Development Director or Hearings Body may allow extensions as provided in Section 8.2300, above.**
- 2. The final plat for a subsequent phases shall be filed in sequential order within three (3) years of the date the final plat for the first phase is filed. If the phased development is a Planned Unit Development, Cluster Development, or Cottage Development as described in RDC 8.0286, the final plat for the final phase shall be filed within eight (8) years of the date the development is approved, as provided in RDC 8.1605.**
- 3. If the applicant fails to file a final plat within the timeframe established herein, the tentative plan for that phase and all subsequent phases shall become null and void.**

Applicant Response: The proposal includes a multiple phased development. As detailed on the Plan Set, all of the phase lines are clearly demarcated and, as shown on the Plan Set, infrastructure will be provided to each lot prior to final plat. Construction of Phase1 is planned to occur as soon as possible after approval (within 2 years), with all subsequent phases occurring thereafter.

As shown on the Plan Set, the design provides all water, sewer, transportation, and franchise utilities that are need to serve each phase of the development, and such facilities will be provided prior to final plat. One unique infrastructure element of the development is

the pump station, which is needed to serve the western portion of the site. The applicant plans on beginning development on the eastern portion of the site, where gravity sewer can serve the site, and then extending to the west, once the pump station is installed. Therefore, the design considers 2 primary phase items (gravity sewer and pump station sewer) and then provides more traditional phasing within each of the primary phase areas. The project is anticipated to be built out over a 7-8 year time period, however the applicant is entitling the entire project at this time and will make a concerted effort to record the final plats within the allowed duration (2 years for the 1st phase and 3 years for the subsequent phases). The applicant understands that additional planning reviews may be needed, if the Code allowed durations are not initially met.

It is further noted that the phasing plan is tentative and with a project of this size, multiple phases could be combined and/ or the order could be revised, so long that each phase is adequately connected and served. The applicant would like to ensure that phasing can change without review by the Planning Commission and/or City Council⁴.

DESIGN STANDARDS AND IMPROVEMENTS

8.2700 Compliance Required.

- 1. Any land division or development shall be in compliance with the design and improvement standards and requirements of this section, and all other applicable provisions, as set forth in this Chapter.**

Applicant Response: The proposal includes a land division; therefore review of this section is applicable.

8.2705 Blocks, Lots and Parcels.

- 1. Blocks. The resulting or proposed length, width and shape of blocks shall take into account the requirements for adequate building lot sizes, street widths, access needs and topographical limitations.**
 - A. No block shall be more than 660 feet in length between street center lines unless it is adjacent to an arterial street, or unless topography or the location of adjoining streets justifies an exception, and is so approved by the reviewing authority. In MUN, MUE and MULW zones, block lengths shall be an average of 330 feet, except where required to meet grid street or access management requirements.**

Applicant Response: The proposal results in the creation new roads, blocks and a grid street system that is bound by Northwest Way (an arterial) to the east, NW Upas Avenue to the north, and NW Quince Avenue to the south. As shown on the Plan Set, aside from the areas to the northeast (where canals are on the neighboring property) all of the blocks are no more that 660 linear feet and therefore in accordance with this standard.

⁴ This noted is being added because the subdivisions is being reviewed concurrent with the Master Development Plan and a Comprehensive Plan Map Amendment and Zone Change, which require Planning Commission and City Council Review.

Furthermore, the design conforms to the Transportation Plan of the Spruce Northwest Master Development Plan, which carries out the Northwest Area Plan. As designed, the proposal complies with the desired block length in this area to a reasonable extent.

- B. The recommended minimum length of a block along an arterial street is 1,320 feet, except that along such blocks, a public right-of-way for pedestrian and bicycle access shall be dedicated at or nearest the mid-point of the block length as is practical. The right-of-way shall be a minimum of 10 feet wide, with an all weather surface a minimum of 5 feet wide, constructed and centered within the right-of-way.**

Applicant Response: The property abuts an Arterial Street to the east (Northwest Way). The design extends the proposed internal streets around the site, connecting to the Northwest Way arterial at NW Spruce Avenue, NW Quince Avenue, and NW Upas Avenue⁵. The design conforms to the Spruce Northwest Master Development Plan, which has been designed in conformance with the TSP and the Northwest Area Plan. In addition to the street (and sidewalk) connections, the design provide multi-use trail connections to the Northwest Way right-of-way at 2 non-street locations.

The proposed design conforms to the TSP, the NAP and the Spruce Northwest Master Development Plan; therefore the proposal conforms to these standards.

- C. A block shall have sufficient width to provide for 2 tiers of lots unless topography, the location of adjoining streets, or adjacency to an arterial street justifies an exception.**

Applicant Response: The site and design is driven by the location of Northwest Way to the east, the NW Spruce Avenue (Collector street) crossing the property, NW Upas Avenue to the north, NW Quince Avenue to the south, the unowned property to the northeast, canals and the intent to carry out the Northwest Area Plan. Amongst these site limitations, the design continues an established street grid in the area. The design allows for two tiers of lots to a reasonable extent, while efficiently designing lots for detached single family homes, townhouses, and multi-family units. The design is an efficient use of land and primarily consists of blocks that accommodate 2 tiers of lots. As designed, the proposal conforms to this standard to a reasonable extent.

- D. Where appropriate at approved cul-de-sacs, dead-end streets, or along blocks approved at more than the maximum block length standard, pedestrian and bicycle access corridors shall be required to be constructed between lots to minimize travel distance between subdivisions, parks, school, and collector or arterial streets. Access corridors shall be located to provide a reasonably direct connection between likely pedestrian destinations, and shall be consistent with**

⁵ Given that the location and ownership status of NW Upas Avenue, and further because the subject property is not located at the intersection of Northwest Way and NW Upas, improvements to NW Upas Avenue are not proposed at this time, but a fee in-lieu of improvements is proposed.

the City of Redmond Bicycle Refinement Plan where applicable. A reasonably direct connection is a route which minimizes out of direction travel for people likely to use the connection considering terrain, safety and likely destination. The Community Development Director or Hearings Body may determine based on evidence in the record that construction of a separate access corridor is inappropriate or impractical. Such evidence may include but is not limited to:...

Applicant Response: The Spruce Northwest Master Development Plan includes a Transportation Plan that foregoes the need for any cul-de-sac and/or dead end streets. The current land division includes a standard street grid; it does not include any cul-de-sacs or dead end streets, and it conforms to the Spruce Northwest Master Development Plan and this standard. Furthermore, going above and beyond Code requirements, the design includes additional trails and pedestrian connects, which minimize travel distances throughout the Master Development Plan Area, improving connections to other (existing and future) subdivisions, parks schools and streets.

- 2. Lots and Parcels. The size, width, and orientation of newly created lots and parcels shall be appropriate for the location of the land division and for the type of development and use contemplated. Lots and parcels shall be generally rectangular in shape, and shall be consistent with the lot size provisions of the zoning standards and the density requirements as established in the City of Redmond Comprehensive Plan.**

Applicant Response: The proposal includes 356 lots, 2 development tracts, multiple common area tracts, and one City utility tract. The lots that are planned for detached single family homes are in the R-4 and exceed 5,500 square feet in size, the lots that are planned for townhomes, in the R-4 and R-5 Zones exceed 1,500 square feet in size, and the Development Tracts that are planned for Multi-Family development exceed 1.5 acres. As detailed above and in the Spruce Northwest Master Development Plan narrative, the lot sizes, overall project density, and lot locations are consistent with the Spruce Northwest Master Development Plan. As depicted on the Tentative Plan, the lots are generally rectangular in shape. Given the sizes, the fact that the proposal provides a variety of housing types in the locations that are laid out in the Spruce Northwest Master Development Plan, the planned subdivision conforms to this section.

Notwithstanding these requirements, the following exceptions may apply:

- A. In areas beyond the City Limits where public sewer is not currently available, minimum lot and parcel sizes shall permit compliance with the requirements of the Department of Environmental Quality and County sanitarian, and shall be sufficient to permit adequate sewage disposal. Any problems posed by soil structure and water table as related to sewage disposal by septic tank shall be addressed and resolved in the applicant's initial plan.**

Applicant Response: With the overall project approval, the property will be located within the City Limits; therefore this section does not apply.

- B. Where property is zoned and planned for business or industrial use, other widths and areas may be permitted by the Community Development Director or Hearings Body. Depth and width of properties reserved or laid out for commercial and industrial purposes shall be adequate to provide for the off-street service and parking facilities required by the type of use and development contemplated.**

Applicant Response: None of the lots are zoned or planned for business or industrial use. This exception does not apply.

- C. In steep terrain, increased lot or parcel sizes may be required to avoid excessive cuts, fills, and steep driveways.**

Applicant Response: The development area does not include any steep terrain; therefore increased parcel size is not needed.

- 3. Frontage. Each newly created lot and parcel shall abut upon a public street other than an alley for at least 50 feet (at least 25 feet in Mixed Use zones). Lots fronting on the bulb of a cul-de-sac the minimum frontage shall be 30 feet. Flag lots shall have no less than 20 feet of street frontage measured at the property line. Townhouse frontage shall be at least 20 feet. Vehicular access shall be provided as specified in Section 8.2820, Access Management Standards, of this Chapter, or as specified in Section 8.2705(6) below, for residential lots and parcels abutting collector and arterial streets. All lot and parcels shall be addressed from the primary public street frontage, not including alleys.**

Applicant Response: As depicted on the Tentative Plan, all units of land that are planned for detached single family homes or multifamily units will have at least 50 feet of frontage and all of the lot that are planned for townhomes will have at least 20 feet of frontage. No cul-de-sacs or flag lots are proposed. Furthermore, the subdivision was designed in conformance with the access standards of Section 8.2820, which to the extent applicable, are addressed below. As proposed, the subdivision conforms to the requirements of this section.

- 4. Side Lot or Parcel Lines. All side lot lines shall be at right angles to street lines or radial to curved streets wherever practical except as provided for in subsection (10) of this section.**

Applicant Response: As detailed on the Tentative Plan all of the side yard lot lines are proposed to be situated at or near to right angles to the abutting streets, in conformance with this section.

5. **Through/Double Frontage Lots and Parcels.** Through lots or parcels, and lots or parcels with double frontage shall be avoided whenever possible, including lots or parcels created adjacent to Collector and Arterial Streets, but not including alley frontage as described in Section 8.2705(6) below, except when they are necessary due to an irregular parent lot or parcel configuration, or are necessitated by topography or other unique circumstance.

Applicant Response: The planned subdivision does not create any through lots or double frontage lots; therefore the proposal complies with this section.

6. **Residential Lots and Parcels Abutting Collector and Arterial Streets.** Lots and parcels created adjacent to Collector and Arterial streets shall be oriented so that the front elevation of the residential development faces the Collector or Arterial Street. Vehicular access shall be provided pursuant to Section 8.2820, Access Management Standards, of this Chapter. In instances where direct vehicular driveway access to lot or parcel from the Collector or Arterial street is not permissible, alley access shall be provided to the rear of the lot or parcel in accordance with the design standards included in Section 8.2710(3) of this Chapter.

Applicant Response: Northwest Way is an Arterial street and NW Spruce Avenue is a Collector street. As shown on the Tentative Plan and consistent with the Spruce Northwest Master Development Plan, the design includes open space buffers along these streets. The design does not include any lots that abut an Arterial or Collector and no individual lots will take access from an Arterial or Collector street. Therefore, the proposal complies with this standard.

7. **Corner Lots and Parcels.** Corner lots and parcels shall be 5 feet more in width than other lots and parcels and also shall have sufficient extra width to meet the additional side yard requirements of the zoning district in which they are located.

Applicant Response: As shown on the Tentative Plan, all corner lots that are planned for detached single family homes are at least 55 feet wide (5 feet wider than the 50 foot requirement)⁶ and all lots that are planned for townhomes are wider than 25 feet (5 feet wider than the 20 foot requirement). As designed, the Tentative Plan conforms to this standard.

⁶ It is noted that while the frontage of Lot 168 may be less than 55 feet (due to the street configuration, which causes this lot pinches down at the north), the majority of the lot is 59.7 feet in width.

8. **Special Building Setback Lines.** If special building setback lines, in addition to those required by the applicable zoning, are to be established in a development, they shall be shown on the final plat of the development and included in the deed restrictions.

Applicant Response: The Zoning Map and Development Code do not contain any Special Building Setback lines for the subject property; therefore additional setback lines are not required on the final plat.

9. **Large Building Lots; Re-division.** In the case where lots or parcels are of a size and shape that future redivision is possible, the Community Development Director or Hearings Body may require that the blocks be of a size and shape so that they may be redivided into building sites, and the development approval and site restrictions may require provision for the extension and opening of streets at intervals which will permit a subsequent redivision of any tract of land into lots or parcels of smaller sizes than originally platted, and in conformance with the density provisions established in the City of Redmond Comprehensive Plan for the existing or intended Zone. A plan indicating the ability for re-division according to these standards may be required as part of the initial land division process.

Applicant Response: Development Tracts A and B are larger units of land that are planned for multifamily developments, consistent with the Northwest Area Plan and the Spruce Northwest Master Development Plan. Given their location amongst the street grid, and the extensive Master Planning effort that development of this project entails, it is not anticipated that an additional re-division plan or mapping will be necessary. Given that the area is part of the Spruce Northwest Master Development Plan site and will receive a thorough assessment and approval from the Planning Commission and City Council, additional restrictions and/or re-division plans are not anticipated to be imposed on the subdivision.

10. **Solar Access.** As much solar access as feasible shall be provided each lot and parcel in every new subdivision or partition considering topography, development pattern, and existing vegetation. The boundary lines of lots and parcels, as far as feasible, shall be oriented to provide solar access at ground level at the southern building line of the adjoining lot to the north two hours before and after the solar zenith from September 22 to March 21. If it is not feasible to provide solar access to the southern building line the solar access, if feasible, shall be provided at 10 feet above ground level at the southern boundary line two hours before and after the solar zenith from September 22 to March 21, and three hours before and after the solar zenith from March 22 to September 21. This solar access shall be protected by solar height restrictions on burdened properties for the benefit of lots receiving the solar access pursuant to Section 8.0370, of the City of Redmond Development Code, Solar Access Standards. If the solar access for any lot, either at the southern building line or at 10 feet above the

southern building line, is not feasible, supporting information may be required with the application.

Applicant Response: As detailed on the Plan Set, the majority of the lots of the subdivision have the longest dimension in a north/south orientation, which provides opportunities for as much solar access as possible, in conformance with the standards of this section.

- 11. Curvilinear Street and Block Design. Although a basic grid street design with minimum and maximum block lengths are requirements of this section, a curvilinear street/block design is encouraged for the purpose of adding interest to new subdivision development.**

Applicant Response: This section establishes that curvilinear street designs are “encouraged” with new street/right-of-way development, however this section does not establish a requirement. As shown on the Plan Set and consistent with the Spruce Northwest Master Development Plan, the design incorporates curvilinear streets throughout the site. The design is consistent with this provision.

- 12. Flag Lots...**

Applicant Response: Flag lots are not proposed; therefore this section does not apply.

8.2710 Streets.

- 1. General. Streets shall be in conformance with the City of Redmond Transportation System Plan as specified herein.**
- A. Except along Arterial Street, public streets shall be spaced a maximum of 660 feet between centerlines. The purpose is to provide a street grid pattern of through streets to facilitate traffic movement. Street designs shall conform to topography and other existing natural and man-made conditions. Illustrative examples of other conditions include the dry canyon, main COI canal, Highway 97, and the Burlington Northern Railroad tracks.**

Applicant Response: As detailed on the Plan Set and consistent with the Spruce Northwest Master Development Plan, aside from the connections to Northwest Way (an Arterial street), the design locates the street connections at intervals that are less than 660, which conforms to this standard.

- B. All proposed streets, sidewalks, bike lanes and pedestrian pathways shall connect to other streets, sidewalks bike lanes and pedestrian pathways within a development and to existing and planned streets, sidewalks, bike lanes and pedestrian pathways outside the development. Such facilities shall serve existing and planned parks, schools or other public lands within a neighborhood.**

Applicant Response: Transportation guidance in this area, particularly as it relates to streets, sidewalks, bike lanes and pedestrian paths, is provided in on the City's Transportation System Plan Map, the Framework Plan, the Northwest Area Plan, along with City required street spacing and design standards. The Spruce Northwest Master Development Plan includes a comprehensive transportation plan that is documented and on the Transportation Plan document. As detailed in the Master Development Plan narrative, the design concept conforms to all adopted City Plans, it will be well connected internally, and to areas outside of the Master Planned Development Area, including parks, schools and other public lands.

The currently proposed subdivision includes a detailed construction plans that carries out each of the elements included of the Spruce Northwest Master Development Plan, including vehicle access, pedestrian access and bicycle access on the development area. By carrying out the Spruce Northwest Master Development Plan, the subdivision adequately connects to surrounding areas and conforms to this standard.

- C. To the maximum extent possible, new local streets shall align and connect with existing local streets and collectors, and in certain special cases arterial streets. Cul-de-sac streets shall be permitted only where no feasible connection with an adjacent street exists, or if the local street connection would be to an arterial street and the function of the arterial street may be diminished as determined through the land use review process, or the block length would be less than that which is permitted by Section 8.2705(1)(B).**

Applicant Response: As depicted on the Tentative Plan, the planned local streets connect to the existing streets to the north, south and east (to NW Upas Avenue, NW Spruce Avenue and NW Quince Avenue). Furthermore, to the west, the streets have been planned in locations where they can extend throughout the Master Development Plan area, and ultimately to properties to the west. The planned street connections conform to this section and to the Spruce Northwest Master Development Plan. No cul-de-sacs are proposed.

- D. Consideration should be given to alternative street designs other than required herein in the City's non-residential land use zones to allow for more effective developments. Such designs may be considered and approved during the subdivision or partition process without need for variance.**

Applicant Response: The property does not include any non-residential zoned property and the planned street designs are consistent with City Standards and the Spruce Northwest Master Development Plan; alternative street designs are not proposed.

- E. All proposed or required streets and alleys shall comply with Section 8.2820 Access Management Standards, the Transportation System**

Plan, and with Local Street Connectivity Plans adopted as part of the transportation element of the Comprehensive Plan.

Applicant Response: A complete review of Section 8.2820 is included below, as detailed therein, the proposed streets and alleys conform to that section. Furthermore, compliance with the TSP, the Framework Plan, the Northwest Area Plan, and the Comprehensive Plan was addressed in the Master Development Plan narrative. The Transportation Plan of the Master Plan submittal materials conforms to each of these elements, and the current proposal is consistent with the Master Plan; therefore the current plan conforms to this section.

- 2. Existing Streets. Whenever existing streets, adjacent to or within a tract, are of inadequate width per City of Redmond Standards and Specifications and the City's approved Transportation System Plan additional right-of-way shall be provided at the time of the land division by the applicant. During consideration of the tentative plat for the subdivision or partition, the Hearings Body shall determine whether the improvements to existing streets, adjacent to or within the tract, are required. If so determined, such improvements shall be required as a condition of approval of the tentative plat. Improvements to adjacent streets shall be required where traffic on said streets shall be directly affected by the proposed subdivision. Notwithstanding these provisions, off-site improvements to streets not within or adjacent to the development may be required when impacts resulting from the development necessitate such improvements as demonstrated through a transportation impact analysis.**

Applicant Response: Northwest Way (Arterial) to the east and NW Spruce Avenue (Collector) traversing the property do not have adequate right-of-way for their classifications. As detailed on the Street Cross Sections sheet of the Plan Set, the proposal will dedicate right-of-way and improve these streets to City standards.

The site also abuts NW Upas Avenue to the north. This existing street is in a 60 foot Deschutes County Rural Public Road Easement. As detailed on the Cross Sections sheet of the Plan Set, the applicant proposed to dedicate 30 feet of right-of-way. This street is not needed to serve the project and it does not extend to Northwest Way to the east; therefore it would most appropriately be developed in association with future development (to the east and north). Therefore the applicant proposes a fee in lieu of street construction for NW Upas Avenue at this time.

As proposed, the design conforms to this section to the extent applicable.

- 3. Minimum Right-of-Way and Roadway Width. The street right-of-way and roadway surfacing widths shall be in conformance with the standards as specified in Table 1 below:**

Table 1 - City of Redmond Right of Way and Roadway Design and Cross-Section Standards

Functional Class	Width (ft)			Travel Lanes	Sidewalks	Bike Lanes**	Parking**
	Pavement Standard	Pavement (minimum)	Right-of-Way				
Residential Alley	16 ft		20 ft	n/a	none	shared	none
Commercial Alley	20 ft		20 ft	n/a	none	shared	none
Local Residential*****	36 ft		60 ft	2***	5 ft	shared	both sides (unstriped)
Parking One Side	28 ft*		60 ft	2***	5 ft	shared	one side (unstriped)
No Parking	24 ft*		60 ft	2***	5 ft	shared	none
Local Industrial	40 ft	38 ft	60 ft	2***	5 ft	shared	optional (unstriped)
Industrial Collector	40 ft	38 ft	80 ft	2	5 ft	6 ft	none
Minor Collector	40 ft	36 ft****	60 ft	2	5 ft	shared	both sides (8 ft)
Major Collector	36-50 ft	36 ft****	80 ft	2	5 ft	6 ft	none
Minor Arterial (3-lane)	50 ft	48 ft	100 ft	3	7 ft	6 ft	none
Minor Arterial (5-lane)	74 ft	72 ft	100 ft	5	7 ft	6 ft	none
Notes:							
*May be constructed only in conjunction with the creation of covenants, conditions, and restrictions (CCR's) and the establishment of a homeowners association (HOA) for the development. The CCR's shall provide that the primary responsibility for parking enforcement shall be the HOA, with the City of Redmond also being acknowledged in the CCR's as a beneficiary for such parking enforcement as a violation of the land use decision and/or city code.							
**In certain cases, bike lanes may be reduced to 5 ft, parking may be reduced to 7 ft, and travel lanes to 11 ft at the discretion of the City Engineer.							
***Unstriped travel lanes							
****36 ft in existing built-out areas							
*****All streets less than 28 feet wide shall be no longer than 300 feet in length, unless such streets include at least one (1) parking bay per lot, located along each lot frontage for the entire length of such street, up to the maximum block length. Streets 300 feet or less in length shall not have any direct driveway access. In no case shall any street less than 28 feet wide intersect with any other street less than 28 feet wide.							

Applicant Response: The proposal includes improvements to and/or development of multiple roadway types, including residential alleys, local residential, a Major Collector (NW Spruce Avenue), and a Minor Arterial (Northwest Way). As depicted on the Tentative Plan, where improvements are proposed, the designs conform to the standards of this Table and section.

4. **Future Extension of Streets.** When necessary to give access to or permit a satisfactory future division of adjoining land, streets shall be extended to the boundary of the subdivision or partition and the resulting dead-end streets may be approved without a permanent turn around if they are 150 feet or less in length, although, an adequate temporary turn around to ensure emergency vehicle access must be provided if such streets are greater than 150 feet in length.

Applicant Response: The proposal extends multiple streets to the western property line. However at all locations, the dead ends are less than 150 feet; therefore temporary turnarounds are not needed. As designed, the proposal allows for the street system to continue in a logical manner and it also ensures fire trucks and safety vehicles can adequately and safely maneuver the site, as required by this section.

5. **Collector and Arterial Street Access.** Notwithstanding the provisions of Section 8.2705 of this Chapter, if a land division abuts or contains an existing or proposed collector or arterial street, the Community Development Director or Hearings Body may require other treatments, including but not limited to frontage roads, necessary for adequate

protection of residential properties and to afford separation of through and local traffic. Provision may be made for emergency access. All frontage roads shall comply with the City of Redmond Transportation System Plan.

Applicant Response: The property abuts Northwest Way (an Arterial) and contains NW Spruce Avenue (a Collector). These streets have been extensively planned for by the City, in the Redmond Comprehensive Plan, the 2006 Framework Plan, the Northwest Area Plan and the Redmond TSP. As detail on the Plan Set and consistent with Spruce Northwest Master Development Plan, the planned improvements to these roadways conform to the prior Planning Documents and to City Standards. Given the City resources that have gone into the prior planning efforts, and based upon pre-submittal correspondence with City Staff, the applicant does not anticipate that other treatments will be required or imposed.

6. Streets Adjacent to Railroads, Freeways and Parkways...

Applicant Response: The property is not adjacent to a railroad, freeway or parkway; therefore this section does not apply.

7. Continuation of Streets. Subdivision or partition streets which constitute the continuation of streets in contiguous territory shall be aligned so that their center lines coincide. Where straight line continuations are not possible, such center lines shall be continued as curves. These streets or the continuation of streets in contiguous territory may be required by the Community Development Director or Hearings Body where such continuation is necessary to maintain the function of the street or desirable in the surrounding area. Where solar orientation would not be possible if the street area continued, a new pattern may be started that is solar oriented.

Applicant Response: NW Spruce Avenue and NW Upas Avenue are existing streets. The proposal includes improvements to NW Spruce Avenue and a fee in lieu of improvements to NW Upas Avenue. The proposal includes improvements to existing streets, but not the continuation of existing streets. This standard does not apply.

8. Lot Layout. Local residential streets should be oriented on an east/west axis to the greatest possible extent to insure solar access for lots within the subdivision or partition.

Applicant Response: In association with the Spruce Northwest Master Development Plan, the majority of the planned local streets are oriented on an east/west axis, which allows for the greatest amount of solar access possible. The proposed lot design conforms to the Spruce Northwest Master Development Plan. Given the intended residential uses of the area and desired density, the proposal conforms to this section.

9. **Street Names.** Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street in a nearby city or in the county. Street names and numbers shall conform to the established pattern in the City, including the continuation of street names across intersecting streets, and shall be subject to the approval of the Fire Department or the responsible agency.

Applicant Response: Aside from extensions of existing streets and/or planned improvements to existing streets, all streets are only generally referred to (not named at this time). Street names have not been finalized at this time, but will be finalized prior to final plat; the applicant understands that street names will need to conform to the standards of this section.

10. **Sidewalks.** Sidewalks are required to be installed on both sides of a public street and in any special pedestrian way within the subdivision or partition except that in the case of collectors, arterials, special industrial districts or in steep terrain, the Hearings Body may approve a subdivision or partition without sidewalk if alternative pedestrian routes are available or provided by the developer. Sidewalks shall be required along routes to existing or future school and park sites.

Applicant Response: As detailed on the Plan Set and consistent with the Spruce Northwest Master Development Plan, sidewalk and/or walkways are proposed along all new streets. For streets that are internal to the site, sidewalks / walkways are proposed on both sides of the streets, whereas perimeter streets plan for improvements on the side of the street abutting the subject property and sidewalks on the opposite side would be developed / constructed with development on the neighboring properties. As detailed on the Plan Set, the proposed design conforms to the requirements of this section.

11. **Bicycle Routes.** If appropriate to the extension of a system of bicycle routes, existing or planned pursuant to the City of Redmond Bicycle Refinement Plan, the Community Development Director or the Hearings Body may require the installation of separate bicycle lanes within streets and/or separate bicycle paths.

Applicant Response: As detailed on the Plan Set and consistent with the Framework Plan, the Northwest Area Plan, the TSP and the Spruce Northwest Master Development Plan, bicycle lanes are planned along Northwest Way and NW Spruce Avenue. The proposed design conforms to this standard.

12. **Intersection Angles.** Street intersections shall be as near right angles as possible except where topography or existing conditions requires a lesser angle, but in no case shall the acute angle be less than as permitted by the adopted City of Redmond Public Works Standards and Specifications.

Applicant Response: As depicted on the Tentative Plan, all proposed intersections are at, or near 90-degree angles, in conformance with this section.

13. **Alignment. Staggered street alignment shall whenever possible leave a minimum of 200 feet distance between the center line of the streets, but in no case be less than as permitted by Standards and Specifications.**

Applicant Response: The proposal is consistent with the Spruce Northwest Master Development Plan and all street intersections are separated by over 200 feet, in accordance with this standard.

14. **Narrow Streets. Local residential grid streets designed at widths less than 36 feet as described in Section 8.2710(3)(Table 1), shall be permitted when the subdivision design is found to be in compliance with the following:**

Applicant Response: While the design includes narrow streets (with 28 feet of pavement), the roads which will be this width are not “grid streets”. All local residential grid streets are proposed to provide 36 feet of pavement width (either now or with current and future development); therefore this section does not apply.

8.2715 Fundamental Design Elements.

1. **Lighting. The subdivider or partitioner shall provide underground wiring to the City standards and a base for any proposed ornamental street lights at locations approved by the affected utility company.**

Applicant Response: The applicant plans to provide underground wiring to City Standards as prescribed in this section.

2. **Multiple Access Points. Whenever possible, a minimum of two points of access to the subdivision or partition shall be provided to provide assured access for emergency vehicles and ease resident evacuation.**

Applicant Response: As detailed on the Tentative Plan, and consistent with the Spruce Northwest Master Development Plan, the Tentative Plan will provide 3 access points to NW Quince Avenue and 2 access points to Northwest Way, which conforms to this standard.

3. **Water/Sewer. All subdivisions and partitions shall provide water and sewer lines constructed to City standards and specifications approved by the City Engineer. All lots or parcels shall be served from the City of Redmond water and sewer systems or by water and sewer systems acceptable to the City. Water and sewer mains and service lines shall be installed prior to the curbing and paving of new streets in all new subdivisions or partitions.**

Applicant Response: As depicted on the Utility Plan of the Tentative Plan, the proposal includes extending water and sewer mainlines to serve the development area. Furthermore, water and sewer laterals will be extended to each of the planned lots. Water and sewer extensions will be constructed in conformance with City Standards, and are anticipated to be reviewed by the Public Works Department prior to construction, in accordance with this section.

4. **Underground Utilities.** All permanent utility service and minor power transmission lines that are within or immediately adjacent to lots in a subdivision or parcels in a partition shall be provided from underground facilities unless otherwise approved by the CDD Director or Hearings Body. The subdivider or partitioner or developer shall be responsible for complying with requirements of this section and shall:
 - A. Obtain a permit from the Public Works Director or designee for placement for all underground utilities within the public right-of-way.
 - B. Make all necessary arrangements with the utility companies and other persons or corporations affected by the installation of such underground utilities and facilities in accordance with rules and regulations of the Public Utility Commission of the State of Oregon.
 - C. All underground utilities, water lines, sanitary sewer lines and storm drains installed in streets shall be constructed prior to the surfacing of such streets to the extent practicable, and water and sanitary sewer service lines shall be placed to such lengths as will negate the necessity for disturbing the street improvements when service connections are made.

Applicant Response: All new utility extensions are proposed to be located underground. The applicant has coordinated with all utility providers, who have indicated willingness to serve the development. Furthermore, the applicant plans to obtain all necessary permits and install underground utilities prior to curbing or paving, in accordance with this section.

5. **Preservation of Natural Features.** Existing trees, vegetation and natural features (i.e. rock outcrops) add character to the development and shall be preserved to the greatest extent practicable. All trees over 8 inches d.b.h. shall be noted and shown on the tentative plat.

Applicant Response: The Existing Conditions Map of the Tentative Plan identifies all trees of 8 inches DBH. The site is sparsely populated with Juniper Trees. Grading activities will occur with each phase and grading will only occur in areas that is need for roads, building locations, parking, pedestrian routes, and accessibility requirements, which will allow for preservation the existing trees to the greatest extent practical, given the need for housing. The need for removal of trees on individual lots will be considered when specific buildings are planned on the lots.

6. **Scenic Views.** Significant views shall be taken into consideration during subdivision design. The establishment of view corridors, building

envelopes, building height restrictions or similar methods shall be employed for the retention and protection of views from individual lots and from public spaces to the greatest degree practicable as determined through the land use review process. Such measures shall be shown on the final plat and included in deed restrictions.

Applicant Response: Views are considered and addressed in association with the Master Development Plan narrative. As detailed therein, the subject property does not contain any adopted view corridors or view restrictions. As detailed on the Plan Set, the design extends Local Street B, NW Spruce Avenue, Local Street G, and NW Quince Avenue in east/west orientations, to the edge of the property. These street connections are intended to provide view corridors throughout the property. Furthermore, the design includes “Neighborhood Park (North)”, which extends from the central part of the property to the western property line; this corridor will maintain scenic views in the area. Also, the design include an approximately 2.3 acre park on the southern portion of the site. The size and location of this park is also anticipated to maintain scenic views from this central community area.

7. Land for Public Purposes.

- A. If the City has an interest in acquiring a portion of a proposed development for a public purpose, it shall notify the property owner as soon as the City Council authorizes the transaction to proceed...**

Applicant Response: The City has not identified the subject property for a public purpose; therefore the standards of this section do not apply.

8. Easements.

- A. Utility Easements. Easements shall be provided along property lines when necessary for the placement of underground utilities and to provide the subdivision or partition with electric power, communication facilities, street lighting, sewer lines, water lines, gas lines, or drainage. Such easements shall be labeled “Public Utility Easement” on the tentative and final plat; they shall be at least 12 feet in width and centered on lot lines where possible, unless determined otherwise by the City Engineer or designate. Excepting utility pole guylines easements along the rear of lots adjacent to unsubdivided land may be reduced to 10 feet in width, unless determined otherwise by the City Engineer or designate.**

Applicant Response: Public utility easements are proposed and will be provided in accordance with this section, through the infrastructure development process.

- B. Drainage. If a tract is traversed by a water course, such as a drainage way, channel or stream, there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of the water course or in such further width as will be adequate**

for the purpose. Streets or parkways parallel to major water courses and drainage ways may be required.

Applicant Response: The subject property is traversed by COID canals and easements. The canals will be relocated and piped across the property and easement will be established as required, in coordination with COID. No other water courses traverse the property.

- 9. Fully developed “pocket parks” or “tot lots” shall be incorporated into medium and high density zoned residential subdivisions and site plans. These areas shall be developed for every twenty-five lots/units, a minimum of 3,000 square feet and privately maintained. Park amenities shall, at a minimum, include: one half of the park dedicated to turf areas, benches, trees, shrubs, ground cover, irrigation, other landscape or decorative features, and acceptable trash receptable(s) and lighting.**

Applicant Response: This element was reviewed and addressed in the Master Development Plan narrative, as detailed therein, the development includes 456 dwelling units. To meet the, the standards of this section, 54,720 square feet (1.26 acres) of park would be required. As shown on the plan set, the design includes an approximately 2.3 acre park south of NW Spruce Avenue and approximately 2.7 acres of park space north of NW Spruce Avenue. The design also includes non-park open spaces and trails; a total of 9.04 acres. The proposed design far exceeds the pocket park requirements of this section.

8.2720 Grading of building sites shall conform to the following standards unless physical conditions demonstrate the propriety of other standards:

- 1. Slopes shall be less than or equal to 3 to 1 (horizontal to vertical) unless slope reinforcement and low maintenance surfaces are provided. Cut slopes as steep as 1 to 1 are permitted in native rock material if that material is suitable to stand at the slope without raveling. Toe of full slopes steeper than 3 to 1 and top of cut slope shall be no closer than 2 feet from the property line.**
- 2. Structural engineering must be provided for retaining walls higher than four feet from the base of the footing to the top of the retaining portion of the wall and for retaining walls of any height that support a surcharge such as a structure, roadway, or slope greater than 4 to 1.**
- 3. Stormwater must be controlled in accordance with the City of Redmond Public Works Standards and Specifications to avoid erosion and impacts to adjacent property.**
- 4. Cuts and fills greater than 5 feet from original ground to final grade should be avoided.**

5. Foundations should be stepped or other measures used to minimize cuts and fills. Slopes steeper than 3:1 shall be landscaped, terraced, or receive other treatment to reduce the visual impact and minimize the need for maintenance.
6. Areas that require engineered fill to support structures, roadways or for other reasons shall be noted in the grading plan. Design and placement of engineered fill shall be under the direction of a licensed professional engineer. Fill material shall be tested and approved by the engineer prior to placement and tested with suitable methods after compaction. Fill in areas that do not support a structure shall be suitable with a minimum of voids and organic material.
7. The composition of soil for fill and the characteristics of lots and parcels made useable by fill shall be suitable for the purpose intended.
8. When filling or grading is contemplated by the subdivider or partitioner, they shall submit plans showing existing and finished grades for the approval of the City Engineer. In reviewing these plans, the City Engineer shall consider the need for drainage and effect of filling an adjacent property.
9. Grading shall be finished in such a manner as not to create steep banks or unsightly areas to adjacent property.
10. Any land that requires engineered fill shall be so noted on the plat. Design and placement of engineered fill shall be under the direction of a licensed professional engineer.

Applicant Response: The proposal includes grading for the subdivision, including grading that is needed for the roads and infrastructure. Additional grading may occur on a phase-by-phase basis as final plans are submitted and reviewed through the infrastructure permitting process. The submittal includes a grading plan and all grading is planned in accordance with the standards of this section.

SUPPLEMENTARY PROVISIONS

- 8.2800 Improvement Procedures.** In addition to other requirements, public or private improvements to be installed by the applicant either as a requirement of these standards or other applicable regulations or at his own option, shall conform to the requirements of this article:
1. **Plan Review and Approval.** Improvement work shall not be commenced until plans thereof have been reviewed and approved by the Community Development Director or Hearings Body or a designated representative

thereof. To the extent necessary for evaluation of a proposed development, such improvement plans may be required before approval of the tentative plat or preliminary map or drawing.

2. **Public Improvements as Platted.** Public improvements shall be designed, installed and constructed as platted and approved by the City Engineering Division, and plans shall be filed with the final plat at the time of recordation or upon completion.
3. **Inspection.** Improvements shall be constructed under the inspection and approval of a city Inspector. Expenses incurred thereby shall be borne by the applicant/owner. The inspector may require changes in sections and details of the improvements if unusual conditions arise during construction to warrant such changes.
4. **As-Built Plans.** A map showing the completed public improvements shall be filed with the Community Development Department upon completion of the improvements.

8.2810 Acceptance of Improvements. Improvements shall be considered for acceptance after final inspection, after the improvements have been completed.

Applicant Response: The planned subdivision includes both public and private improvements. The applicant understands that work cannot commence until the plans are approved by the City Building and Public Works Departments. Furthermore, the applicant plans to include all required plans with the final plat and understands that improvements will be inspected by a City Inspector. Lastly, the applicant understands that “as-built” plans will need to be provided and that public improvements will only be accepted after completing a final inspection.

8.2815 Transportation System Analysis. It shall be the burden of the developer to evaluate transportation system impacts when a proposed development involves either a Subdivision, Site and Design Review, PUD, Master Plan, Comprehensive Plan Amendments, a change or expansion of use, or any other development that the City Engineer deems necessary. Transportation system analyses are not required for residential site plan review for up to four units or for partitions up to three lots...

Applicant Response: The Master Development Plan submittal is accompanied by a Traffic Impact Analysis, prepared by Transight Consulting, LLC. The TIA has been prepared for the entire Master Development Plan area, in accordance with this provision of this chapter. The applicant plans to complete each of the referenced items needed, thereby ensuring conformance with the TIA requirements of this section.

8.2820 Access Management Standards. All land use approvals shall be in compliance with the following standards.

1. **Driveway spacing and corner clearance as follows:**

<u>Roadway Classification</u>	<u>Minimum Access Driveway Spacing</u>	<u>Minimum Access Clearance to Corner</u>	<u>Intersection Spacing (Min.)</u>
Local Street	No Restrictions	30 ft	165 ft
Minor Collector	50 ft	80 ft	330 ft
Major Collector	165 ft	165 ft	330 ft
Minor Arterial	330 ft	330 ft	1/4 mile
Major Arterial	ODOT Stds	ODOT Stds	ODOT Stds

2. In all instances, access near an intersection shall be located beyond the influence of standing queues and opposing left turns sharing a continuous two-way left turn lane. This requirement may result in greater corner clearance or access spacing than the minimum distance indicated.
3. Every lot or parcel shall be permitted an access. In the event that the access management standards cannot be achieved, shared access with adjacent property shall be explored and provided where available.
4. Access shall be taken from the lower order street or alley unless otherwise approved by Public Works and/or ODOT through the land use review and approval process. Access to higher order streets may be allowed for emergency vehicles when restricted with a locked fire gate, bollards or similar, when approved or required by Redmond Fire and Rescue.
5. Unless adequate demonstration of site necessity, intersection safety and functionality are provided, through the land use review process, new lots and/or parcels will be limited to a single vehicular access. Existing lots may be permitted a secondary access when approved by the City Engineer.
6. The access management standards apply to new development, redevelopment, subdivision, and partitioning of land.
7. Corner clearance is measured from the edge of right-of-way to the nearest edge of access. Spacing is measured from centerline of access/intersection to centerline of access/intersection.
8. Adequate intersection sight distance and clear zone shall be maintained at all access/driveway locations per AASHTO standards (American Association of State Highway and Transportation Officials).
9. Public Works may require supporting information, including but not limited to traffic count data, trip generation, trip distribution, truck and trailer turning/backing templates and/or onsite circulation diagram. Transportation Impact Analysis study, etc., in order to make a proper determination of access/driveway location.

10. **Access/driveway locations may require alignment with existing driveways on the opposite side of the roadway as determined by Public Works or through the land use review and approval process.**
11. **Access within the North Redmond US 97 Interchange Area Management Plan (IAMP) shall also conform to the 2007 “North Redmond US 97 Interchange Area Management Plan (IAMP),” as amended.**

Applicant Response: Exact access locations will be finalized when the final products are planned for each lot and with site development. The lots have been designed such that access can be provided in conformance with these standards, which are anticipated to be further reviewed in infrastructure permits and/or site development.

8.2825 Street Dedications. Any person desiring to create a street not part of a subdivision or partition shall make written application to the Community Development Department...

Applicant Response: The proposal does not include new streets outside of a land division process; therefore this section does not apply.

IV. Summary and Conclusion:

The preceding sections document that the proposed development conforms to the applicable approval criteria and the applicable development standards of the Redmond Development Code. Because the proposal conforms to all applicable criteria and standards, the applicant respectfully requests that the City approve the Subdivision, as proposed.

**CITY OF REDMOND**
Engineering Division

(541) 504-2002

Fax: (541) 548-0253

www.redmondoregon.govTO: KYLE ROBERTS, *Planning Division/Community Development Dept.*FROM: DAVID PILLING, *Engineering Division*

DATE: December 1, 2023

SUBJECT: **711-23-000216-PLNG-MD & 217-PLNG-SUB: Spruce Northwest Phase 1-11 Master Plan**HLM Inc/Northwest Way Land JV LLC/Te Amo Despacio LLC/Blackmore Planning & Dev Services LLC
Tax Lots 15-13-05-600, 800 & 804

Subject property located west of Northwest Way, north and south of Spruce Ave., south of Upas Ave. and north of Maple Avenue. 2515 and 2917 Northwest Way and 2902 NW Spruce Avenue. The Engineering Department provides the following recommendations based on the Master Development Plan dated 9-25-23 and Tentative Subdivision Plan dated 7-26-23 per Redmond Development (COR) Code Section 8.0270, 8.0305 and 8.2000-2840 and City of Redmond Public Works Standards and Specifications (CORPWSS):

1. **Transportation:** All public streets shall be designed, constructed and dedicated to current City of Redmond Standards & Specifications and Transportation System Plan (TSP) standards and extended to the limits of each project phase unless otherwise specified or approved. Five (5) ft. minimum width public utility easement (PUE) shall be dedicated along all street right-of-way per COR Standard Drawing 2-1. Street signage, lane striping, street lights and postal box installation shall be required. Barricades shall be required on all dead-end streets at phase/property boundaries and signed for future extension. All street names shall be approved by Redmond Fire and Rescue and/or Deschutes County. The proposed master plan and public street system complies with City grid street and TSP standards subject to the following: [COR Code 8.0270(2(D), 3(B)(1)(a), 3(C)(11) & 3(C)(14)(a))] [COR Code 8.2240(1 & 4) 8.2320(2)(A) & 8.2710(1, 2, 3 & 10)] [CORPWSS Development Provisions 03]

A) **Northwest Way** - minor arterial street. A paved street and eighty (80) ft. right-of-way exist, no curb or sidewalk, north of Spruce Ave. and along property frontage of tax lot 15-13-05-600. A paved rural road and sixty (60) ft. right-of-way exist, no curb or sidewalk, south of Spruce Ave. and along property frontage of tax lot 15-13-05-800. Twenty (20) ft. public right-of-way dedication shall be required along property/project frontage for a total of fifty (50) ft. west of centerline per City minor arterial standards. Street and right-of-way centerline shall match existing. Street frontage improvements conforming to City minor arterial street standards per COR Standard Drawing 2-1 and 2-3 shall be required along project/property frontage as follows;

1) North of Spruce Ave. (Phase 6) - Twenty-five (25) ft. half street improvements with pavement section widening, pavement grind/inlay to centerline, curb and 10 ft. wide multi-use path on the west side, storm drainage, turn/bike lanes and striping unless otherwise approved by the City Engineer.

2) South of Spruce Ave. (Phase 1 & 4) - Fifty (50) ft. wide full street improvements with new/reconstructed pavement section, curb on both sides, 10 ft. wide multi-use path on the west side, storm drainage, turn/bike lanes and striping unless otherwise approved by the City Engineer. Partial street improvements may be considered by the City Engineer where adequate right-of-way is not available.

B) **NW Spruce Ave.** - major collector street. A gravel/dirt road and sixty (60) ft. right-of-way exist through subject properties west of Northwest Way. Street frontage improvements conforming to full width City major collector street standards shall be required per COR Standard Drawing 2-1 with 36 ft. minimum wide pavement, curb, 10 ft. multi-use path, storm drainage, bike lane/striping and turn lanes as warranted through subject properties from Northwest Way to the west boundary of tax lot 15-13-05-804. Forty (40) ft. width right-of-way north and south of centerline and/or eighty (80) ft. total width public right-of-way dedication shall be required through subject properties from Northwest Way to the west boundary of tax lot 15-13-05-804. Proposed re-alignment shall match existing street and right-of-way centerline east of Northwest Way and at west project/property boundary.

C) **NW Upas Ave.** - local grid street. A paved rural road exists with sixty (60) ft. Deschutes County Rural Public Road Easement, no curb or sidewalk, along project/property frontage. Street frontage improvements conforming to City partial local street standards shall be required per COR Standard Drawing 2-1 and 2-3 with new/reconstructed pavement section to centerline, curb and sidewalk/path on the south side, storm drainage and thirty (30) ft. minimum public right-of-way dedication along property frontage as proposed. At the discretion of the City Engineer, a cash contribution may be provided for the south half at local street standards in lieu of construction due to lack of available public right-of-way. Street and right-of-way/easement centerline shall match existing. The emergency/fire access gates at 30th St. and 31st St. shall be required as proposed to prevent public access onto Upas Ave. until such time public right-of-way on the north half is dedicated/annexed, City street improvements are extended east to and including the Northwest Way intersection or as otherwise approved by the City Engineer.

- D) **NW Quince Ave.** - local grid street. Street frontage improvements conforming to City full width local street standards shall be required per COR Standard Drawing 2-1 with 36 ft. wide pavement, curb on both sides, sidewalk/path on the north side, storm drainage and sixty (60) ft. public right-of-way dedication along project/property frontage as proposed.
- E) **NW 30th St. & 31st St.** - local grid streets. Street improvements conforming to City local grid street standards per COR Standard Drawing 2-1 shall be required with 36 ft. wide pavement, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication.
- F) **Local Road B** - local/grid street. Street improvements conforming to City local/grid street standards per COR Standard Drawing 2-1 with 36 ft. wide pavement, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.
- G) **Local Road G** - local grid street. Street improvements conforming to City local grid street standards per COR Standard Drawing 2-1 shall be required with 36 ft. wide pavement, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.
- H) **NW 28th St.** - local street. Proposed right-angle elbow corner at Local Road B shall conform to City elbow/cul-de-sac standard per COR Std Dwg 2-4 and/or 2-5 unless otherwise approved by the City Engineer. Street improvements conforming to City local/cul-de-sac street standards shall be required per COR Standard Drawing 2-1 and 2-4 and/or 2-5 with 36 ft. wide pavement, curb, sidewalk, storm drainage, sixty (60) ft. right-of-way dedication, fifty (50) ft. cul-de-sac right-of-way radius dedication and/or fifty (50) ft. eyebrow corner right-of-way radius dedication measured from the centerline curve/arc midpoint of the tangent centerline projections.
- I) **NW 29th St.** - local reduced width non-grid street. Street improvements conforming to City local street standards per COR Standard Drawing 2-1 and 2-2 shall be required with 28 ft. wide pavement, parking on one side only with NO PARKING signs installed on one side of the roadway, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.
- J) **NW 28th Pl. & Local Road H** - local reduced width non-grid street. Proposed right-angle elbow corner at Local Road E shall conform to City elbow/cul-de-sac standard per COR Std Dwg 2-4 and/or 2-5 unless otherwise approved by the City Engineer. Street improvements conforming to City local/cul-de-sac street standards shall be required per COR Standard Drawing 2-1 and 2-4 and/or 2-5 with 28 ft. wide pavement, parking on one side only with NO PARKING signs installed on one side of the roadway, curb, sidewalk, storm drainage, sixty (60) ft. right-of-way dedication, fifty (50) ft. cul-de-sac right-of-way radius dedication and/or fifty (50) ft. eyebrow corner right-of-way radius dedication measured from the centerline curve/arc midpoint of the tangent centerline projections.
- K) **NW 29th Way & Local Road A, C, D, E & F** - local non-grid streets. Street improvements conforming to City local street standards shall be required per COR Standard Drawing 2-1 with 28 ft. wide pavement, parking on one side only with NO PARKING signs installed on one side of the roadway, curb, sidewalk/path, storm drainage and sixty (60) ft. right-of-way dedication as proposed.
- L) **Reduced (28 ft.) Width Local Non-Grid Streets** - Homeowner's Association (HOA) formation and creation of covenants, conditions and restrictions (CCR's) with HOA parking enforcement shall be required in conjunction with all 28 ft. reduced width local streets. Parking shall be restricted to one side only with "No Parking" signs and painted curb. Additionally, reduced width streets may be approved as proposed with an exception in certain cases to the standard for public utility and alley access at the rear of lots per COR Std Dwg 2-2. *[CORPWSS Design Standards II(A)(1)]*
- M) **Private Drives and Alleys** - proposed drives and alleys shall be privately owned and maintained. Private alley improvements conforming to City alley standards per COR Standard Drawing 2-1 are recommended. Approved private drive and alley connections to public streets shall be constructed to City driveway standards.
- N) **Public Paths/Trails** - all public paths and trails shall conform to City paved multi-use path standards per COR Standard Drawing 2-6.
- O) **Pedestrian Connections & Crossings** - specific pedestrian connection and crossing improvements shall be required as follows;
- 1) Northwest Way - enhanced pedestrian crossings of Northwest Way shall be constructed on the north side of the Northwest Way/Spruce Ave. intersection prior to Phase 1 plat approval and near the northern project/property boundary prior to Phase 6 plat approval. These crossings shall include a Rectangular Rapid Flashing Beacon (RRFB), advance signing, striping, overhead illumination and median refuge island unless otherwise approved by the City Engineer. Provide an internal path route through Phase 6 connecting NW 28th St. to the Northwest Way pedestrian crossing prior to Phase 6 plat approval.
 - 2) NW Spruce Ave. - the north-south crossing at Northwest Way/Spruce Avenue intersection shall be constructed accommodate a full 10 ft. wide pathway crossing and include a striped pedestrian crossing along the pathway alignment, illumination and advance stop bar prior to Phase 1 plat approval.
- P) **Street Storm Drainage:**
- 1) Stormwater drainage systems in the public right-of-way shall be subject to current City design standards. *[COR Code 8.2825(2)] [CORPWSS Design Standards II(B)]*
 - 2) New drywells shall comply with City/DEQ pretreatment and City testing requirements. Drywell drain rock shall not extend under any street pavement section. *[COR Code 8.2825(2)] [CORPWSS Design Standards II(B)]*
 - 3) The location of drywells or other UIC's within City streets shall not conflict with existing active private water wells, community water wells or existing/future municipal drinking water wells. Identify all existing water wells that are within 500 ft. or the two-year time of travel zone of subject properties. *[COR Code 8.2825(2)] [CORPWSS Design Standards II(B)]*

Q) Street Trees:

- 1) No street trees within 50 ft. of a street intersection per COR Standard Drawing 2-27.
- 2) No trees within 10 ft. of domestic water service, fire service or public storm facilities.
- 3) Trees shall not conflict with street or stop sign/control device and pedestrian crossing/ADA ramp line of sight.
- 4) No trees within driveway clear vision areas or blocking public street lighting.
- 5) Street tree species shall be selected from Redmond Parks Division approved tree list.

R) Lot/Tract Access:

- 1) Vehicular access to each new lot shall conform to City access management, corner clearance, clear vision and driveway construction standards. *[COR Code 3.300, 8.0305 & 8.2820]*
- 2) Direct vehicular access to Northwest Way, a minor arterial street, and NW Spruce Ave., a major collector street, shall not be permitted from any lot, tract or alley except for gated and locked emergency/fire and permitted COID access connections unless otherwise approved by the City Engineer. *[COR Code 8.2820(4)]*
- 3) Corner lots and double fronting lots shall take vehicular access from the lower order street, alley or access easement. *[COR Code 8.2820(4)]*
- 4) Postal box installation shall be subject to US Postal Service standards and City Engineer approval. *[CORPWSS Design Standards II(A)(16)]*

S) Traffic Impacts: The Transportation System Analysis Application (TSAA) dated 4-21-23 and Transportation Impact Analysis (TIA) dated 7-5-23 submitted by Transight Consulting LLC have been reviewed and approved by City Engineering conditioned upon the transportation mitigation requirements identified by the Assistant City Engineer per City Approval Memo dated 10-2-23 unless otherwise specified. A notable required mitigation includes the total proportionate share of \$131,555 for impacts to OR126/SW 27th St. based on the cost of the parallel route improvements at OR126/SW 35th Street. The total payment (\$131,555) shall be due prior to Phase 1 final plat approval or partial payments may be provided prior to final plat approval of each individual phase (\$11,949.54 per each phase). The proportionate share will not be required if the City adopts a separate funding mechanism that addresses the impacts at OR126/27th St. in their entirety prior to plat of Phase 1. *[COR Code 8.0270(3)(C)(11), 8.1010(1)(C) & 8.2815]*

2. Water: A twelve (12) inch City water main exists in Northwest Way north of Spruce Ave. and along property frontage of tax lot 15-13-05-600 per current City Water System Master Plan (WSMP). A twelve (12) inch City water main exists in Spruce Ave. east of Northwest Way.

A) Connection to the City's public water system shall be required for each new lot. *[COR Code 8.2240(5) & 8.2715(3)]*
B) The proposed public water system complies with City "to & through" Public Facility Requirement and WSMP standards for service to each new lot and adjacent property subject to the following: *[COR Code 8.0270(2)(G), 3(B)(1)(a) & 3(C)(12)]* *[CORPWSS Development Provisions 03]*

- 1) The twelve (12) inch public water main shall be extended in Northwest Way south from existing at Spruce Ave. and along project/property frontage per current WSMP.
- 2) Design review of the public improvement construction plans for compliance to City standards.
- 3) Domestic and fire water systems located on-site and beyond public right-of-way shall be privately owned and maintained.

C) A separate domestic water service connection conforming to City standards shall be required for each new lot with meter located at the property/right-of-way line. A single water master meter shall be required for all multi-family lots. A City approved backflow prevention device shall be required for all multi-family and non-residential properties, water services larger than one (1) inch, fire sprinkler systems and irrigation systems. *[COR Code 4.200, 4.161, 8.2240(5) & 8.2715 (3 & 4(C))]*

D) Fire flow, fire hydrant locations and fire code requirements to be determined by Redmond Fire & Rescue (RFR).

- 1) A water system/fire flow analysis and mitigation plan prepared by a registered professional engineer shall be provided as required by the Redmond Fire Marshal. *[CORPWSS Development Provisions 04.2.00]* *[CORPWSS Design Standards II(D)(1(a) & 3(a))]*
- 2) Public water system improvements may be required as deemed necessary by the fire flow analysis mitigation plan to meet minimum fire code and fire flow requirements for the proposed development. *[COR Code 8.2235(1)(D)]* *[CORPWSS Design Standards II(D)(1(a) & 3(a))]*

E) New fire hydrants and fire/water lines located on-site shall be privately owned and maintained with City approved backflow prevention device located at the property/right-of-way line. *[COR Code 8.3035(7)(D)]* *[CORPWSS Design Standards II(D)(1)(d)]*

F) Abandonment of any existing water well, cistern or other private water facility located on subject properties shall be in accordance with Oregon Water Resource Department regulations. *[CORPWSS Development Provisions 04.7.00 & 22(13)]*

3. Wastewater: The thirty (30) inch Far West Sewer Interceptor (FWSI) City gravity sewer trunk main exists in Spruce Ave. at Northwest Way per current Redmond Wastewater System Master Plan (RWSMP).

A) Connection to the City's public sewer system shall be required for each new lot. *[COR Code 8.2240(5) & 8.2715(3)]*

B) Proposed public gravity/pressure sewer system and FWSI extension complies with City "to & through" Public Facility Requirement and RWSMP standards for complete gravity service to each new lot and adjacent property subject to the following: *[COR Code 8.0270(2)(G), 3(B)(1)(a) & 3(C)(12)]* *[CORPWSS Development Provisions 03]*

- 1) Proposed public gravity sewer main in Quince Ave. shall be extended and/or stubbed to the east side of Northwest Way.

2) All public gravity sewer mains shall be designed and constructed to provide a gravity service to each new lot and neighboring properties unless otherwise approved by the City Engineer.

4) Sewer services shall be located to provide complete gravity service.

5) Sewer manholes shall be located on street centerline whenever possible, at 400 ft. max spacing and at any main line terminus. Manholes shall be added or moved accordingly to match street alignments and to avoid conflicts with public water.

6) Public sanitary sewer facilities located beyond public right-of-way will require dedication of City sewer and/or public utility easements that provide unobstructed City access and turnarounds. *[COR Code 8.2215(2(E) & 3(B)), 8.2320(2)(B) & 8.2715(8)(4)] [CORPWSS Development Provisions 07]*

7) Design review of the public improvement construction plans for compliance to City standards.

8) Sanitary sewer systems located on-site and beyond public right-of-way or easements shall be privately owned and maintained.

C) A separate sanitary sewer service conforming to City standards shall be required for each new lot with cleanout located at the property/right-of-way or easement line. All sewer services shall be connected at right angles to the sewer mainline, and not to manholes, unless otherwise approved by the City Engineer. *[COR Code 8.2240(5) & 8.2715(3 & 4(C))]*

D) Any existing sewage drill hole, septic tank or other private sewer facility located on subject property shall be permanently abandoned in accordance with Deschutes County and Oregon Dept. of Environmental Quality (DEQ) regulations. *[COR Code 4.304(3)] [CORPWSS Development Provisions 04.7.00 & 22(13)]*

4. Subdivision Grading and Drainage: A subdivision site grading and drainage plan with erosion/sediment control plan and drainage report shall be required upon development of each project phase per current City standards and the following: *[COR Code 8.0270(3)(C)(7 & 12) & 8.2720] [CORPWSS Development Provisions 23] [CORPWSS Design Standards II(B)]*

A) Lot and Tract grading shall conform to current COR Development Code 8.2720 and shall not create steep banks, extreme cut/fills or areas unsightly to adjacent properties or lots.

B) All storm water runoff and drainage shall be maintained on each lot or tract and shall not drain onto public streets, neighboring properties or irrigation canals/ditches except as provided for in City standards.

C) Total contributing area to the public storm system shall include all right-of-way surface runoff and 100% of the future developed lots potential contributing areas unless otherwise approved by the City Engineer.

D) The stormwater system shall be designed to pass up-gradient flow through the site without damage to the proposed development, public stormwater facilities or neighboring properties.

E) Storm water runoff from private property shall not impact public right-of-way or easements unless otherwise approved by the Public Works Director or City Engineer.

F) New on-site private drywells and other underground injection control (UIC) systems not part of the public drainage system must be registered and approved or permitted by the Oregon Department of Environmental Quality (DEQ) prior to construction or building permit issuance. Contact DEQ UIC Program Coordinator at 503-229-5945. Send copy of UIC Registration Packet to DEQ and City of Redmond, 3100 NW 19th Street, Redmond, OR, 97756.

G) Private drywells serving paved areas may not be located within public or community wellhead protection areas or 500 ft. of existing irrigation or drinking water wells. Please note that this site may be located within 500 ft. of existing private water wells. Privately owned drywells within 500 ft. of any private water well will require a general permit from the Oregon DEQ prior to construction plan approval. Locate and identify existing water wells and wellhead protection zones that could affect the location of proposed drywells. *[CORPWSS Development Provisions 23] [OAR 340-044-0018]*

H) Maintenance agreement required for any on-site private storm system.

5. Construction Plans: Upon land use approval, a separate set of construction drawings may be submitted directly to the Engineering Department for design review of all required and/or proposed public improvements, utilities and subdivision site grading. *[COR Code 8.2720 & 8.2800] [CORPWSS Development Provisions 04 & 23] [CORPWSS Design Standards]*



REDMOND FIRE & RESCUE

341 NW Dogwood Avenue, Redmond, OR 97756

Phone: (541) 504-5000 Fax: (541) 526-1254

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December 4, 2023

Kyle Roberts
Planning Director
City of Redmond
411 SW 9th Street
Redmond, OR 97756

Re: 711-23-000215, 000216, 000217, 000221-PLNG (PA1, MD, SUB, ANN)

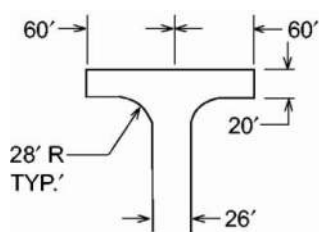
Tax Lot ID: 1513050000800, 1513050000600, and 1513050000804

Dear Kyle,

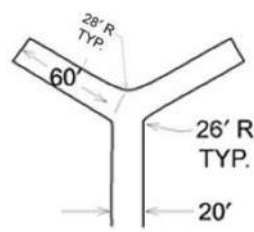
Thank you for the opportunity to review the proposed site plan surrounding the above-named development project. These notes are provided in regard to the plans received October 17, 2023. There may be more or less requirements needed based upon the final project design, however, Redmond Fire & Rescue will endorse this proposal predicated on the following criteria and conditions of approval.

FIRE APPARATUS ACCESS:

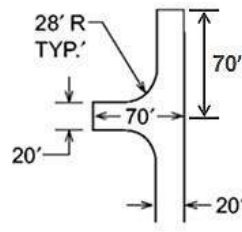
- FIRE APPARATUS ACCESS ROAD DISTANCE FROM BUILDINGS AND FACILITIES:** Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)
- DEAD END ROADS AND TURNAROUNDS:** Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams of approved turnarounds are shown below: (OFC 503.2.5 & D103.1)



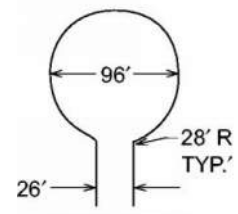
120' HAMMERHEAD



60-FOOT "Y"



ACCEPTABLE ALTERNATIVE
TO 120' HAMMERHEAD



96' DIAMETER
CUL-DE-SAC

3. **ADDITIONAL ACCESS ROADS – ONE- OR TWO-FAMILY RESIDENTIAL DEVELOPMENTS:** Developments of one- or two-family dwellings, where the number of dwelling units exceeds 30, shall be provided with separate and approved fire apparatus access roads and shall meet the requirements of Section D104.3.
Exception: Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2, or 903.3.1.3 of the International Fire Code, access from two directions shall not be required. (OFC D107)
4. **MULTIPLE ACCESS ROADS SEPARATION:** Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the area to be served (as identified by the Fire Marshal), measured in a straight line between accesses. (OFC D104.3)
5. **FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1)
6. **NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, “No Parking” signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Signs shall read “NO PARKING - FIRE LANE” and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)
7. **NO PARKING:** Parking on emergency access roads shall be as follows (OFC D103.6.1-2):
 1. 20-26 feet road width – no parking on either side of roadway
 2. 26-32 feet road width – parking is allowed on one side
 3. Greater than 32 feet road width – parking is not restricted
8. **PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked “NO PARKING FIRE LANE” at 25-foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background (or as approved). (OFC 503.3)
9. **FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)
10. **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced as to provide all-weather driving capabilities. (OFC 503.2.3)
11. **TURNING RADIUS:** The inside turning radius and outside turning radius shall not be less than 30 feet and 50 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

12. **ACCESS ROAD GRADE:** Fire apparatus access roadway grades shall not exceed 10%.
13. **ANGLE OF APPROACH/GRADE FOR TURNAROUNDS:** Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)
14. **ANGLE OF APPROACH/GRADE FOR INTERSECTIONS:** Intersections shall be level (maximum 5%) with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)
15. **AERIAL APPARATUS OPERATING GRADES:** Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%.
16. **BOLLARDS:** Where secondary fire access roads are required, they shall be secured utilizing a removable bollard. The *fire code official* is authorized to require the installation and maintenance of gates or other *approved* barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. The MaxiForce Removable Bollard MRRW-RS1-R, MRRW-RS2-R, MRSW-SS1-R, MRSW-SS2-R and MRSW-SS3-R are approved for use. maxiforcebollards.com (OFC 503.5)
17. **ACCESS DURING CONSTRUCTION:** Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)
18. **TRAFFIC CALMING DEVICES:** Shall be prohibited on fire access routes unless approved by the Fire Marshal. (OFC 503.4.1).

FIREFIGHTING WATER SUPPLIES:

19. **FIREFIGHTING WATER SUPPLY FOR INDIVIDUAL ONE- AND TWO-FAMILY DWELLINGS:** The minimum available fire flow for one and two-family dwellings served by a municipal water supply shall be 1,000 gallons per minute. If the structure(s) is (are) 3,600 square feet or larger, the required fire flow shall be determined according to OFC Appendix B. (OFC B105.2)
20. **FIRE FLOW WATER AVAILABILITY:** Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

Provide documentation of fire hydrant flow test or modeling.

21. **WATER SUPPLY DURING CONSTRUCTION IN MUNICIPAL AREAS:** In areas with fixed and reliable water supply, approved firefighting water supplies shall be installed

and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

FIRE HYDRANTS:

22. **FIRE HYDRANTS – ONE- AND TWO-FAMILY DWELLINGS & ACCESSORY STRUCTURES:** Where the most remote portion of a structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided. (OFC 507.5.1)
23. **FIRE HYDRANT NUMBER AND DISTRIBUTION:** The minimum number and distribution of fire hydrants available to a building shall not be less than that listed in Table C 105.1. (OFC Appendix C)
24. **FIRE HYDRANT(S) PLACEMENT:** (OFC C104)
 - Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
 - Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the Fire Marshal.
 - Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the Fire Marshal.
 - Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the Fire Marshal.
25. **FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal. (OFC C102.1)
26. **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6 & OFC 312)
27. **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3-foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

BUILDING ACCESS AND FIRE SERVICE FEATURES

28. **PREMISES IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

If you have questions or need further clarification or would like to discuss any alternate methods and/or materials, please feel free to contact me at 541-504-5010.

Sincerely,

Tom Mooney

Tom Mooney
Fire Marshal
Tom.mooney@rdmfire.org

Cc: File

From: [LandUse](#)
To: [Kyle Roberts](#)
Subject: 711-23-000215-PLNG (PA1) | Spruce Northwest & 711-23-000216-PLNG (MD) & 711-23-000217-PLNG (SUB) & 711-23-000221-PLNG (ANN) COID Comments
Date: Monday, October 30, 2023 8:48:45 AM
Attachments: [imaod001.png](#)

[EXTERNAL]: This email originated from outside of the city. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Kyle,

Please find COID's comments for the above-mentioned applications below. Please let me know if you have any questions. Thanks!

"October 30, 2023

Sent Via Email Only

Re: 711-23-000215-PLNG (PA1) | Spruce Northwest
711-23-000216-PLNG (MD)
711-23-000217-PLNG (SUB)
711-23-000221-PLNG (ANN)

2515, 2917 Northwest Way and 2902 NW Spruce Avenue, Redmond, OR 97756

1513050000800, 1513050000600, and 1513050000804

Please be advised that Central Oregon Irrigation District (COID) has reviewed the application received on October 17, 2023, for the above referenced project located at 2515, 2917 Northwest Way and 2902 NW Spruce Avenue, Redmond, OR 97756/tax lots: 1513050000800, 1513050000600, and 1513050000804. This proposal includes four distinct applications to annex into Redmond city limits approximately 77 acres, a zone change request, and to create lots and tracts for the development of a master development planned residential subdivision.

There are 15.70 acres of COID irrigation rights appurtenant to tax lot 1513050000800. There are an additional 0.40 acres of COID pond rights appurtenant to tax lot 1513050000800. There are no COID facilities, ditches, or pipes within tax lot 1513050000800. There are 20.75 acres of COID irrigation rights appurtenant to tax lot 1513050000804. There are no COID facilities, ditches, or pipes within tax lot 1513050000804. There are 28.00 acres of COID irrigation rights appurtenant to tax lot 1513050000600. Please note, COID's C-Lateral travels through the tax lot from the southeast corner of the property to the north. The C-Lateral has a 50-foot right of way easement plus an additional 20-foot road easement on the east side of the ditch. The C-20 sub-lateral begins in the southeast corner of the tax lot and travels northwest before leaving the tax lot on the western property line. The C-20 sub-lateral has a 20-foot right of way easement. The C-11 sub-lateral leaves the C-Lateral and travels northeasterly. The C-11 sub-lateral has a 30-foot right of way easement plus an additional 20-foot road easement on the east side of the ditch. The C-20B & C-20C sub-laterals come off the C-20 and deliver irrigation water to surrounding properties via private ditches. The C-20B & C-20C along with the private ditches are protected through OAR and ORS irrigation delivery laws. No encroachment or crossing into COID's easements are permitted without a recorded license from COID.

Pursuant to ORS 92.090(6) Central Oregon Irrigation District (COID) certifies that the Tentative Plan lies within the boundary of COID and is subject to the fees and policies of COID.

Within the Tentative Plan, COID holds an easement and/or rights of way and has the right to install, pipe, maintain and operate its irrigation system above and below ground and all other related facilities within the canal irrigation easement. This includes the right of access to such facilities and the right to require the removal of any obstructions that may be placed within the canal easement at the lot owner's expense. At no time may permanent structures be placed within the canal easement, nor may any other obstruction be placed within the easement which interferes with the use of the canal easement without prior written approval of the COID.

The Spruce Northwest Master Plan area has an adjudicated 64.85 acres of water right on Certificates issued to COID. Prior to development, the 64.85 acres of water rights must be quitclaimed to COID. These water rights will remain appurtenant to the land until completion of a water right transfer to remove the 64.85 acres from the described parcels. Upon issuance of an Order by OWRD, no water rights will remain within the boundaries of Spruce Northwest Master Plan area. Any irrigation conveyance, District or private, which passes through the subject property shall not be encroached upon or crossed without written permission from this office.

Pursuant to ORS 92.103 (2) Central Oregon Irrigation District (COID) is providing comments (statements) containing information or recommended conditions for approval of the tentative plan for the proposed plat.

Listed below are COID's initial comments to the provided application. All development affecting irrigation facilities shall be in accordance with COID's Development Handbook and/or as otherwise approved by the District.

- The Master Development Plan depicts COID and private facilities within the project boundary piped and re-routed. COID has not yet agreed to any piping or relocation of its facilities. Prior to any construction that may impact COID facilities, the applicant must record the proper licensing/agreements. COID has the right to refuse any proposed relocation or piping of its facilities.
 - The applicant should contact COID prior to finalizing construction plans to record all necessary agreements.
- All water rights within the project boundary must be removed prior to development. Please contact COID for further steps.
- Irrigation infrastructure and rights-of-way are required to be identified on all maps and plans.
- No structures or encroachment of any kind, including fence, are permitted within COID property/easement/right of way without written permission from this office.
- Comply with Requirements of COID Developer Handbook including restriction on drilling / blasting and excavation within and adjacent to the existing canal embankment. There is no blasting within 100-feet within the marginal limit of the canal.
- Policies, standards and requirements set forth in the COID Developer Handbook must be complied with.

Our comments are based on the information provided, which we understand to be preliminary nature at this time. Our comments are subject to change and additional requirements may be made as site planning progresses and additional information becomes available. Please provide updated documents to COID for review as they become available.

Central Oregon Irrigation District"

Spencer Stauffer | Land Use Technician

Central Oregon Irrigation District | [1055 SW Lake Court Redmond, OR 97756](#) | 541.504.7575



ATTACHMENT D

No public comments were received by the Planning Division.



Engineering Department
243 E. Antler Ave, Suite 100
Redmond, OR 97756-0100
541-504-2002

siteplan@redmondoregon.gov
www.redmondoregon.gov

TRANSPORTATION SYSTEM ANALYSIS APPLICATION

Applicability: Required when a proposed development involves either a Subdivision, Site and Design Review, Planned Unit Development, Master Plan, Comprehensive Plan Amendment, a change or expansion of use, or any other development that the City Engineer deems necessary. This application is not required for residential site plan review (4 units or less) or for partitions (3 lots or less).

This application must be approved prior to submitting a land use application for the project.

Applicant Information

Applicant: Joe Bessman Email: joe@transightconsulting.com
Company: Transight Consulting, LLC Phone: 503 997 4473
Address: 61271 Splendor Lane, Bend, OR 97702
Date Submitted: 4/21/2023

Owner Information

Owner: Megan Norris Email: mnorris@hayden-homes.com
Company: Hayden Homes Phone: 916-529-5691
Address: _____

Project Information

Project Title: Hayden Homes' Northwest Redmond Tax Lot Number(s): 1513050000800, 1513050000804, 1513050000600
Project Address: 2515 Northwest Way
Zone: R-4/R-5 Area (SF): 76.82 Acres
Existing Use: Rural/Agricultural
Proposed Use(s) and code(s) per the Institute of Transportation Engineer's (ITE) Manual, 11th Edition:
See attached
Total PM Peak Trips: 320 Average Daily Trips (ADT): 3634

Reserved for City of Redmond Approval

Reviewed by: _____
Approved (date): _____
Approved PM Peak Trips: _____
Approved ADT: _____



SPRUCE NORTHWEST

TRANSPORTATION MASTER PLAN

Prepared For: Hayden Homes

July 5, 2023

Engineer of Record: Joseph W. Bessman, PE
Transight Consulting, LLC



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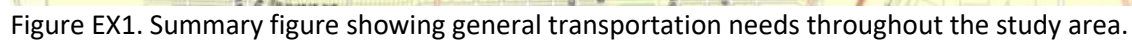
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EXECUTIVE SUMMARY

This report provides a Transportation Impact Analysis (TIA) for the proposed Hayden Homes development located within the Northwest Area Plan Lands in Redmond, Oregon. This report was prepared in compliance with Redmond Development Code 8.2815 and follows the project scoping materials that were completed in March 2022 (and formally updated to comply with the City's new process in April 2023).

The overall findings of this report are shown in the summary Figure EX1, which shows that new roadway extensions, left-turn lanes, and implementation of City-identified projects will be needed to address regional impacts of this project and other "pipeline" development. Consistent with Council request, this traffic study has been coordinated with the recently submitted and adjacent Vollertsen Master Plan, and accounts for concurrent development of both projects.

Additional discussion of the Hayden Homes project, the analysis methodology, and the specific impacts of the proposed 76.82-acre residential development are further summarized herein. Overall, with the mitigation measures presented and continued implementation of regional system improvements in partnership with the City and ODOT, the proposed development can comply with City of Redmond transportation standards and the Transportation Planning Rule.



PROJECT OVERVIEW

The overall site consists of 76.82 acres of land west of NW Northwest Way that is bisected by Spruce Avenue (see Figure 1). The site is located west of the approved Dry Canyon Village and northwest of the proposed Vollertsen Master Plan. The site covers three parcels (tax lots 1513050000600, 1513050000804, and 1513050000800) of which 60.39 acres are designated *General Residential* (R-4) and 16.43 acres are designated for *High Density Residential* (R-5) development. The proposal will slightly modify the location of the R-4 and R-5 lands but will maintain the same overall acreage of each, thereby resulting in no plan or land use changes that would trigger further documentation of compliance with the Transportation Planning Rule. The land is located within the City's Urban Growth Boundary but outside City limits, and the submittal of the master plan allows finalization of an annexation agreement that will formally bring these lands into the City.



Figure 1. Site vicinity map. Source: Deschutes County DIAL.

This site is included in the Northwest Area Plan (NAP) that was prepared in August 2007 as a supplement to the City's Transportation System Plan. The purpose of the plan was to identify general land use designations and future zoning to be incorporated as part of future annexation efforts. This plan established the anticipated amounts and character of residential, commercial, and employment lands, and was also intended to identify financing strategies. Implementation of the plan was intended to be expedited if plans were consistent with the NAP framework, as the subarea was adopted as an element of the City's Comprehensive Plan.

The NAP, in Figure 2, shows street extensions through the site to include NW Spruce Avenue, a new east-west street north of NW Spruce Avenue and a new north-south street west of NW Northwest Way. The NAP also includes a plan for proposed trail corridors through the site as shown in Figure 3. This shows a proposed off-street trail adjacent to the Central Oregon Irrigation District (COID) canals in the northeast corner of the site that would connect in the future to the Dry Canyon Park and trail system to the east of the site.



Figure 2. Northwest Area Plan Zoning Designations



Figure 3. Northwest Area Plan Trail Corridors.

In 2020 the City adopted an updated Transportation System Plan, which was developed with the intent of planning for these and other surrounding Area Plan lands. The land use assumptions that dictate future travel demands were prepared by ODOT's Transportation Planning and Analysis Unit (TPAU) based on forecast population and employment data provided by the City. Within this model, the subject property is located within Transportation Analysis Zone 617. As shown in Figure 4, this zone extends south of Spruce Avenue and north to Upas Avenue, encompassing not just the subject property but additional lands south of Spruce Avenue. All of these lands within TAZ 617 were designated for high-growth with residential uses in the City's long-range transportation planning, serving a population of 1,048 persons within 322.5 households by 2040.

The 457 housing units planned within this Master Plan, which are consistent with the City's zoning and density requirements, will exceed the total growth assumed for this TAZ while comprising 66 percent of the land. With 457 housing units comprising two-thirds of the TAZ will result in more than double the assumed density identified within the City's Transportation System Plan located within this area.



Figure 4. City of Redmond Transportation Analysis Zone (TAZ) map used in preparing forecast travel demand estimates for the City's 2020 Transportation System Plan.

During the development of the travel forecasts within the TSP process the low assumed density for the subject TAZ and surrounding areas were raised with City staff and the consultant team, to ensure that infrastructure planning adequately accounted for area growth. Correspondence from the City showed that while the growth was much lower than anticipated, the NAP lands were still one of the highest-growth areas of the City.

Part of the reason for this discrepancy is that the population and employment projections for Redmond were prepared in 2015 and were based on 2010 census and economic conditions, with population and jobs allocated to Deschutes County (and the City of Redmond) through Portland State University (PSU). This modeling forecast population growth of 1.8% between 2015 and 2035, with growth slowing to 1.6% annually from 2035 to 2040. Review of the City's population trends shows that by 2021 Redmond had already reached 35,582 persons¹, which was not expected to be reached until 2029. Despite the City adopting its TSP in 2020 (when Redmond's population had already reached 33,274 persons per the 2020 census) the growth forecasts that serve as the land use basis for the Transportation System Plan were not reviewed or updated². *See attached land use correspondence.* Our project team coordinated with City of Redmond staff to confirm that development at the allowable and anticipated density, which was higher

¹ REDI information shows a 2021 population of 36,122 persons, and a 2022 population of 37,566 persons.

² September 4, 2019 Land Use Correspondence (see attachments)

than the City's assumptions, would not require any type of modifications to the City's Transportation System Plan.

PROPOSED DEVELOPMENT PLAN

The proposed development plan for the property will slightly revise the location but maintains the acreage of the R-3, R-4, and R-5 zoning designations. The preliminary plans include a net density of 10.54 dwelling units per acre, with approximately 457 total units. While the specific unit counts may vary slightly as the project moves through the final design layout (or changes in product mix due to market conditions), this housing mix is currently broken down to include the following:

- 175 single-family detached residential units (38%)
- 182 attached cottage/townhome units (40%)
- 100 apartment units (22%)

The preliminary site layout is provided in Figure 5 illustrating the circulation and access plan for these lands. As shown, this plan is consistent with the NAP and includes placement of the higher-density lands along the NW Northwest Way corridor, with reducing density toward the west, and buffers between this property and the surrounding lands. Parks lands surround the adjacent tax lot on the north side of the site, and additional parks and green space are interspersed throughout the development.

The streets are laid out in a grid pattern with two proposed north-south streets (30th Street and 31st Street) connecting NW Upas Avenue to NW Quince Avenue. NW Spruce Avenue, an east-west street, will be built through the center of the site connecting to NW Northwest Way on the east edge of the site and stubbed to the west to connect to future development. NW Quince Avenue will be improved along the site frontage and will provide east-west connectivity.

The northern frontage is located along NW Upas Avenue, which is currently a rural road that is under Deschutes County ownership. Based on research prepared by the team, while DIAL does not indicate that the road is within a public ROW, the ROW was established while Upas Avenue was still within Crook County, despite the adjacent properties owning to the centerline of the road. Before the extension of NW Northwest Way, the alignment of the corridor made a left-turn onto Upas Avenue and a right-turn west of the property to continue north. The 60-foot ROW established with this earlier alignment provides the corridor within a public easement from the property east to NW Northwest Way.

With the rural design of NW Upas Avenue, the incomplete frontage east of the project, and the location of the intersection on a horizontal curve the project proposes gating the new subdivision connections to the alignment, and providing the City of Redmond a fee in-lieu payment for improvements. This will allow the uses served by Upas Avenue to remain unaffected by the project, with future annexation and improvements completed as part of a broader effort. In the interim, emergency access will be available through the gates. In addition to the fee in-lieu, standard ROW dedications will occur 30-feet south of the roadway centerline, relinquishing ownership to the centerline.

A trail system is included throughout the site connecting the neighborhood parks to the NW 30th Street, NW Northwest Way, and NW Spruce Avenue trail corridors. On the east side of NW Northwest Way the trail system extends east along NW Spruce Avenue, and connects through the adjacent Dry Canyon subdivision to the Dry Canyon Trail. These trail alignments generally conform with those shown in the NAP, providing the same connectivity as was envisioned for these lands.

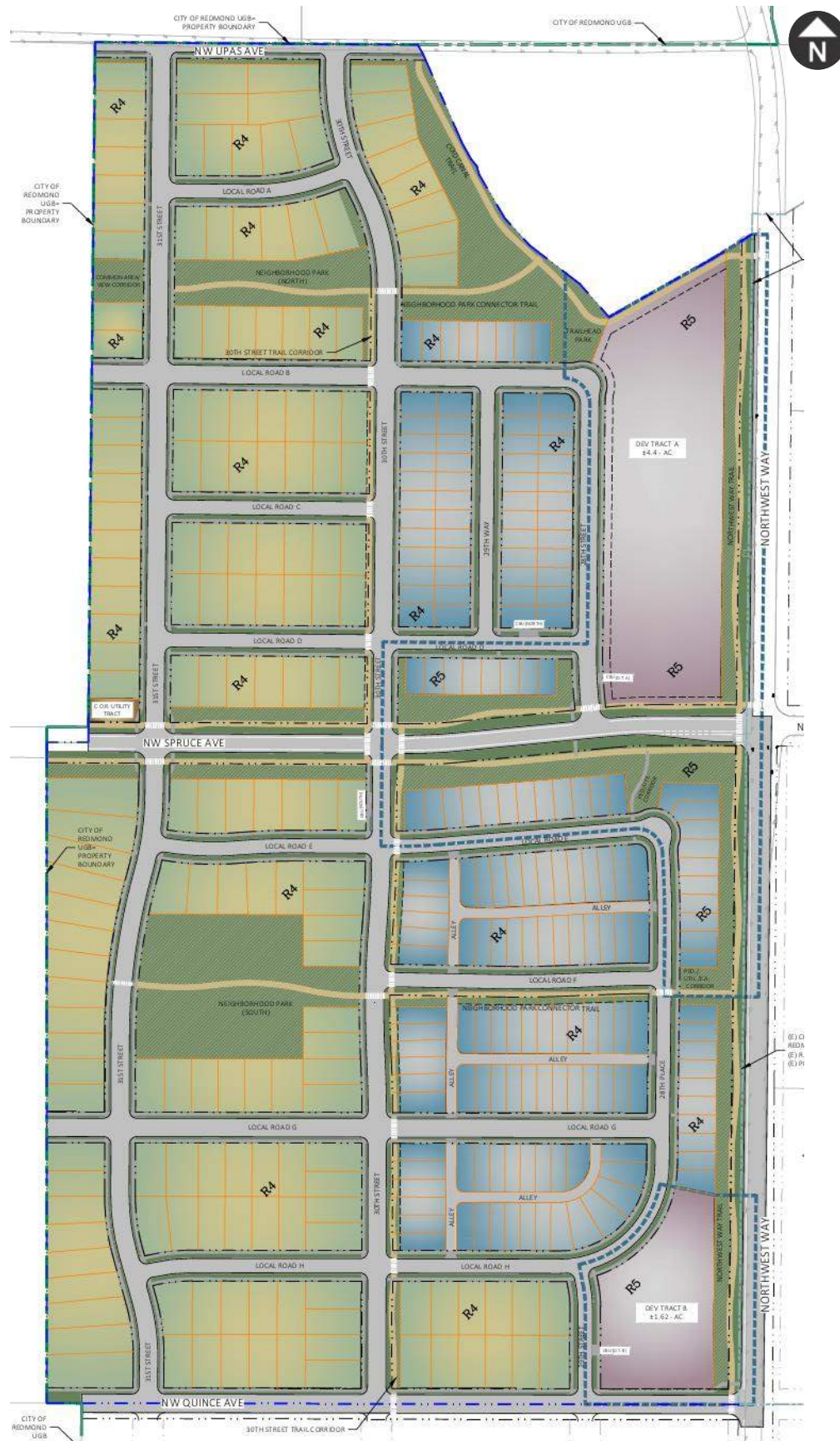


Figure 5. Preliminary site plan. Source: Know Ledge Engineering, LLC dated 6/16/2023.

Vehicular access to the development will be provided by NW Spruce Avenue, NW Quince Avenue, and NW Upas Avenue (following improvements of the road and annexation into the City of Redmond). Each of these accesses will be reliant on NW Northwest Way.

EXISTING TRANSPORTATION FACILITIES

The primary transportation corridors in the site vicinity include Northwest Way, NW 27th Street, NW Maple Avenue, and NW 6th Street. The site will extend NW Spruce Avenue as a Collector, and has frontage along the rural Upas Avenue corridor. The functional classification of the surrounding transportation corridors is illustrated in Figure 6.

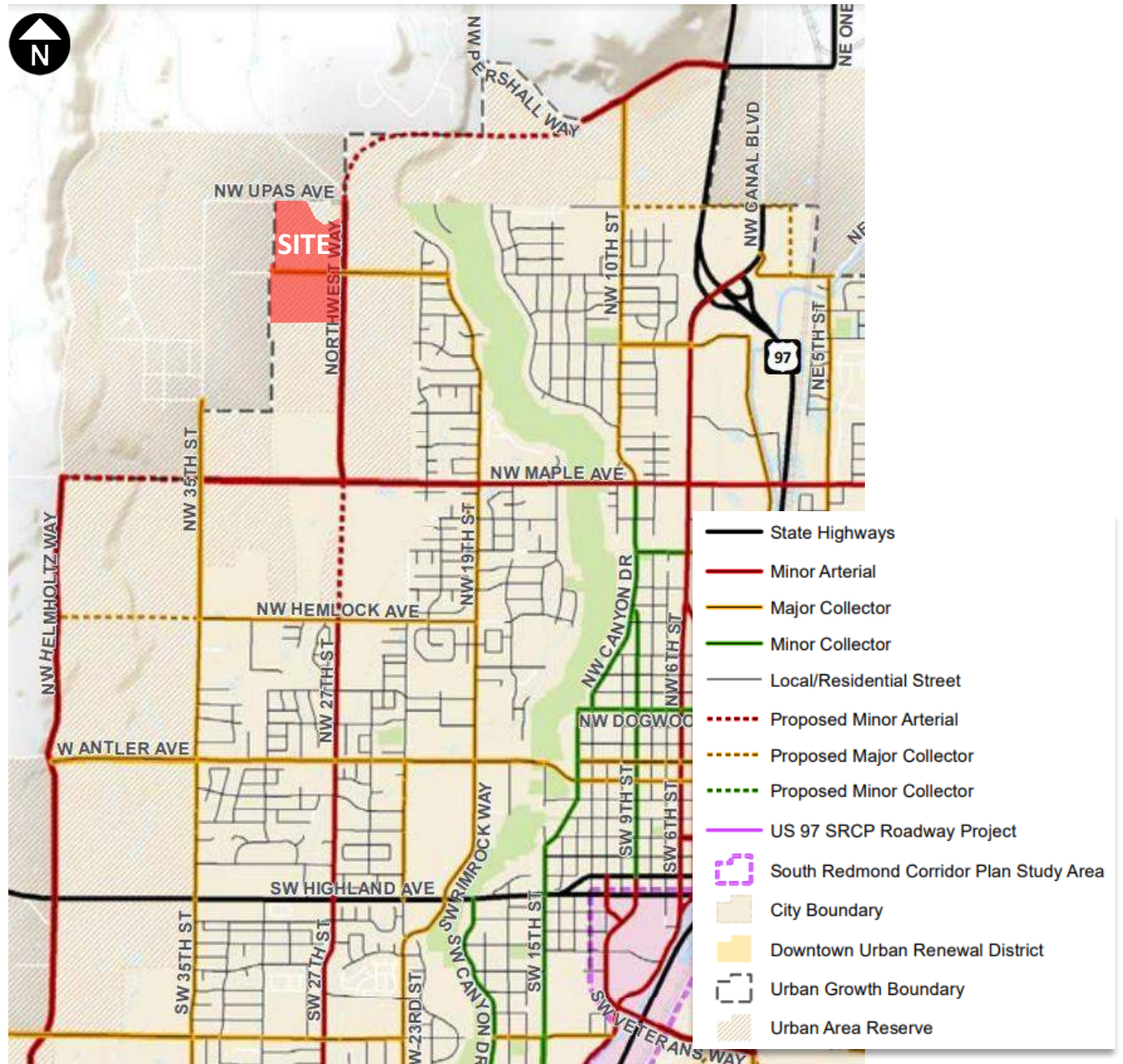


Figure 6. Functional Classification Map.

Source: Redmond Transportation System Plan Dated: December 2020

Further descriptions of the characteristics of the primary roadways supporting the proposed development are included below:

- Northwest Way is classified as a *Minor Arterial* and is located along the east frontage of the site. It extends north beyond the City limits connecting to other streets that provide a route to Terrebonne and northern connections to US 97. It currently terminates to the south at NW Maple Avenue. Figure 6 shows future plans to connect Northwest Way to the north to Pershall Way, which would provide an alternate route to US 97 at the O'Neil Highway Junction. Figure 6 also shows the extension of Northwest Way to the south to connect with SW 27th Street at NE Hemlock Avenue, connecting the site south to OR 126 (SW Highland Avenue). This latter project is included in the City's five-year Capital Improvement Plan for Fiscal Year 2025-2026.

Northwest Way has a varying ROW width ranging from 60- to 80-feet. As part of development, an additional 20 feet of right-of-way will be dedicated along the site frontage based on its classification as a *Minor Arterial*, bringing the fully improved sections to the 100-foot ROW standard. Along the site frontage, Northwest Way has two travel lanes and bicycle lanes. A striped median is provided along a portion of the site frontage. Frontage improvements for the Dry Canyon PUD have been built along the east side of the road that include curb, landscape strip, and a paved multi-use path. Frontage improvements for Hayden Homes will include the construction of a similar multi-use pathway, and completing any remaining frontage improvements (that are also conditioned on the adjacent Dry Canyon PUD). This streetscape design continues to follow the modifications to the original NAP that were approved with Dry Canyon.

- SW 27th Street is classified as a *Minor Arterial* and provides a north-south connection from NW Hemlock Avenue south to OR 126 (SW Highland Avenue). It has a three-lane cross-section with continuous bicycle lanes and sidewalks on both sides of the roadway, with the exception of one gap on the west side of the road between W Antler Avenue and SW Cascade Avenue (which appears to be encumbered by a strip of privately owned land and an irrigation canal). The posted speed is 35 miles per hour.
- NW Maple Avenue, a *Minor Arterial*, provides a major east-west connection from the site across the Dry Canyon to US 97 and the downtown area. Its cross-section varies between two and three lanes with bicycle lanes on both sides of the road. It will be one of the main routes for vehicles to and from the site, and the subject property and surrounding lands are heavily reliant on the corridor pending the completion of the NW 27th Street extension. Continuous sidewalks are provided east of NW 19th Street. The posted speed varies between 35 and 45 mph.
- NW 6th Street, a *Minor Arterial*, provides a connection to the US 97/Canal Boulevard interchange to the north and a route to downtown Redmond and additional connections to US 97 to the south. North of NW Jackpine Avenue, NW 6th Street has a five-lane cross-section to serve two-way traffic. The cross-section includes continuous bicycle lanes and sidewalks adjacent to newer developments. The posted speed is 40 mph. South of NW Jackpine Avenue, NW 6th Street and NW 5th Street form a one-way couplet, with NW 6th Street serving southbound vehicles and NW 5th Street serving northbound vehicles. Both roads provide two travel lanes, on-street parking, and sidewalks. Bicycle lanes are provided north of W Antler Avenue, and both roads are marked with "sharrows" or shared lane markings south of W Antler Avenue. The posted speed ranges from 25 to 35 mph.
- NW Upas Avenue is a *Local Street* on the north edge of the site. It connects to NW 35th Street to the west and terminates at a T-intersection with Northwest Way. It is a two-lane rural road with gravel shoulders, and while it contains a public access easement property ownership extends to the roadway centerline. The road is currently managed by Deschutes County, but our

understanding is that this is not a County-maintained road (and would presumably be maintained by a local road district).

- NW Spruce Avenue is classified as a *Major Collector*. West of Northwest Way, it is currently a narrow gravel road. Additional right-of-way will be dedicated adjacent to NW Spruce Avenue to provide a total of 80-feet of right-of-way. This roadway will also be upgraded to *Major Collector* standards with two travel lanes, buffered bicycle lanes, and multiuse pathways within a wide greenspace. East of Northwest Way, it was upgraded with the Dry Canyon PUD to a full urban cross section with two travel lanes, bicycle lanes, landscape strip and property tight sidewalks on the south and a multiuse pathway on the north. East of the Dry Canyon development, the cross-section changes to two travel lanes with on-street parking and curb tight sidewalks.

As summarized, Northwest Way, NW Upas Avenue, and NW Spruce Avenue all require additional right-of-way dedication and urban street improvements to meet street standards based on their functional classification.

EXISTING PEDESTRIAN AND CYCLIST NETWORK

The existing pedestrian network is somewhat limited on the major roadways within this developing portion of the City. Streets, sidewalks, and bicycle lanes are being extended as development occurs. The development of the Dry Canyon PUD provides a sidewalk connection to the neighborhoods to the east. Bicycle lanes are provided on Northwest Way that connect to NW Maple Avenue and other portions of the City. The primary pedestrian and bicycle facilities are located within the Dry Canyon, and trail connections are being developed to tie into this Citywide network.

TRANSIT SERVICE

The City of Redmond does not have its own fixed route transit system within City boundaries. On-demand transit services are provided to the site with 24-hour advance notice, though this service is limited to weekdays between 5:30 a.m. and 7:00 p.m. Mondays through Fridays. Redmond implemented deviated flex-routes in the summer of 2022 using Statewide Transportation Improvement Fund (STIF), and pending successful bus driver recruitment plans to permanently implement this service in 2023. The route extends along NW Maple Avenue, but it is likely that the route will be modified as transit-supportive densities are achieved within the NAP lands. Figures 7 and 8 illustrate the routes for this service, with Figure 8 illustrating the Northwest Redmond route nearer to the site.



Figure 7. Southeast Redmond Flex Route.



Figure 8. Northwest Redmond Flex Route.

Regional (inter-community) transit service is provided through Cascades East Transit's *Community Connector* system, with service to Madras, Prineville, Sisters, and Bend. Buses travel to and from Bend at approximately 90-minute headways, with service only provided on weekdays. This service connects from the Redmond Hub on Kalama Boulevard to US 97/Robal near the Cascade Village Shopping Center and the Hawthorne Station. Service to Madras, Sisters, and Prineville is more limited throughout the day, and generally only available during the commute periods.

Cascades East Transit has suspended all bus fares other than along its recreational routes that serve Mt Bachelor and the Ride the River shuttle.

RIDE SHARING

Ride sharing is available within Central Oregon through online providers such as UBER and LYFT. The service boundary for LYFT is more limited, providing on-demand service throughout Bend, Redmond, Prineville, Terrebonne, and Sisters. Uber service boundaries include Warm Springs, Madras, and La Pine. These on-demand ride sharing services are available all days and hours, with ride costs based on distances.

ROADWAY SAFETY

This section provides a safety review of the transportation infrastructure serving the proposed development based on review of historical crash records submitted through the DMV and maintained by ODOT, as well as field review of area conditions, roadway and intersection geometrics, and available sight lines.

HISTORICAL CRASH REVIEW

Historical crash records were obtained through the ODOT Crash Analysis and Reporting System (CARS) from the period between January 2016 and December 2020. This reflects the most recent five-year period available. Crashes that are required to be reported during this period include those that involve at least one motor vehicle, involve any level of personal injury, or that result in \$1,500 or more in property damage before 2018 or in \$2,500 or more in property damage after 2018.

Table 1 summarizes the number and severity of reported crashes at each of the study area intersections. The table also provides a crash rate per million entering vehicles, which is often used to assess whether a geometric or traffic control deficiency is present when the crash rate is greater than 1.0 per million entering vehicles. ODOT also provides crash rates separated by control type and the number of approaches, which better distinguish between varying intersection forms and are provided for reference.

Table 1. Crash Summary

Intersection	Number of Crashes	Crash Severity			Crash Rate per MEV	ODOT 90 th % Rate
		Fatal	Injury	Non-Injury		
1: Northwest Way / NW Upas Ave	3	0	3	0	0.57	3ST: 0.475 Rural
2: Northwest Way / NW Spruce Ave	0	0	0	0	0.00	4ST: 1.080 Rural
3: Northwest Way / NW Quince Ave						
4: NW 22 nd St / NW Quince Ave	0	0	0	0	0.00	3ST: 0.293 Urban
5: NW 19 th St / NW Quince Ave	0	0	0	0	0.00	3ST: 0.293 Urban
6: Northwest Way / NW Maple Ave	0	0	0	0	0.00	3ST: 0.475 Rural
7: NW 22 nd St / NW Maple Ave	1	0	1	0	0.11	4ST: 0.408 Urban
8: NW 19 th St / NW Maple Ave	10	0	5	5	0.41	n/a
9: NW 9 th St / NW Maple Ave	6	0	4	2	0.24	n/a
10: NW 6 th St / NW Quince Ave	17	0	11	6	0.54	4SG: 0.860 Urban
11: NW 6 th St / NW Maple Ave	28	0	17	11	0.64	4SG: 0.860 Urban
12: NW 6 th St / NW Kingwood Ave	4	1	1	2	0.13	4ST: 0.408 Urban
13: NW 27 th St / NW Hemlock Ave	0	0	0	0	0.00	n/a
14: NW 27 th St / W Antler Ave	1	0	1	0	0.07	n/a
15: SW 27 th St / SW Highland Ave	23	0	14	9	0.59	4SG: 0.860 Urban

(Continued)

Table 1 (Continued). Crash Summary

Intersection	Number of Crashes	Crash Severity			Crash Rate per MEV	ODOT 90 th % Rate
		Fatal	Injury	Non-Injury		
16: NW 19 th St – SW Rimrock Way / W Antler Ave	12	0	7	5	0.40	4SG: 0.860 <i>Urban</i>
17: SW Canyon Dr / SW Black Butte Blvd	1	0	0	1	0.07	4ST: 0.408 <i>Urban</i>
18: SW 9 th St / SW Black Butte Blvd	5	0	1	4	0.43	4ST: 0.408 <i>Urban</i>
19: NW 5 th St / NW Dogwood Ave	4	0	2	2	0.21	n/a
20: NW 5 th St / W Antler Ave	8	0	4	4	0.38	n/a
21: SW 6 th St / SW Black Butte Blvd	9	0	4	5	0.40	n/a
22: SW 5 th St / SW Black Butte Blvd	9	0	4	5	0.41	n/a
23: SW 5 th St / SW Evergreen Ave	15	0	8	7	0.57	n/a

4ST: Four-legged minor stop-controlled, 3ST: Three-legged minor stop-controlled, 4SG: Four-legged signalized, 3SG: Three-legged signalized

As shown in Table 1, all of the intersections experienced a crash rate less than 1.0 crashes per million entering vehicles and all of the study intersections operate below ODOT's 90th percentile crash rates with the exception of the Northwest Way/NW Upas Avenue, SW 9th Street/SW Black Butte Boulevard, US 97/SW Glacier Avenue-SW Highland Avenue, and US 97/SW Veterans Way intersections. Table 2 summarizes the types of collisions that occurred at the study intersections, and additional details on the high-crash locations are provided below.

Table 2. Reported Collision Types (January 2016 through December 2020)

Intersection	Rear-End	Turning	Angle	Fixed-Object	Pedestrian	Sideswipe	Other
1: Northwest Way / NW Upas Ave	0	1	0	2	0	0	0
7: NW 22 nd St / NW Maple Ave	0	0	1	0	0	0	0
8: NW 19 th St / NW Maple Ave	4	3	2	0	0	0	1 <i>head-on</i>
9: NW 9 th St / NW Maple Ave	2	3	1	0	0	0	0

(Continued)

Table 2 (Continued). Reported Collision Types (January 2016 through December 2020)

Intersection	Rear-End	Turning	Angle	Fixed-Object	Pedestrian	Sideswipe	Other
10: NW 6 th St / NW Quince Ave	2	12	3	0	0	0	0
11: NW 6 th St / NW Maple Ave	11	15	2	0	0	0	0
12: NW 6 th St / NW Kingwood Ave	0	1	1	0	1	1	0
14: NW 27 th St / W Antler Ave	0	0	1	0	0	0	0
15: SW 27 th St / SW Highland Ave	13	6	4	0	0	0	0
16: NW 19 th St – SW Rimrock Way / W Antler Ave	7	4	1	0	0	0	0
17: SW Canyon Dr / SW Black Butte Blvd	0	0	1	0	0	0	0
18: SW 9 th St / SW Black Butte Blvd	1	0	4	0	0	0	0
19: NW 5 th St / NW Dogwood Ave	0	4	0	0	0	0	0
20: NW 5 th St / W Antler Ave	1	5	2	0	0	0	0
21: SW 6 th St / SW Black Butte Blvd	4	2	2	0	0	1	0
22: SW 5 th St / SW Black Butte Blvd	3	4	1	0	0	1	0
23: SW 5 th St / SW Evergreen Ave	1	4	6	0	1	2	1 <i>parking</i>

Northwest Way / NW Upas Avenue

The Northwest Way/NW Upas Avenue intersection had three crashes reported over the five-year review period, but as a low-volume rural intersection this provides a high overall crash rate. This T-intersection is located near a curve in the road on Northwest Way that may be a contributing factor. One of the crashes was a turning collision between an eastbound right-turning vehicle and a southbound through vehicle. The other two crashes were fixed object collisions. One occurred when it was a clear, dry day. The other occurred when there was ice on the road. Both were headed in the northbound direction and resulted in injuries.

Field review conducted at the intersection in May 2023 noted that adjacent vegetation along the curve reduces sight lines in both directions. Based on the location of fencing it was unclear whether this vegetation was located within the public right-of-way or on private property. Regardless, as the property

is owned by Hayden Homes it is recommended that the applicant coordinate with the City to limb these trees to a height of eight-feet and/or remove vegetation within the right-of-way. Figures 9 and 10 illustrate the current sight lines at the intersection.



Figure 9. NW Northwest Way/NW Upas Avenue facing north.

Photo date: May 12, 2023



Figure 10. NW Northwest Way/NW Upas Avenue facing south.

Photo date: May 12, 2023

NW 6th Street / NW Kingwood Avenue

Four crashes were reported at the NW 6th Street/NW Kingwood Avenue, which resulted in a crash rate of 0.13. One collision resulted in a pedestrian fatality. The crash records indicate that the pedestrian crossed at an unmarked location approximately 240 feet north of the intersection. This crash occurred during the evening when street lamps were on and the pedestrian was wearing clothing that was not visible in the dark. The crash records indicate the crash was a hit-and-run collision and the driver was under the influence.

No patterns were observed among the three other crashes at this intersection, which included a turning, angle, and sideswipe collision. The angle collision resulted in injury, while the other crashes resulted in property damage only. The turning collision occurred when the road surface was wet, while the other crashes occurred during dry conditions.

SW 27th Street / SW Highland Avenue (OR 126)

Twenty-three crashes were reported at the signalized SW 27th Street/SW Highland Avenue intersection over the five-year review period. This resulted in a crash rate of 0.55, which is *less* than the statewide 90th percentile rate for other four-legged signalized intersections in the urban area. This intersection was listed within ODOT's 2017 and 2018 Safety Priority Index System in the top 85th percentile of crash locations to the top 90th percentile. The intersection is the first traffic signal encountered for eastbound motorists traveling from Sisters.

- Of the 23 reported crashes, the majority (13) were rear-end collisions of which six occurred in the westbound direction, four in the eastbound direction, two in the southbound direction, and one in the northbound direction. Five of these crashes resulted in property damage only, and the rest of the rear-end crashes resulted in some level of personal injury.
- Six turning collisions were reported at this intersection. Three involved a conflict between a northbound left-turn vehicle and a southbound through vehicle. This movement is controlled by protected-permissive phasing with flashing yellow arrow signal indications. The crash records indicate the left-turning drivers “did not yield right-of-way.” No other patterns were observed among these crashes. All occurred on clear days when the road surface was dry.
- Four of the crashes were angle collisions. Two of the crashes occurred on dry days and resulted in injuries. One crash occurred during icy weather and resulted in property damage only, and one occurred on a wet day also resulting in property damage. No pattern was observed among the crashes.

It was noted in field review that the intersection includes retroreflective backplates on the signal indications and overhead illumination, but no “Signal Ahead” warning signs are present on the highway approaches, and the 35 to 45 mile per hour speed transition occurs east of the signal. As area urbanization occurs (along with curbing, completion of sidewalks, and replacement of guardrail if possible), the point of the speed transition should be shifted west. A specific cross-section for Highland Avenue was not provided within the City’s Transportation System Plan, but development of a suitable urban section that meets ODOT and City acceptance would be useful in shaping future corridor improvement projects.

SW 9th Street / SW Black Butte Boulevard

Five crashes were reported at the SW 9th Street/SW Black Butte Boulevard intersection. This resulted in a crash rate of 0.44, which is higher than the 90th percentile statewide rate for similar intersections. Four of the crashes were angle collisions, three of which involved a northbound through vehicle. Three of these crashes occurred on Sunday, at varying times. Two occurred during the daylight, one at dusk, and one at dark. One resulted in injuries, the rest resulted only in property damage. All occurred during dry surface conditions.

SW 9th Street/SW Black Butte Boulevard is a two-way stop-controlled intersection with the north and south movements controlled by stop signs. SW 9th Street is a straight two-lane roadway with on-street parking. In the northbound direction, SW 9th Street also has stop signs two blocks south at W Deschutes Avenue. Three of the crash records indicate that drivers passed the stop sign. In review of historical imagery it appears that the crosswalk design was modified within the crash analysis period, with solid transverse bars now present on the stop-controlled approach (see Figure 11). It is recommended the City continue to monitor crashes at this location to evaluate whether further treatments are necessary to draw attention to the traffic control at this intersection. It appeared that clear sight lines were available to the stop signs for north-south travelers.



Figure 11. Current crosswalk design at SW Black Butte Boulevard/SW 9th Street.

Photo date: May 12, 2023

The fifth crash at this intersection was a rear-end collision in the eastbound direction, resulting only in property damage.

INTERSECTION SIGHT DISTANCE

The site is proposed to connect to the existing street network at two new locations on Northwest Way and, when improved, two new locations on NW Upas Avenue. Sight distance information and requirements are based on the standard reference *A Policy on Geometric Design of Highways and Streets, 7th Edition* published by the American Association of State Highway and Transportation Officials (AASHTO) in 2018, commonly referred to as the *Green Book*.

Intersection Sight Triangles

For minor-street stop-control intersections, intersection sight triangles are based on guidance cited within Conditions B1 (left-turn from minor road) and B2 (right-turn from minor road) of the *Green Book*. All distances are measured from a vertex point located 14.5 feet from the major-road travel way along the center of the approaching travel lane, accounting for comfortable positioning distance from the travel way (6.5 feet) and the distance from the front of the vehicle to the driver eye (8.0 feet). The assumed eye height is 3.5 feet above the departing road for passenger vehicles. The object height is also 3.5 feet above the major road, providing enough space on the approaching vehicle to recognize it. Based on a posted speed of 55 mph (which we anticipate will be reduced as additional streetscape improvements are completed along the corridor) and mostly level terrain, Figure 12 illustrates the recommended

intersection sight distance measurements required at the roadway connections and any new access points to Northwest Way. The figure shows the sight distance for a three-lane cross-section on Northwest Way, which will be completed with the frontage improvements (and is already present at NW Spruce Avenue).

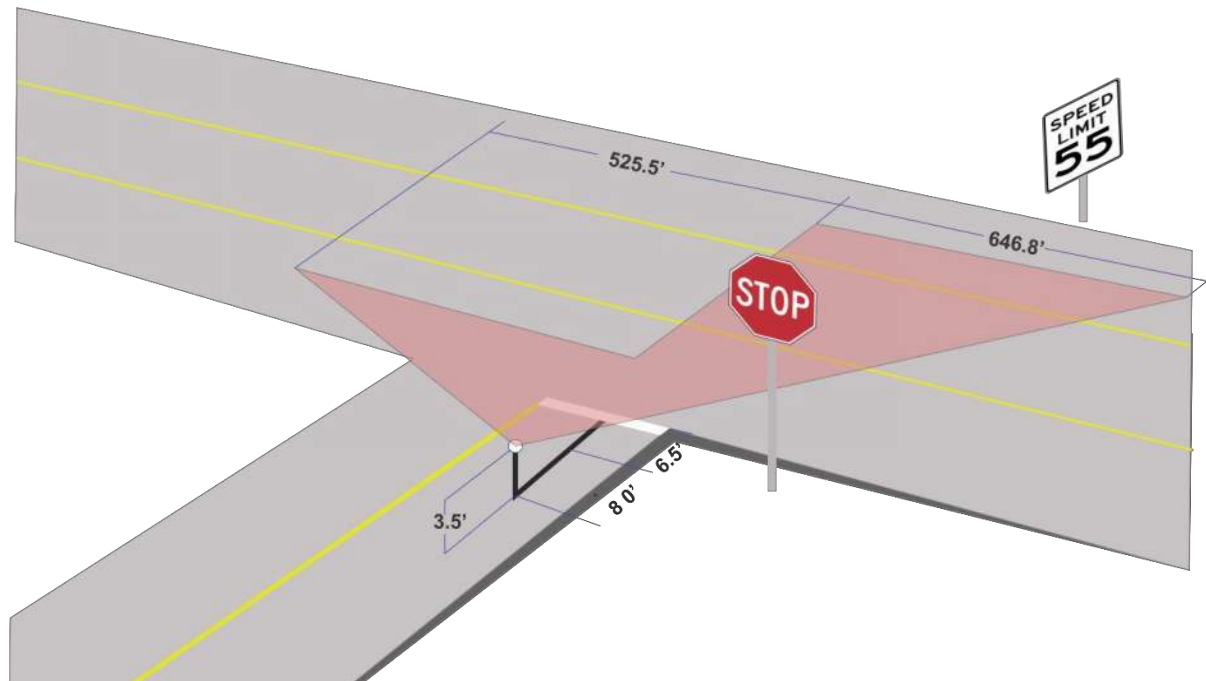


Figure 12. Recommended Intersection Sight Distance Dimensions on Northwest Way for Three-Lane Cross-Section.

Figure 13 illustrates the recommended intersection sight distance measurements for the new street connections to the existing rural two-lane section of NW Upas Avenue. These measurements are based on a statutory rural speed of 55 mph and level terrain. Similar to Northwest Way, it is expected that speeds will be reduced on this corridor when the road is annexed into the City, the gated connections are made public, and urban development occurs that provides curbing, sidewalks, and other urban streetscape elements that improve is to the City's local street standards. Accordingly, these sight distance dimensions are largely irrelevant to the proposed project, as the connections will be gated until urban improvements are made. This will require reconstruction of the existing roadway, and with its straight and flat alignment no obstructions are identified that would preclude these connections.

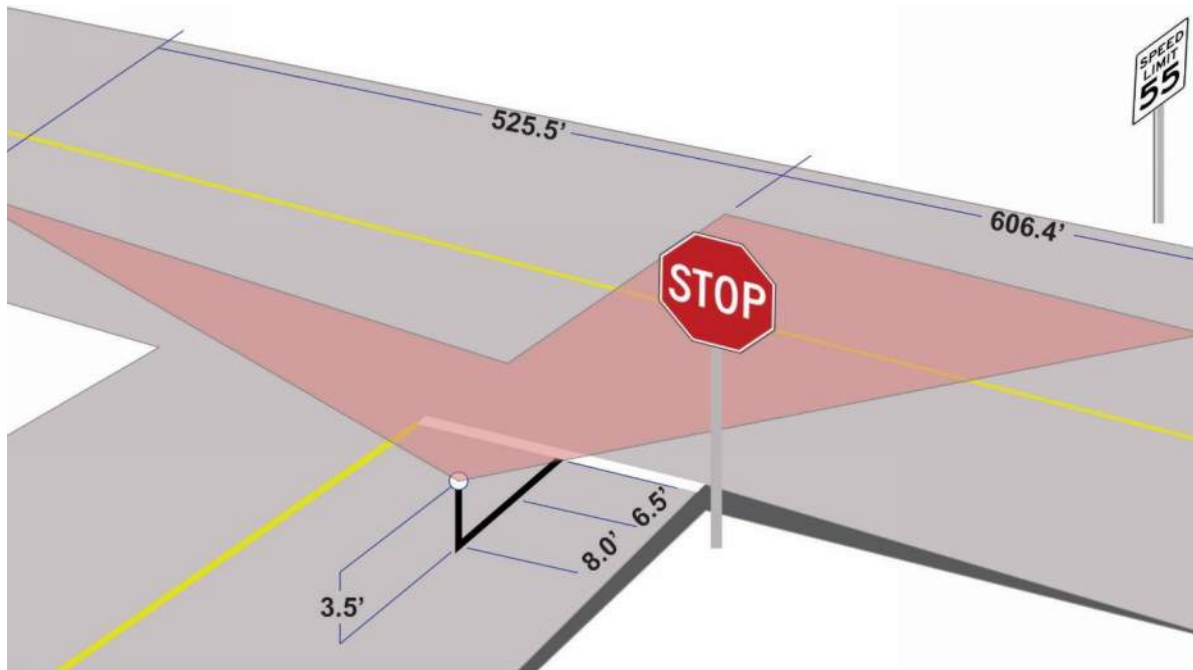


Figure 13. Recommended [Rural] Intersection Sight Distance Dimensions on NW Upas Avenue
(Note: not applicable following annexation and urban improvements)

The locations of the existing and future accesses were visited to ensure that no sight distance obstructions were present that would prevent these recommended sight distances from being achieved. Field review along Northwest Way noted the rural two-lane section that is present today, with a horizontal curve present north of NW Upas Avenue. As shown in Figure 9, sight distance to the north of NW Upas Avenue can be achieved with the trimming of vegetation, as the treeline to the north makes it difficult to view southbound vehicles (this property is under Hayden Homes' ownership). Figure 10 of the safety section of this report shows sight distance to the south of NW Upas Avenue (and Figure 9 of this section shows sight lines to the north) where there is adequate sight distance available with the removal of the roadside obstructions.

Review of the planned Spruce Avenue connection shows clear sight lines in all directions, with clear views toward the north, south, and due west in alignment with the Dry Canyon PUD (see Figures 14 through 16). Field review of views along the planned NW Quince Avenue connection to NW Northwest Way also showed clear and unobstructed sight lines in both directions. This portion of NW Northwest Way is straight and flat, and located farther from the curve near Upas Avenue.



Figure 14. View from NW Spruce Avenue facing north along Northwest Way.



Figure 15. View from NW Spruce Avenue facing south along Northwest Way.



Figure 16. View from NW Spruce Avenue facing east toward the Dry Canyon PUD.

TRAFFIC OPERATIONS

This section of the report describes the operational impact of the site on the transportation system.

TRIP GENERATION ESTIMATES

Trip generation estimates were prepared based on the preliminary site layout prepared by the project team. These estimates remain preliminary and are subject to more detailed site layout review; the specific density may vary slightly throughout the development review process, particularly within the multifamily component when specific plans detailing the layout, unit count, and number of bedrooms per unit are known.

Trip generation estimates were prepared based on national data within the Institute of Transportation Engineers' standard reference *Trip Generation, 11th Edition*. This reference provides cord-on-area trip generation surveys of similar uses throughout the US. For the subject site located on the west edge of Redmond the *General Urban/Suburban* data has been applied. When the Northwest Area Plan density and uses are fully implemented these trip rates are expected to reflect additional interaction between the residential, employment, and commercial uses.

Based on the different unit types, the following ITE land use classifications were applied to the housing products:

- Single-family detached units: (ITE Land Use 210) - *A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.*
- Attached Cottage/Townhome Units: (ITE Land Use 215) - *Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space. The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).*
- Apartment units: (ITE Land Use 220) - *Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.*
 - *A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.*
 - *A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.*
 - *A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.*
 - *A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.*

Using these land use descriptions as summarized above, Table 3 provides the estimated trip generation for the proposed development. Note that ITE's average rate equations were applied to each of the housing types.

Table 3. Trip Generation Estimates (ITE 11th Edition, General Urban/Suburban Area Classification)

ITE Land Use	ITE Code	Size (Units)	Weekday Daily Trips	Weekday PM Peak Hour		
				Total	In	Out
Single Family Detached Housing <i>ITE Trip Rate</i>	210	175 Units	1,650 <i>(9.43/Unit)</i>	165 <i>(0.94/Unit)</i>	104 63%	61 37%
Single Family Attached Housing <i>ITE Trip Rate</i>	215	182 Units	1,310 <i>(7.20/Unit)</i>	104 <i>(0.57/Unit)</i>	61 57%	43 43%
Multifamily Housing (Low-Rise) <i>ITE Trip Rate</i>	220	100 Units	674 <i>(6.74/Unit)</i>	51 <i>(0.51/Unit)</i>	32 63%	19 37%
Total		457 Units	3,634	320	197	123

Table 3 shows that the residential development will produce about 3,634 trips on a weekday daily basis, with approximately 320 trips during the weekday p.m. peak hour. This translates to about 4.2 weekday p.m. peak hour trips per gross acre. The Redmond Development Code requires a Transportation Impact Analysis for all new developments expected to generate more than 20 weekday p.m. peak hour trip ends. Therefore, a traffic study is required for this development as presented within this document.

TRIP DISTRIBUTION AND TRIP ASSIGNMENT

The distribution pattern for residential uses on the northwest side of the City will largely be oriented toward the south and east as shown in Figure 17. Travel will primarily occur along Maple Avenue to cross the Dry Canyon until the Northwest Way extension is completed south of the site (or the planned connection of NW Northwest Way to the O'Neil Highway). While the southern extension of NW Northwest Way is anticipated within the next five years (as described below), the northern connection is neither funded nor identified within the City's near- or mid-term plans.

The City's 5-year Capital Improvement Plan includes an arterial connection of NW 27th Street between NW Maple Avenue and NW Hemlock Avenue in Fiscal Year 2025 to 2026. While vehicles are unable to drive this route today, this connection will be in place at the time of buildout (and to support early project phases), which is anticipated to be in 2030. Vehicles heading south and east of the site will be using NW 27th Street, NW Maple Avenue, and W Antler Avenue to head to their destinations.

The proposed access to the development will align with NW Spruce Avenue, which extends through the Dry Canyon PUD and connects to NW Maple Avenue via NW 19th Street and NW 22nd Street. However, the travel time due south along NW Northwest Way would be much quicker and more direct, and it is unlikely that many residents would use this route unless their destination was within the neighborhoods to the east. Accordingly, the distribution pattern does not include this as a likely travel route. While there may be some limited volume of trips that use this route, the level of travel would be negligible.

City of Redmond Code requires that the Traffic Study Area include all site-access points to the public roadway system via either a driveway or private roadway, along with Collector and Arterial intersections affected by 25 or more weekday p.m. peak hour trips. This requires the analysis of an extensive number of intersections throughout the City. Longer-term, as area roads are developed and more supportive uses are provided within proximity of the site, trips will be better internalized, and trips that do extend from the Northwest Area Plan boundaries will become more dispersed on the system. For analysis purposes, Figure 18 illustrates the impacts of full site build-out could create on the current system.

STUDY INTERSECTIONS

Redmond Development Code 8.3035.8B requires the TIA to study:

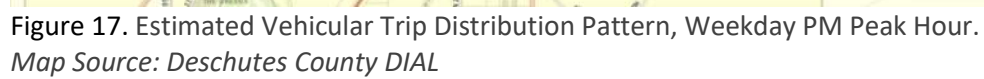
1. All site access intersections
2. Nearest intersecting collector or arterial street upstream and downstream of the development.
3. Any other collector or arterial street intersection that would experience an increase of 25 additional peak hour trips.
4. Additional intersections requested by staff.

Many of the trips are expected to utilize intersections under ODOT jurisdiction. ODOT analysis criteria considers 50 or more weekday p.m. peak hour trips as its threshold of significance, as State facilities serve much higher traffic volumes than City streets.

Based on the above requirements the following intersections are required for inclusion as *study intersections* within this TIA:

- Intersection 1: Northwest Way/NW Upas Avenue (*site access*)
- Intersection 2: Northwest Way/NW Spruce Avenue (*site access*)

- Intersection 3: Northwest Way/NW Quince Avenue (*site access*)
- Intersection 6: Northwest Way/NW Maple Avenue (*nearest arterial downstream from the development, >25 new trips*)
- Intersection 8: NW 19th Street/NW Maple Avenue (*>25 new trips*)
- Intersection 9: NW 9th Street/NW Maple Avenue (*>25 new trips*)
- Intersection 10: NW 6th Street/NW Quince Avenue (*>25 new trips*)
- Intersection 11: NW 6th Street/NW Maple Avenue (*>25 new trips*)
- Intersection 12: NW 6th Street/NW Kingwood Avenue (*>25 new trips*)
- Intersection 13: NW 27th Street/NW Hemlock Avenue (*>25 new trips*)
- Intersection 14: NW 27th Street/W Antler Avenue (*>25 new trips*)
- Intersection 15: SW 27th Street/SW Highland Avenue (*>50 new trips*)
- Intersection 16: NW 19th Street – SW Rimrock Way/W Antler Avenue (*>25 new trips*)
- Intersection 17: SW Canyon Drive/SW Black Butte Boulevard (*>25 new trips*)
- Intersection 18: SW 9th Street/SW Black Butte Boulevard (*>25 new trips*)
- Intersection 19: NW 5th Street/NW Dogwood Avenue (*>25 new trips*)
- Intersection 20: NW 5th Street/W Antler Avenue (*>25 new trips*)



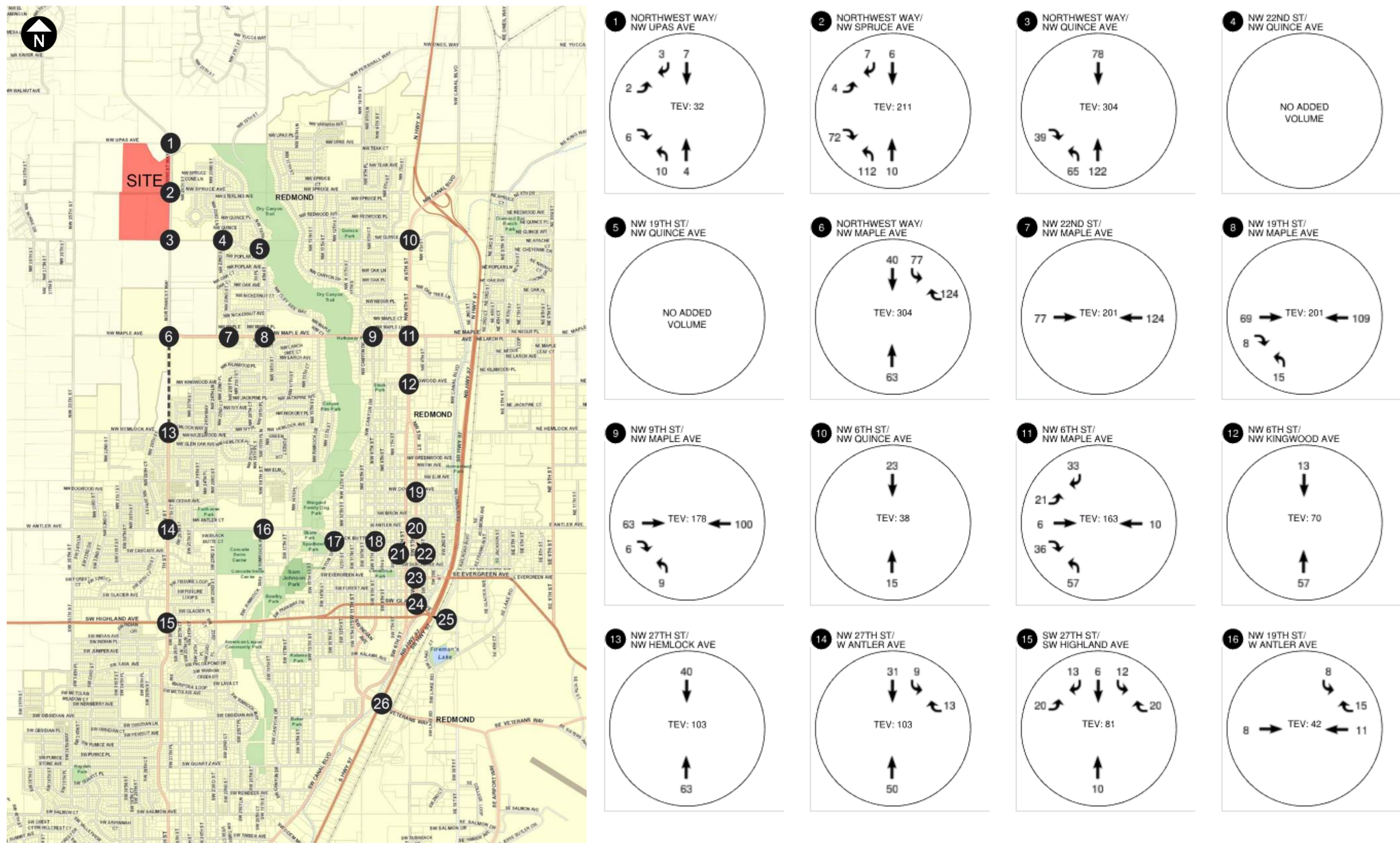


Figure 18. Hayden Homes Estimated Vehicular Trip Assignment, Weekday PM Peak Hour.
Map Source: Deschutes County DIAL

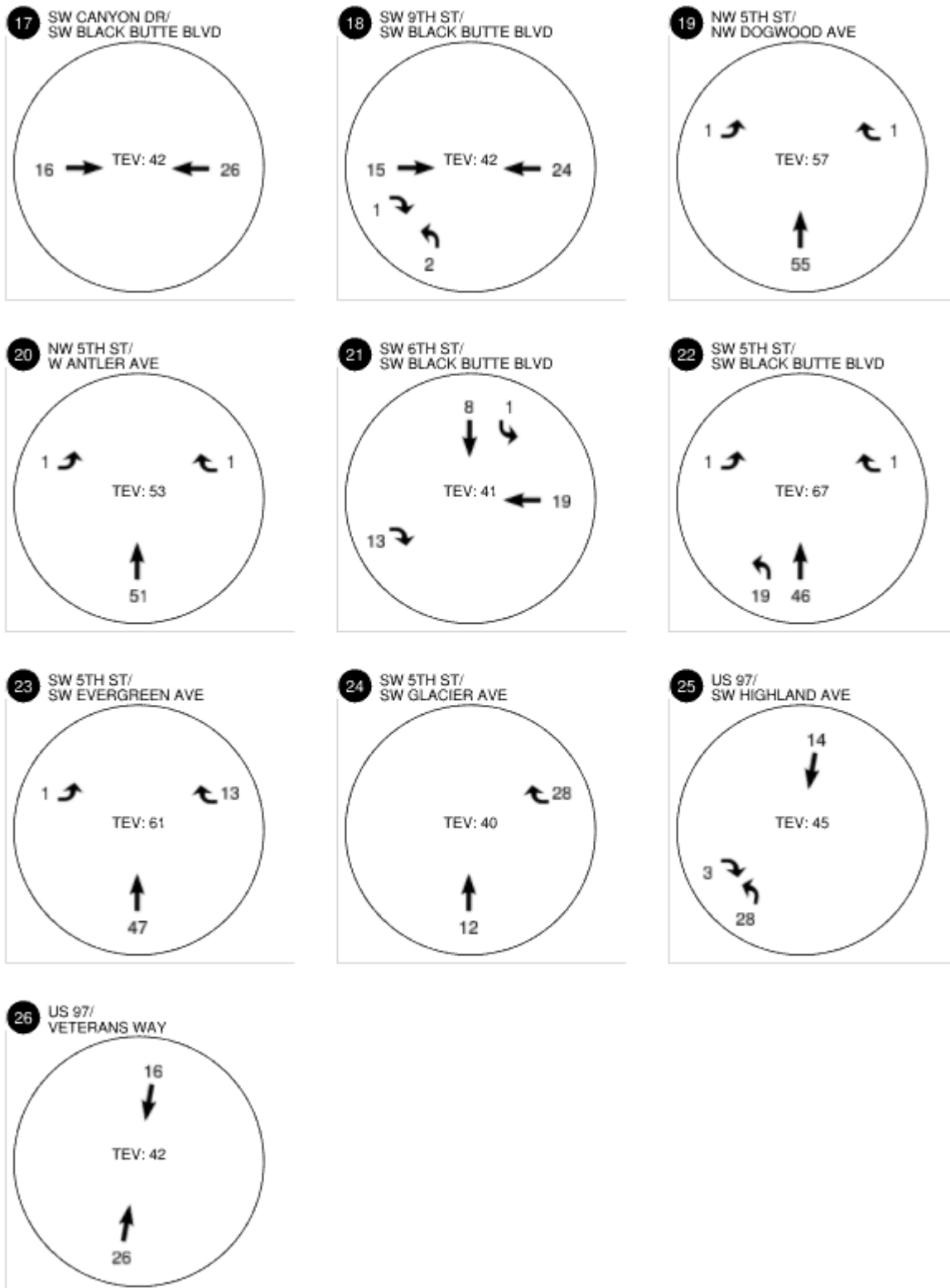


Figure 18 (cont.) Hayden Homes Estimated Vehicular Trip Assignment, Weekday PM Peak Hour.

- Intersection 21: SW 6th Street/SW Black Butte Boulevard (>25 new trips)
- Intersection 22: SW 5th Street/SW Black Butte Boulevard (>25 new trips)
- Intersection 23: SW 5th Street/SW Evergreen Avenue (>25 new trips)

Per City Council direction, the analysis for the Hayden Homes development has been coordinated with the Vollertsen Master Plan to the southeast, as generally shown in Figure 1. The TIA considers the cumulative impact of both projects on the system to develop a coordinated mitigation trigger for any locations unable to support build-out of both projects. Figure 19 depicts the trip assignment from the Vollertsen Master Plan and the study intersections for this study have been expanded to include those also required for study in the Vollertsen Master Plan development, which are listed below:

- Intersection 4: NW 22nd Street/NW Quince Avenue *Vollertsen Master Plan study Intersection*
- Intersection 5: NW 19th Street/NW Quince Avenue *(Vollertsen Master Plan study Intersection)*
- Intersection 7: NW 22nd Street/NW Maple Avenue *(Vollertsen Master Plan study Intersection)*

As noted above, while these intersections are included within this analysis the trip impacts of the Hayden Homes subdivision to the neighborhoods to the east is negligible.

ANALYSIS YEARS

Redmond Development Code 8.2815(6) requires operational analysis of the following year conditions:

- Year 2023 – Existing conditions
- Year 2030 – Estimated completion year
- Year 2035 – Five-year forecast beyond final phase

OPERATIONAL ANALYSIS

Traffic operations analysis were prepared using Synchro 10 software and implementing the Highway Capacity Manual 6th Edition operations methods for signalized and stop-controlled intersections. All traffic operations within this report reflect peak fifteen-minute conditions.

The City of Redmond Development Code 8.2815(1) contains the City's operational requirements for intersections. Performance standards in the City of Redmond vary based on intersection control type as summarized below:

- LOS "E" or better during the peak fifteen minutes of the peak hours of the average weekday.
- Unsignalized minor street approaches should operate with a volume-to-capacity ratio of 0.90 or less and with a 95th percentile queue of less than four vehicles during the peak hour.

The SW 27th Street/SW Highland Avenue intersection is under the jurisdiction of ODOT. Intersections under ODOT jurisdiction require compliance with the Oregon Highway Plan mobility targets based on Action 1F. Table 6 of the OHP summarizes the relevant ODOT mobility targets outside the Portland Metropolitan area; ODOT performance standards vary by location of the facility (urban vs. rural), State Functional Classification, and posted speed. Based on this table, intersections on OR 126 generally have a target v/c ratio less than or equal to 0.80 in the City of Redmond.

Study intersections, traffic control, roadway jurisdiction, and operational standards/mobility targets throughout the study area are summarized in Table 4.

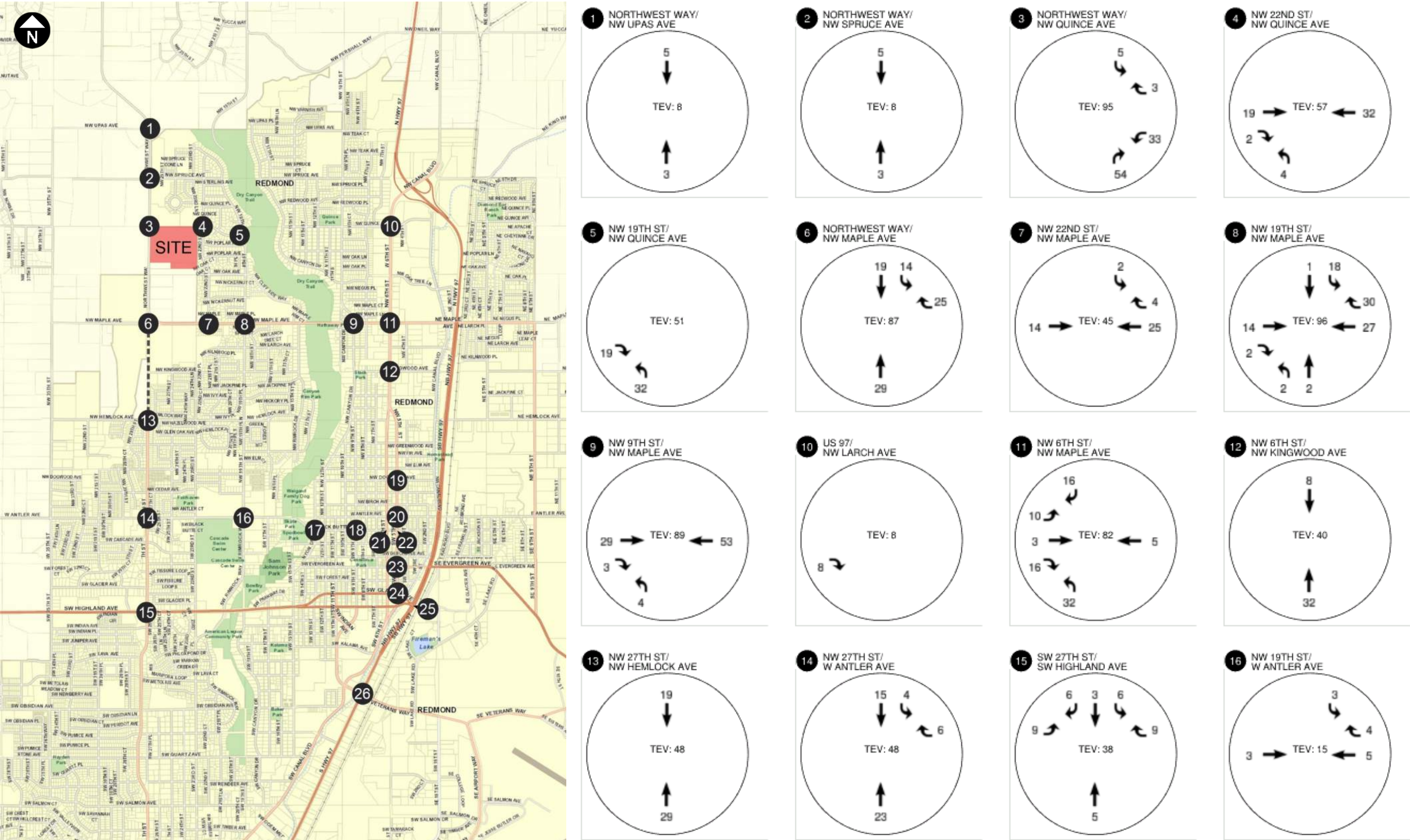


Figure 19. Vollertsen Master Plan Estimated Vehicular Trip Assignment, Weekday PM Peak Hour.
Map Source: Deschutes County DIAL

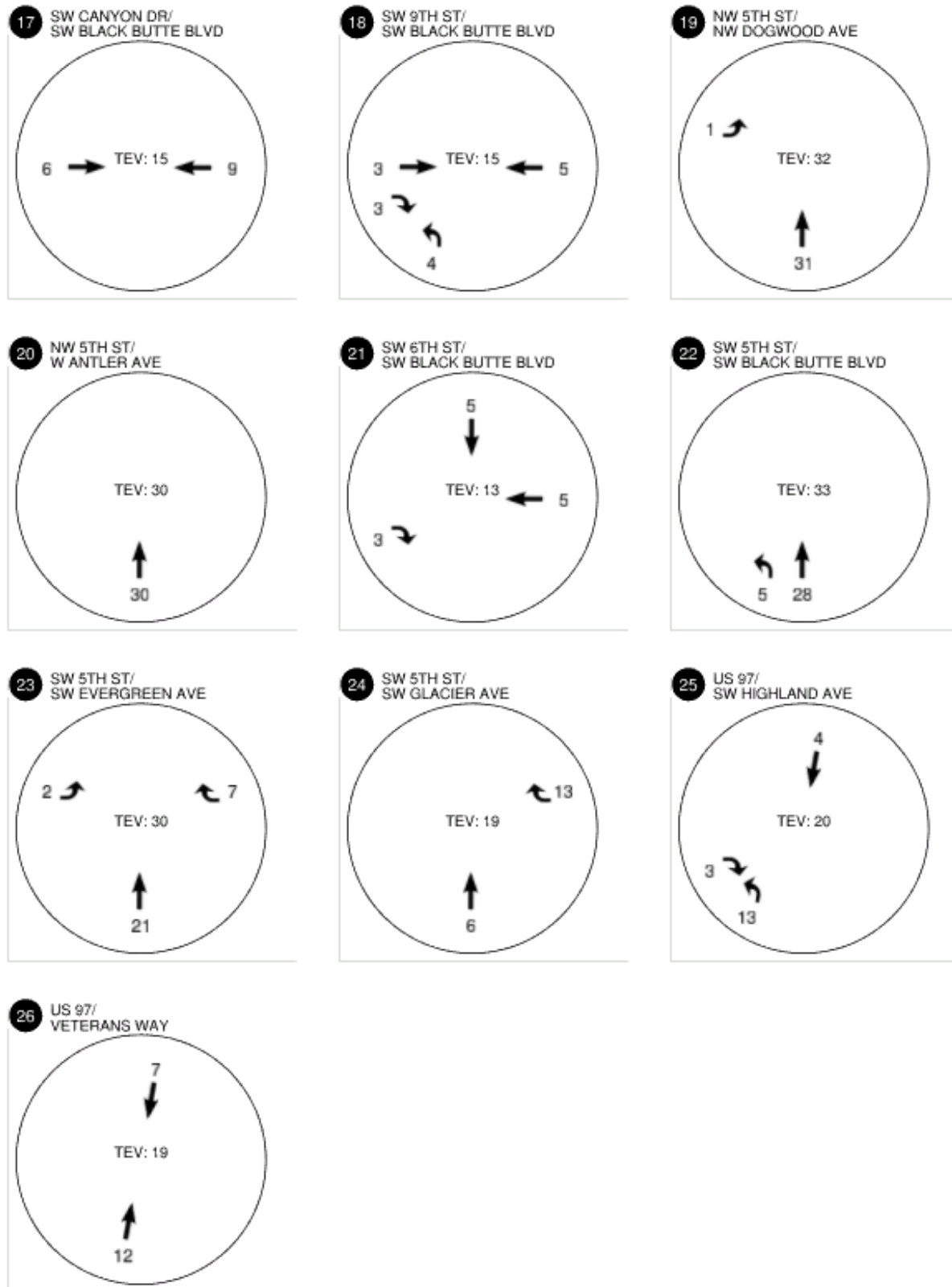


Figure 19 (cont.) Vollertsen Master Plan Estimated Vehicular Trip Assignment, Weekday PM Peak Hour.

Table 4. Study Area Intersection Operational Standards and Mobility Targets

Intersection	Traffic Control	Jurisdiction	Performance/ Mobility Standard
1: Northwest Way / NW Upas Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
2: Northwest Way / NW Spruce Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
3: Northwest Way / NW Quince Ave	Future Minor-Street Stop-Control ¹	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
4: NW 22 nd St / NW Quince Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
5: NW 19 th St / NW Quince Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
6: Northwest Way / NW Maple Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
7: NW 22 nd St / NW Maple Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
8: NW 19 th St / NW Maple Ave	All-Way Stop-Control	City of Redmond	LOS "E" or better
9: NW 9 th St / NW Maple Ave	All-Way Stop-Control	City of Redmond	LOS "E" or better
10: NW 6 th St / NW Quince Ave	Signalized	City of Redmond	LOS "E" or better
11: NW 6 th St / NW Maple Ave	Signalized	City of Redmond	LOS "E" or better
12: NW 6 th St / NW Kingwood Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
13: NW 27 th St / NW Hemlock Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
14: NW 27 th St / W Antler Ave	All-Way Stop-Control	City of Redmond	LOS "E" or better
15: SW 27 th St / SW Highland Ave	Signalized	ODOT	$v/c \leq 0.80$
16: NW 19 th St – SW Rimrock Way / W Antler Ave	Signalized	City of Redmond	LOS "E" or better
17: SW Canyon Dr / SW Black Butte Blvd	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
18: SW 9 th St / SW Black Butte Blvd	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
19: NW 5 th St / NW Dogwood Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft
20: NW 5 th St / W Antler Ave	Minor-Street Stop-Control	City of Redmond	$v/c < 0.90$ 95 th % Queue < 100 ft

Table 4 (Continued). Study Area Intersection Operational Standards and Mobility Targets

Intersection	Traffic Control	Jurisdiction	Performance/ Mobility Standard
21: SW 6 th St / SW Black Butte Blvd	Signalized	City of Redmond	LOS “E” or better
22: SW 5 th St / SW Black Butte Blvd	Signalized	City of Redmond	LOS “E” or better
23: SW 5 th St / SW Evergreen Ave	Signalized	City of Redmond	LOS “E” or better

¹Stop-control assumed to be on NW Quince Ave

Year 2023 Existing Traffic Conditions

The existing year 2023 traffic conditions reflect the current operations throughout the study area during the weekday p.m. peak hour. This analysis is used to calibrate operational models to field conditions, and in conjunction with historical safety information, is intended to help understand and prioritize transportation system improvement needs.

The traffic counts used in the existing conditions analysis were collected on February 10, 2022, May 5, 2022, and April 27, 2023. A 1.2-percent growth rate was applied to each of the 2022 traffic counts to approximate year 2023 traffic volumes. This growth rate is based on the volume forecasts in the City’s Transportation System Plan for multiple intersections around the study area and is further discussed in “Growth Forecasts” within this report.

Unlike the City of Redmond, ODOT requires analysis of conditions during the 30th Highest Hourly conditions, which generally reflects mid-summer volumes. To account for the seasonal variations at the SW 27th Street/SW Highland Avenue (OR 126) intersection, ODOT’s Automatic Traffic Recorder at Station 09-021 (located on OR 126, 1.38 miles west of SW Helmholtz Way) was reviewed for the past five years. It showed that the volumes on SW Highland Avenue collected in April should be increased by 23% to reflect peak July conditions. The April counts do reflect conditions with area schools in operation.

Figure 20 depicts the existing and seasonally adjusted 2023 traffic volumes applied within the existing conditions analysis. Results of the existing conditions analysis are presented in Table 5. This shows that all the study area intersections are currently meeting City and State standards with the exception of the traffic signal at SW 27th Street/SW Highland Avenue which operates with a v/c ratio nearing capacity. The all-way stop-controlled intersection at NW 9th Street and NW Maple Avenue meets the City’s Level of Service Standard for overall intersection delay. However, the westbound leg exceeds the City’s LOS standard and movement capacity. This intersection is planned for signalization this year.

Year 2030 Background Traffic Conditions

Background traffic conditions are presented to provide the basis for comparison to “with-site” conditions. This provides an understanding of area transportation needs that are attributable to the proposed Hayden Homes development and Vollertsen Master Plan. These conditions consider the regional traffic growth and specific approved developments.

Table 5. Summary of Existing Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	Acceptable?
1: Northwest Way / NW Upas Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS B	EB LR: 10.2	EB LR: 0.02	EB LR: <25 ft	Yes
2: Northwest Way / NW Spruce Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LR: LOS B	WB LR: 10.3	WB LR: 0.02	WB LR: 25 ft	Yes
3: Northwest Way / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft					
4: NW 22 nd St / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS A	WB LTR: 8.3	WB LTR: 0.01	WB LTR: <25 ft	Yes
5: NW 19 th St / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS A	EB LR: 8.5	EB LR: 0.01	EB LR: <25 ft	Yes
6: Northwest Way / NW Maple Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS B	EB LR: 10.3	EB LR: 0.16	WB LR: 25 ft	Yes
7: NW 22 nd St / NW Maple Ave	v/c < 0.90 95 th % Queue < 100 ft	SB LTR: LOS B	SB LTR: 12.4	SB LTR: 0.04	SB LTR: 25 ft	Yes
8: NW 19 th St / NW Maple Ave	LOS “E” or better	Overall: LOS C NB LT: LOS B NB R: LOS C EB L: LOS B EB TR: LOS C WB L: LOS D WB TR: LOS C SB LTR: LOS B	Overall: 18.1 NB LT: 14.2 NB R: 16.1 EB L: 10.8 EB TR: 15.9 WB L: 26.1 WB TR: 16.1 SB LTR: 13.5	NB LT: 0.34 NB R: 0.51 EB L: 0.01 EB TR: 0.46 WB L: 0.71 WB TR: 0.51 SB LTR: 0.23	NB LT: 50 ft NB R: 75 ft EB L: <25 ft EB TR: 75 ft WB L: 150 ft WB TR: 75 ft SB LTR: 25 ft	Yes
9: NW 9 th St / NW Maple Ave	LOS “E” or better	Overall: LOS E NB LTR: LOS B EB L: LOS B EB TR: LOS D WB L: LOS A WB TR: LOS F SB LTR: LOS B	Overall: 47.2 NB LTR: 12.9 EB L: 11.4 EB TR: 32.2 WB L: 9.8 WB TR: 80.4 SB LTR: 13.6	NB LTR: 0.22 EB L: 0.19 EB TR: 0.83 WB L: 0.03 WB TR: 1.06 SB LTR: 0.33	NB LTR: 25 ft EB L: 25 ft EB TR: 225 ft WB L: 25 ft WB TR: 450 ft SB LTR: 50 ft	Yes
10: NW 6 th St / NW Quince Ave	LOS “E” or better	LOS B	13.0	0.36	EB L: 55 ft EB TR: 45 ft WB L: 55 ft WB TR: 50 ft NB L: 45 ft NB T: 90 ft NB R: 15 ft SB L: 25 ft SB TR: 95 ft	Yes
11: NW 6 th St / NW Maple Ave	LOS “E” or better	LOS B	19.3	0.65	EB L: 75 ft EB T: 105 ft EB R: 35 ft WB L: 100 ft WB TR: 145 ft NB L: 115 ft NB TR: 165 ft SB L: 30 ft SB TR: 130 ft	Yes
12: NW 6 th St / NW Kingwood Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS E	WB LTR: 35.7	WB LTR: 0.22	WB LTR: 25 ft	Yes
13: NW 27 th St / NW Hemlock Ave	v/c < 0.90 95 th % Queue < 100 ft	NB L: LOS B	NB L: 10.2	NB L: 0.02	NB L: 25 ft	Yes
14: NW 27 th St / W Antler Ave	LOS “E” or better	Overall: LOS B NB L: LOS A NB TR: LOS B EB L: LOS A EB TR: LOS A WB L: LOS B WB TR: LOS B SB L: LOS A SB TR: LOS B	Overall: 10.7 NB L: 9.9 NB TR: 11.9 EB L: 9.7 EB TR: 10.0 WB L: 10.7 WB TR: 10.4 SB L: 9.5 SB TR: 10.3	NB L: 0.11 NB TR: 0.39 EB L: 0.03 EB TR: 0.20 WB L: 0.19 WB TR: 0.25 SB L: 0.02 SB TR: 0.20	NB L: 25 ft NB TR: 50 ft EB L: 25 ft EB TR: 25 ft WB L: 25 ft WB TR: 25 ft SB L: 25 ft SB TR: 25 ft	Yes
15: SW 27 th St / SW Highland Ave	v/c ≤ 0.80	LOS D	48.1	0.94	EB L: 35 ft EB TR: 675 ft WB L: 95 ft WB TR: 790 ft NB L: 65 ft NB TR: 345 ft SB L: 125 ft SB TR: 170 ft	No
16: NW 19 th St – SW Rimrock Way / W Antler Ave	LOS “E” or better	LOS B	15.8	0.54	EB L: 45 ft EB TR: 105 ft WB L: 40 ft WB T: 140 ft WB R: 35 ft NB L: 40 ft NB TR: 315 ft SB L: 40 ft SB TR: 245 ft	Yes
17: SW Canyon Dr / SW Black Butte Blvd	v/c < 0.90 95 th % Queue < 100 ft	NB LTR: LOS C	NB LTR: 19.4	NB LTR: 0.32	NB LTR: 50 ft	Yes
18: SW 9 th St / SW Black Butte Blvd	v/c < 0.90 95 th % Queue < 100 ft	NB LTR: LOS C	NB LTR: 15.8	NB LTR: 0.24	NB LTR: 25 ft	Yes

(Continued)

Table 5 (Continued). Summary of Existing Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	Acceptable?
19: NW 5 th St / NW Dogwood Ave	v/c < 0.90 95 th % Queue < 100 ft	WB TR: LOS C	WB TR: 19.2	WB TR: 0.19	WB TR: 25 ft	Yes
20: NW 5 th St / W Antler Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LT: LOS D	EB LT: 25.7	EB LT: 0.31	EB LT: 50 ft	Yes
21: SW 6 th St / SW Black Butte Blvd	LOS “E” or better	LOS A	8.8	0.44	EB TR: 60 ft WB LT: 75 ft SB LTR: 105 ft	Yes
22: SW 5 th St / SW Black Butte Blvd	LOS “E” or better	LOS B	11.6	0.45	EB LT: 60 ft WB TR: 30 ft NB LTR: 195 ft	Yes
23: SW 5 th St / SW Evergreen Ave	LOS “E” or better	LOS B	12.9	0.57	EB LT: 80 ft WB TR: 155 ft NB LTR: 145 ft	Yes

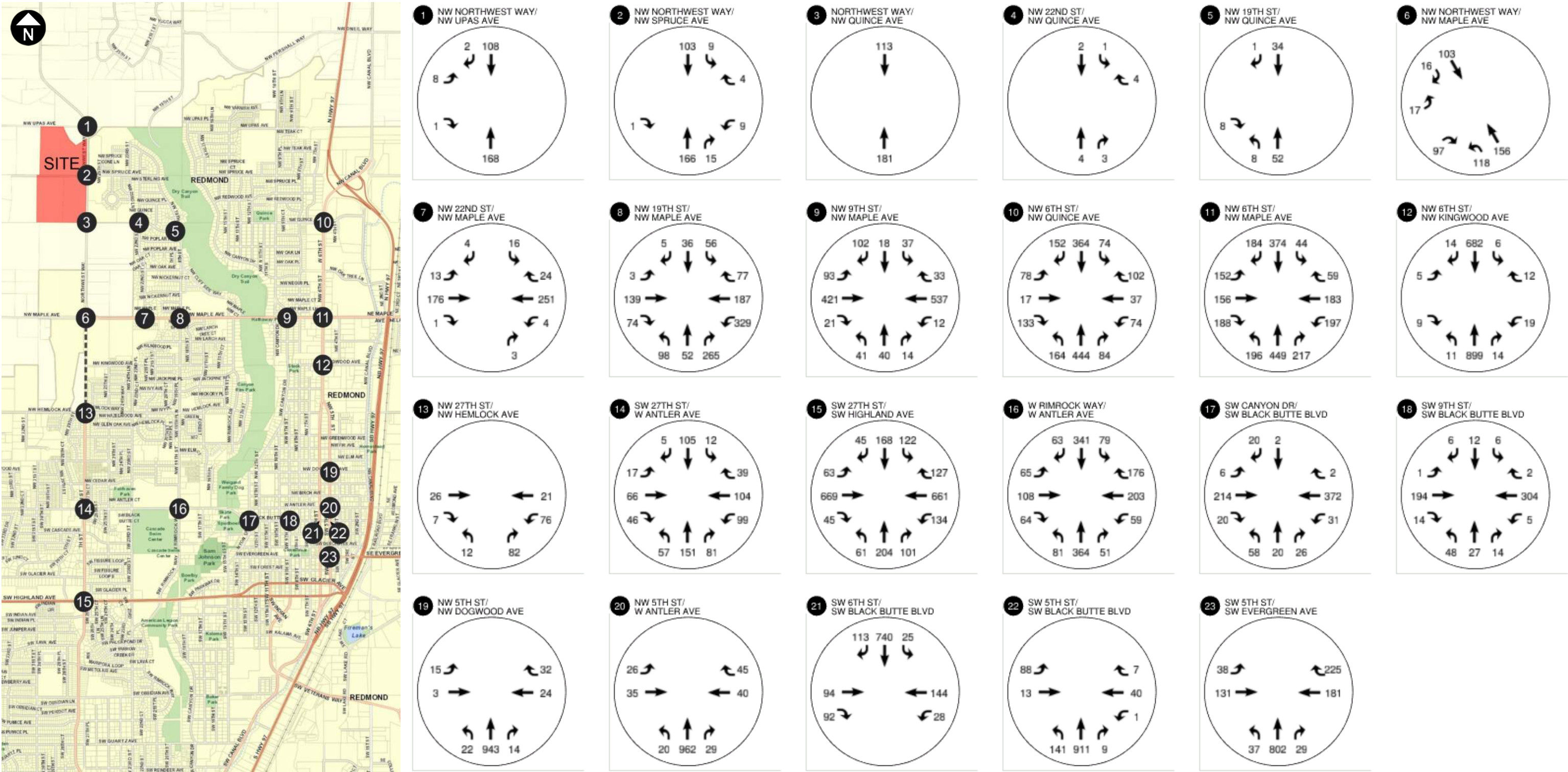


Figure 20. Year 2023 Existing Traffic Volumes, Weekday PM Peak Hour.
Map Source: Deschutes County DIAL

Growth Forecasts

The City's 2020 Transportation System Plan includes existing 2017 and forecast 2040 traffic volumes at major intersections around the City. Nine of these intersections are included within this study and have an annual growth rate ranging from 1.1- to 2.3-percent. The annual growth rates were averaged (as shown in Table 6) and result in an average growth rate of 1.2-percent. As noted earlier within this report, the City's TSP was premised on lower population growth than is currently projected; however, as this TIA also includes planned "in-process" trips with an additive approach, the overall forecasts are likely to be closer to 3% within developing portions of the study area.

Table 6. Forecast Growth (2017 to 2040)

Intersection	Year 2017 Base Entering Volumes Weekday PM Peak Hour	Year 2040 Future Entering Volumes Weekday PM Peak Hour	Annual Growth
5: NW 19 th St / NW Maple Ave	1,245	1,902	1.9%
8: NW 6 th St / NW Maple Ave	2,149	2,689	1.0%
11: NW 27 th St / W Antler Ave	636	900	1.5%
12: SW 27 th St / SW Highland Ave	2,399	3,002	1.0%
13: NW 19 th St – SW Rimrock Way / W Antler Ave	1,626	2,019	0.9%
18: SW 6 th St / SW Black Butte Blvd	965	1,265	1.2%
19: SW 5 th St / SW Black Butte Blvd	995	1,278	1.1%
20: SW 5 th St / SW Evergreen Ave	1,200	1,508	1.0%
21: SW 5 th St / SW Glacier Ave	1,417	1,784	1.0%
Average			1.2%

The year 2030 traffic forecasts for the site were developed by applying the 1.2-percent annual growth rate to the 2023 existing volumes, along with inclusion of approved development trips and funded projects.

Planned and Funded Projects

The City's Five-Year Capital Improvement Plan (CIP) includes multiple projects within the study area. These are assumed to be complete in the future year analysis and are summarized below:

- A new traffic signal was planned for fiscal year 2020/2021 at the NW 9th Street/NW Maple Avenue intersection with an estimated cost of \$500,000. This is now scheduled for construction in 2023.
- A new traffic signal is planned for fiscal year 2023/2024 at the NW 19th Street/NW Maple Avenue intersection (if warranted) with an estimated cost of \$500,000.
- A new roundabout is planned for fiscal year 2023/2024 at the Northwest Way (NW 27th Street)/NW Maple Avenue intersection with an estimated cost of \$3.2 million.
- A new arterial connection of NW 27th Street between NW Maple Avenue and NW Hemlock Avenue is planned in the 2025/2026 timeframe. This project is expected to improve traffic distribution and is estimated to cost nearly \$1.5 million. This connection is expected to change some of the travel patterns in the surrounding area as a more direct route will be available to many motorists through the NW 27th Street connection to SW Highland Avenue. Traffic volumes were adjusted and redistributed accordingly.

No other funded and committed improvements were assumed to be in place by 2030.

Approved Development Trips

While the Transportation System Plan volume forecasts account for anticipated growth, it is not sensitive to the “point” impacts that specific developments can create. Numerous projects were identified throughout the city that are expected to contribute trips through the study area intersections. These include the following:

- *Dry Canyon Village* is a residential development located opposite the site on Northwest Way. It is planned to contain up to 505 units of single-family homes, townhomes, and multifamily homes. Development has been ongoing within this project.
- *Maple Meadows Subdivision* contains a mix of single-family homes, cottage units, and apartments and is located south of NW Maple Avenue and west of NW 23rd Street. Phases 1 through 6 are complete, and trips from phases 7 through 9 were included as in-process trips in the study.
- *Canyon Rim Village Phase 11 Subdivision* is located on the corner of NW 19th Street and NW Hemlock Avenue. It includes 22 single-family homes and a small commercial component.
- *Home Depot Station* is a commercial development located on NW 6th Street south of NW Quince Avenue, south of the carwash. Development has not been initiated.
- *Juniper Canyon Living Center* is a 108-bed long-term patient care facility located west of US 97 on NW Spruce Avenue.
- *Arrive Redmond Apartment Complex* is a 252-unit development located between NW Canal Boulevard and US 97 south of Quince Avenue.
- *121 West Master Plan* is a mixed-use development located north of NW Upas Avenue and along the extension of NW 8th Street.
- *Canyon Trails Subdivision* is a 92-unit subdivision located in the southwest quadrant of the NW 10th Street/NW Pershall Way intersection.
- *Canyon Ridge* is a 220-unit subdivision located on NW Canyon Drive and NW Upas Avenue.
- *Cinder Butte Phase 4* is a subdivision located on NW 10th Street and NW Upas Avenue.
- *Junegrass Meadows Subdivision* is a 24-unit subdivision located at the intersection of NW 10th Street and NW Upas Avenue.

The regional growth was applied to the existing traffic volumes and approved, and pending developments were added to forecast year 2030 “No-Build” conditions within the site vicinity. The resulting volumes are depicted in Figure 21. As the TSP volumes already account for some level of growth within the subject properties, the combination of regional growth and inclusion of approved development trips is expected

to conservatively account for area growth, resulting in travel scenarios that are higher than those within the City's recent TSP.

The analysis results are summarized in Table 7. As shown in Table 7, all of the study intersections are expected to meet standards with the exception of the SW 27th Street/SW Highland Avenue (OR 126) intersection. The demand at this intersection is expected to exceed capacity.

Year 2030 'With Site' Conditions

Year 2030 conditions with the proposed development were prepared by adding the no-build conditions with site generated trips from the Hayden Homes development and Vollertsen Master Plan. The resulting volumes are depicted in Figure 22 and the operational analysis of "with-site" conditions are also summarized in Table 7. As shown in the table, all intersections are expected to meet City and State standards with both developments again with the exception of the SW 27th Street/SW Highland Avenue intersection.

While meeting operational standards, the following issues were noted in the 2030 conditions:

- The NW Maple Avenue/NW 6th Street intersection is operating near its capacity with or without the Vollertsen and Hayden projects
- The northwest Redmond area is heavily reliant on the NW Maple Avenue corridor, with major intersections requiring capacity improvements to support the heavy east-west through demands, even with the planned extension of NW 27th Street.
- There are high westbound approach delays on the NW 6th Street/NW Kingwood Avenue intersection with or without the planned projects, likely associated with demands from the St Charles Campus.
- The NW 27th Street/NW Antler Avenue intersection serves as the junction of two major facilities, and will experience increasingly high delays by 2030 without capacity improvements.

Year 2035 Planning Analysis

Analysis of conditions five years beyond build-out were also assessed to assist with long-range planning efforts. This future scenario was conducted for both the background conditions developed through the application of continued regional growth, and the "With Site" conditions with the addition of site-generated trips from both the Hayden Homes development and Vollertsen Master Plan. The forecast volumes are depicted in Figure 23 and the results of the analysis are summarized in Table 8. As shown in the table, the SW 27th Street/SW Highland Avenue intersection will continue to worsen. Additionally, two other intersections are expected to meet the City's Level of Service standard, but have some operational issues.

- The NW 6th Street/NW Maple Avenue is forecast to operate at capacity in 2035 during the weekday p.m. peak hour.
- The NW 27th Street/W Antler Avenue intersection is expected to meet the City's Level of Service standard for the intersection as a whole. However, the northbound shared through-right lane is expected to operate with high delays and LOS F during the weekday p.m. peak hour.



Figure 21. 2030 Background Traffic Volumes, Weekday PM Peak Hour.
Map Source: Deschutes County DIAL

Table 7. Summary of Year 2030 Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	2030 Background Conditions				2030 With Site (Hayden Homes & Vollertsen Master Plan) Conditions				Acceptable?
		LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	
1: Northwest Way / NW Upas Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS B	EB LR: 10.7	EB LR: 0.02	EB LR: 25 ft	EB LR: LOS B	EB LR: 10.6	EB LR: 0.03	EB LR: 25 ft	Yes
2: Northwest Way / NW Spruce Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LR: LOS B	WB LR: 12.1	WB LR: 0.14	WB LR: 25 ft	WB LTR: LOS C	WB LTR: 23.9	WB LTR: 0.31	WB LTR: 50 ft	Yes
3: Northwest Way / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LR: LOS B	WB LR: 13.0	WB LR: 0.05	WB LR: 25 ft	WB LTR: LOS E	WB LTR: 35.1	WB LTR: 0.37	WB LTR: 50 ft	Yes
4: NW 22 nd St / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS A	WB LTR: 8.4	WB LTR: 0.01	WB LTR: <25 ft	WB LTR: LOS A	WB LTR: 9.2	WB LTR: 0.05	WB LTR: 25 ft	Yes
5: NW 19 th St / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS A	EB LR: 8.7	EB LR: 0.01	EB LR: <25 ft	EB LR: LOS A	EB LR: 8.7	EB LR: 0.04	EB LR: 25 ft	Yes
6: Northwest Way / NW Maple Ave	LOS “E” or better	Overall: LOS A EB LTR: LOS A WB LTR: LOS A NB LTR: LOS A SB LTR: LOS B	Overall: 7.5 EB LTR: 5.9 WB LTR: 6.6 NB LTR: 6.2 SB LTR: 11.2	EB LTR: 0.17 WB LTR: 0.38 NB LTR: 0.18 SB LTR: 0.38	EB LTR: 1 Vehicle WB LTR: 2 Vehicles NB LTR: 1 Vehicle SB LTR: 2 Vehicles	Overall: LOS B EB LTR: LOS A WB LTR: LOS B NB LTR: LOS B SB LTR: LOS C	Overall: 12.1 EB LTR: 8.3 WB LTR: 10.3 NB LTR: 10.3 SB LTR: 17.4	EB LTR: 0.23 WB LTR: 0.57 NB LTR: 0.37 SB LTR: 0.62	EB LTR: 1 Vehicle WB LTR: 4 Vehicles NB LTR: 2 Vehicle SB LTR: 4 Vehicles	Yes
7: NW 22 nd St / NW Maple Ave	v/c < 0.90 95 th % Queue < 100 ft	SB LTR: LOS C	SB LTR: 16.9	SB LTR: 0.07	SB LTR: 25 ft	SB LTR: LOS C	SB LTR: 23.6	SB LTR: 0.11	SB LTR: 25 ft	Yes
8: NW 19 th St / NW Maple Ave	LOS “E” or better	LOS B	13.3	0.57	EB L: 5 ft EB TR: 110 ft WB L: 220 ft WB TR: 175 ft NB LT: 80 ft NB R: 50 ft SB LTR: 80 ft	LOS B	15.3	0.68	EB L: 5 ft EB TR: 145 ft WB L: 250 ft WB TR: 275 ft NB LT: 90 ft NB R: 50 ft SB LTR: 90 ft	Yes
9: NW 9 th St / NW Maple Ave	LOS “E” or better	LOS C	26.2	0.76	EB L: 110 ft EB TR: 315 ft WB L: 10 ft WB TR: 615 ft NB LTR: 105 ft SB LTR: 135 ft	LOS D	49.5	0.87	EB L: 115 ft EB TR: 405 ft WB L: 10 ft WB TR: 790 ft NB LTR: 120 ft SB LTR: 140 ft	Yes
10: NW 6 th St / NW Quince Ave	LOS “E” or better	LOS B	16.9	0.60	EB L: 85 ft EB TR: 55 ft WB L: 70 ft WB TR: 60 ft NB L: 85 ft NB T: 115 ft NB R: 30 ft SB L: 50 ft SB TR: 135 ft	LOS B	17.2	0.61	EB L: 85 ft EB TR: 55 ft WB L: 70 ft WB TR: 60 ft NB L: 85 ft NB T: 120 ft NB R: 30 ft SB L: 50 ft SB TR: 150 ft	Yes

Table 7 (Continued). Summary of Year 2030 Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	2030 Background Conditions				2030 With Site (Hayden Homes & Vollertsen Master Plan) Conditions				Acceptable?
		LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	
11: NW 6 th St / NW Maple Ave	LOS “E” or better	LOS C	27.1	0.92	EB L: 135 ft EB T: 135 ft EB R: 85 ft WB L: 120 ft WB TR: 260 ft NB L: 235 ft NB TR: 210 ft SB L: 35 ft SB TR: 185 ft	LOS D	40.1	0.97	EB L: 185 ft EB T: 165 ft EB R: 120 ft WB L: 135 ft WB TR: 340 ft NB L: 335 ft NB TR: 220 ft SB L: 35 ft SB TR: 250 ft	Yes
12: NW 6 th St / NW Kingwood Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS F	WB LTR: >50.0	WB LTR: 0.40	WB LTR: 50 ft	WB LTR: LOS F	WB LTR: >50.0	WB LTR: 0.49	WB LTR: 50 ft	Yes
13: NW 27 th St / NW Hemlock Ave ¹	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS B	WB LTR: 13.7	WB LTR: 0.25	WB LTR: 25 ft	WB LTR: LOS C	WB LTR: 17.8	WB LTR: 0.33	WB LTR: 50 ft	Yes
14: NW 27 th St / W Antler Ave	LOS “E” or better	Overall: LOS C NB L: LOS B NB TR: LOS C EB L: LOS B EB TR: LOS B WB L: LOS B WB TR: LOS B SB L: LOS B SB TR: LOS B	Overall: 16.6 NB L: 10.7 NB TR: 23.3 EB L: 11.1 EB TR: 12.3 WB L: 12.8 WB TR: 12.9 SB L: 10.3 SB TR: 14.8	NB L: 0.13 NB TR: 0.71 EB L: 0.05 EB TR: 0.26 WB L: 0.25 WB TR: 0.32 SB L: 0.03 SB TR: 0.44	NB L: 25 ft NB TR: 150 ft EB L: 25 ft EB TR: 25 ft WB L: 25 ft WB TR: 50 ft SB L: 25 ft SB TR: 75 ft	Overall: LOS D NB L: LOS B NB TR: LOS E EB L: LOS B EB TR: LOS B WB L: LOS B WB TR: LOS B SB L: LOS B SB TR: LOS C	Overall: 25.6 NB L: 11.2 NB TR: 43.3 EB L: 11.9 EB TR: 13.6 WB L: 13.8 WB TR: 14.7 SB L: 11.0 SB TR: 19.0	NB L: 0.14 NB TR: 0.89 EB L: 0.05 EB TR: 0.29 WB L: 0.27 WB TR: 0.39 SB L: 0.06 SB TR: 0.57	NB L: 25 ft NB TR: 275 ft EB L: 25 ft EB TR: 50 ft WB L: 50 ft WB TR: 50 ft SB L: 25 ft SB TR: 100 ft	Yes
15: SW 27 th St / SW Highland Ave	v/c ≤ 0.80	LOS F	>80.0	1.13	EB L: 45 ft EB TR: 800 ft WB L: 135 ft WB TR: 985 ft NB L: 65 ft NB TR: 400 ft SB L: 160 ft SB TR: 290 ft	LOS F	>80.0	1.17	EB L: 95 ft EB TR: 815 ft WB L: 130 ft WB TR: 1,040 ft NB L: 65 ft NB TR: 510 ft SB L: 195 ft SB TR: 290 ft	No
16: NW 19 th St – SW Rimrock Way / W Antler Ave	LOS “E” or better	LOS B	16.2	0.55	EB L: 45 ft EB TR: 115 ft WB L: 45 ft WB T: 150 ft WB R: 35 ft NB L: 45 ft NB TR: 305 ft SB L: 50 ft SB TR: 235 ft	LOS B	16.5	0.57	EB L: 45 ft EB TR: 120 ft WB L: 45 ft WB T: 160 ft WB R: 35 ft NB L: 45 ft NB TR: 305 ft SB L: 55 ft SB TR: 235 ft	Yes
17: SW Canyon Dr / SW Black Butte Blvd	v/c < 0.90 95 th % Queue < 100 ft	NB LTR: LOS C	NB LTR: 23.7	NB LTR: 0.40	NB LTR: 50 ft	NB LTR: LOS D	NB LTR: 26.7	NB LTR: 0.44	NB LTR: 75 ft	Yes
18: SW 9 th St / SW Black Butte Blvd	v/c < 0.90 95 th % Queue < 100 ft	NB LTR: LOS C	NB LTR: 17.8	NB LTR: 0.28	NB LTR: 50 ft	NB LTR: LOS C	NB LTR: 19.9	NB LTR: 0.33	NB LTR: 50 ft	Yes
19: NW 5 th St / NW Dogwood Ave	v/c < 0.90 95 th % Queue < 100 ft	WB TR: LOS C	WB TR: 24.2	WB TR: 0.26	WB TR: 25 ft	WB TR: LOS D	WB TR: 27.3	WB TR: 0.29	WB TR: 50 ft	Yes

¹Assumed to be two-way stop control with stop control on NW Hemlock Avenue

Table 7 (Continued). Summary of Year 2030 Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	2030 Background Conditions				2030 With Site (Hayden Homes & Vollertsen Master Plan) Conditions				Acceptable?
		LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	
20: NW 5 th St / W Antler Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LT: LOS E	EB LT: 35.8	EB LT: 0.39	EB LT: 50 ft	EB LT: LOS E	EB LT: 42.7	EB LT: 0.45	EB LT: 75 ft	Yes
21: SW 6 th St / SW Black Butte Blvd	LOS “E” or better	LOS A	9.2	0.49	EB TR: 70 ft WB LT: 80 ft SB LTR: 130 ft	LOS A	9.6	0.52	EB TR: 75 ft WB LT: 90 ft SB LTR: 140 ft	Yes
22: SW 5 th St / SW Black Butte Blvd	LOS “E” or better	LOS B	12.4	0.51	EB LT: 65 ft WB TR: 35 ft NB LTR: 235 ft	LOS B	12.9	0.55	EB LT: 65 ft WB TR: 35 ft NB LTR: 255 ft	Yes
23: SW 5 th St / SW Evergreen Ave	LOS “E” or better	LOS B	13.8	0.65	EB LT: 90 ft WB TR: 185 ft NB LTR: 170 ft	LOS B	14.4	0.69	EB LT: 90 ft WB TR: 235 ft NB LTR: 185 ft	Yes

Note: **Bold** values are shown as areas to monitor in the future due to extended queuing or performance near the City’s thresholds.

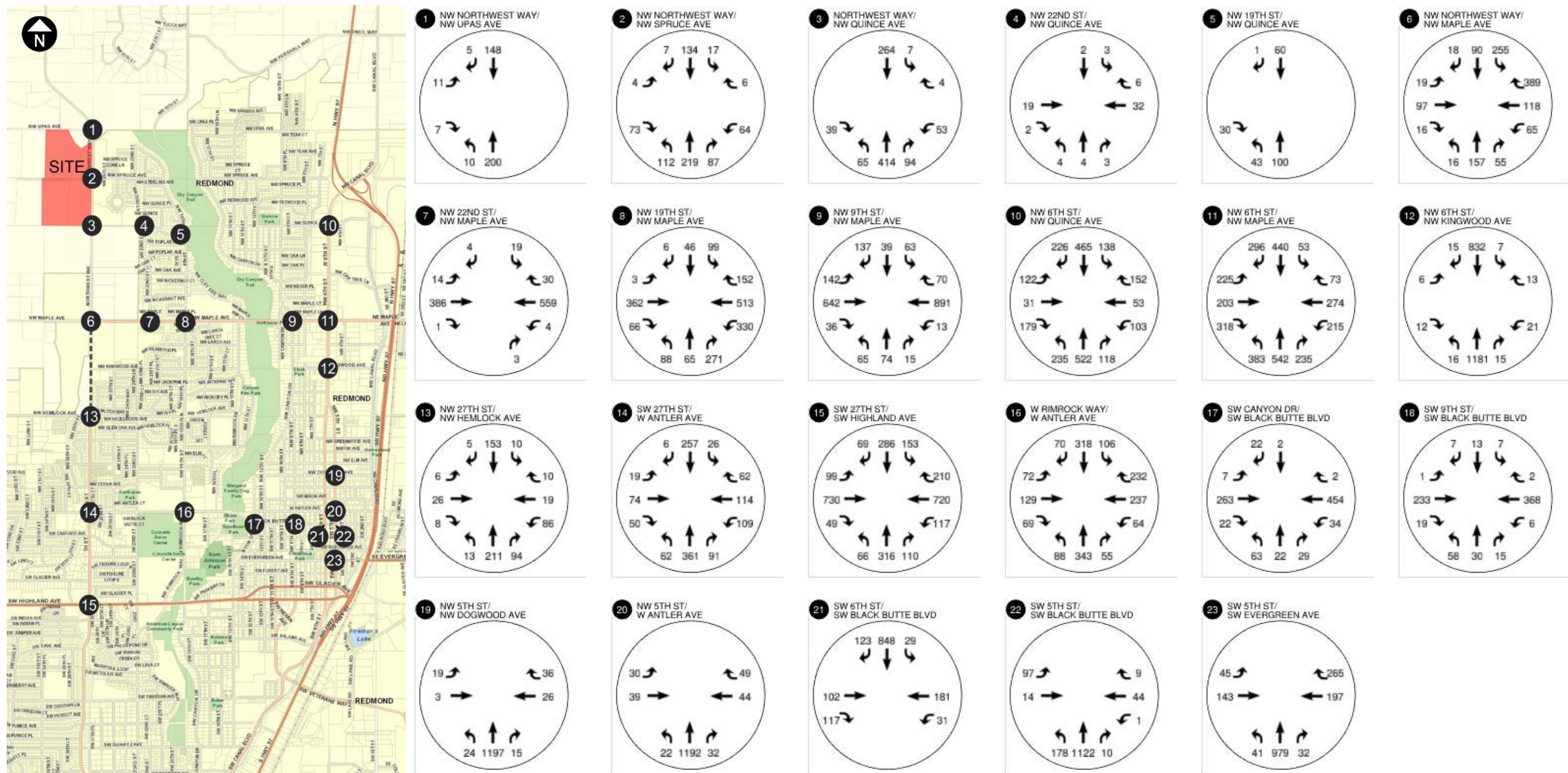


Figure 22. 2030 With Site (Hayden Homes & Vollertsen Master Plan) Traffic Volumes, Weekday PM Peak Hour.

Map Source: Deschutes County DIAL

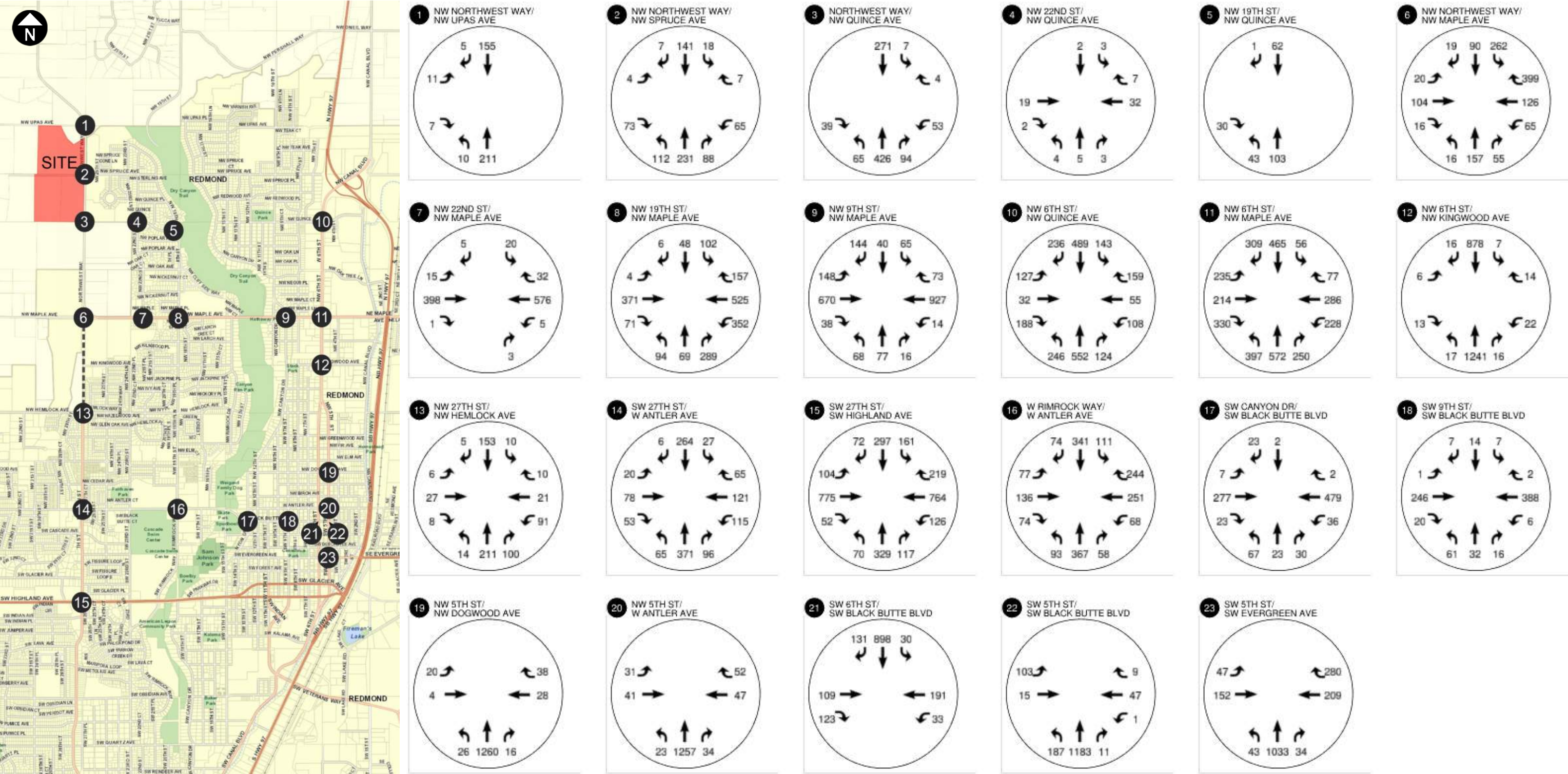


Figure 23. Year 2035 Planning Analysis (With Hayden Homes & Vollertsen Master Plan) Weekday PM Peak Hour.
Map Source: Deschutes County DIAL

Table 8. Summary of Year 2035 (Planning Analysis) Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	2030 With Site (Hayden Homes & Vollertsen Master Plan) Conditions				Acceptable?
		LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	
1: Northwest Way / NW Upas Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS B	EB LR: 10.7	EB LR: 0.03	EB LR: 25 ft	Yes
2: Northwest Way / NW Spruce Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS D	WB LTR: 25.2	WB LTR: 0.33	WB LTR: 50 ft	Yes
3: Northwest Way / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS E	WB LTR: 36.9	WB LTR: 0.38	WB LTR: 50 ft	Yes
4: NW 22 nd St / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS A	WB LTR: 9.2	WB LTR: 0.05	WB LTR: 25 ft	Yes
5: NW 19 th St / NW Quince Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LR: LOS A	EB LR: 8.8	EB LR: 0.04	EB LR: 25 ft	Yes
6: Northwest Way / NW Maple Ave	LOS “E” or better	Overall: LOS B EB LTR: LOS A WB LTR: LOS B NB LTR: LOS B SB LTR: LOS C	Overall: 12.7 EB LTR: 8.7 WB LTR: 10.8 NB LTR: 10.7 SB LTR: 18.5	EB LTR: 0.24 WB LTR: 0.59 NB LTR: 0.38 SB LTR: 0.64	EB LTR: 1 Vehicle WB LTR: 4 Vehicles NB LTR: 2 Vehicle SB LTR: 5 Vehicles	Yes
7: NW 22 nd St / NW Maple Ave	v/c < 0.90 95 th % Queue < 100 ft	SB LTR: LOS C	SB LTR: 24.6	SB LTR: 0.13	SB LTR: 25 ft	Yes
8: NW 19 th St / NW Maple Ave	LOS “E” or better	LOS B	16.4	0.72	EB L: 5 ft EB TR: 155 ft WB L: 275 ft WB TR: 290 ft NB LT: 100 ft NB R: 50 ft SB LTR: 95 ft	Yes
9: NW 9 th St / NW Maple Ave	LOS “E” or better	LOS E	58.3	0.91	EB L: 120 ft EB TR: 490 ft WB L: 10 ft WB TR: 835 ft NB LTR: 125 ft SB LTR: 145 ft	Yes
10: NW 6 th St / NW Quince Ave	LOS “E” or better	LOS B	18.2	0.66	EB L: 90 ft EB TR: 55 ft WB L: 75 ft WB TR: 60 ft NB L: 115 ft NB T: 125 ft NB R: 30 ft SB L: 55 ft SB TR: 160 ft	Yes
11: NW 6 th St / NW Maple Ave	LOS “E” or better	LOS D	46.3	1.00	EB L: 200 ft EB T: 175 ft EB R: 135 ft WB L: 145 ft WB TR: 360 ft NB L: 350 ft NB TR: 240 ft SB L: 35 ft SB TR: 280 ft	Yes
12: NW 6 th St / NW Kingwood Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS F	WB LTR: >50.0	WB LTR: 0.59	WB LTR: 75 ft	Yes
13: NW 27 th St / NW Hemlock Ave	v/c < 0.90 95 th % Queue < 100 ft	WB LTR: LOS C	WB LTR: 18.5	WB LTR: 0.36	WB LTR: 50 ft	Yes
14: NW 27 th St / W Antler Ave	LOS “E” or better	Overall: LOS D NB L: LOS B NB TR: LOS F EB L: LOS B EB TR: LOS B WB L: LOS B WB TR: LOS C SB L: LOS B SB TR: LOS C	Overall: 29.9 NB L: 11.5 NB TR: >50.0 EB L: 12.1 EB TR: 14.3 WB L: 14.4 WB TR: 15.7 SB L: 11.2 SB TR: 20.6	NB L: 0.15 NB TR: 0.94 EB L: 0.05 EB TR: 0.31 WB L: 0.29 WB TR: 0.42 SB L: 0.06 SB TR: 0.59	NB L: 25 ft NB TR: 325 ft EB L: 25 ft EB TR: 50 ft WB L: 50 ft WB TR: 50 ft SB L: 25 ft SB TR: 100 ft	Yes
15: SW 27 th St / SW Highland Ave	v/c ≤ 0.80	LOS F	>80.0	1.24	EB L: 105 ft EB TR: 895 ft WB L: 145 ft WB TR: 1,130 ft NB L: 65 ft NB TR: 530 ft SB L: 205 ft SB TR: 290 ft	No
16: NW 19 th St – SW Rimrock Way / W Antler Ave	LOS “E” or better	LOS B	17.6	0.60	EB L: 50 ft EB TR: 130 ft WB L: 45 ft WB T: 170 ft WB R: 35 ft NB L: 50 ft NB TR: 335 ft SB L: 55 ft SB TR: 255 ft	Yes
17: SW Canyon Dr / SW Black Butte Blvd	v/c < 0.90 95 th % Queue < 100 ft	NB LTR: LOS D	NB LTR: 31.4	NB LTR: 0.50	NB LTR: 75 ft	Yes

Table 8 (Continued). Summary of Year 2035 Intersection Operations, Weekday PM Peak Hour

Intersection	Performance/ Mobility Standard	2030 With Site (Hayden Homes & Vollertsen Master Plan) Conditions				Acceptable?
		LOS	Delay (s/veh)	v/c Ratio	95 th % Queue	
18: SW 9 th St / SW Black Butte Blvd	v/c < 0.90 95 th % Queue < 100 ft	NB LTR: LOS C	NB LTR: 21.6	NB LTR: 0.37	NB LTR: 50 ft	Yes
19: NW 5 th St / NW Dogwood Ave	v/c < 0.90 95 th % Queue < 100 ft	WB TR: LOS D	WB TR: 31.6	WB TR: 0.35	WB TR: 50 ft	Yes
20: NW 5 th St / W Antler Ave	v/c < 0.90 95 th % Queue < 100 ft	EB LT: LOS F	EB LT: >50.0	EB LT: 0.53	EB LT: 75 ft	Yes
21: SW 6 th St / SW Black Butte Blvd	LOS “E” or better	LOS A	10.0	0.55	EB TR: 80 ft WB LT: 90 ft SB LTR: 155 ft	Yes
22: SW 5 th St / SW Black Butte Blvd	LOS “E” or better	LOS B	13.3	0.58	EB LT: 65 ft WB TR: 35 ft NB LTR: 275 ft	Yes
23: SW 5 th St / SW Evergreen Ave	LOS “E” or better	LOS B	15.3	0.74	EB LT: 100 ft WB TR: 265 ft NB LTR: 200 ft	Yes

Note: **Bold** values are shown as areas to monitor in the future due to extended queuing or performance near the City’s thresholds.

AVERAGE DAILY TRAFFIC ON LOCAL STREETS

Redmond Development Code 8.2815(2) states the following:

The Average Daily Traffic (ADT) volume of Local Street roadways within the City of Redmond shall be less than 1,200 vehicles per day (VPD). Development which add vehicle trips to Local Streets with an ADT greater than 1,200 VPD may be asked to provide mitigation in the form of additional access to the site, when in the opinion of the City Engineer, the residential livability is degraded by excessive local street traffic volume.

The standards of this section of Code are intended to protect surrounding residential projects from excessive traffic volumes that would effectively turn local streets into higher-order through streets. Accordingly, Table 9 provides a summary of the local streets and estimated Average Daily Traffic (which was calculated from the peak hour volumes, with these volumes reflecting about 9% of the daily trips). Traffic volumes for the internal streets were approximated based on the number of residential lots that would be most conveniently served by the connection, and all values are intended to be approximations.

Table 9. Estimated Local Street ADT

Local Street	Existing ADT (Estimated)	Future with Project ADT	<1,200 Trips per Day?
NW Upas Avenue (West of Northwest Way)	122	367 ¹	Yes
NW Quince Avenue (West of Northwest Way)	n/a	1,156	Yes
31 st Street (North of Spruce Ave)	n/a	Approx. 30 homes, 283 Total	Yes
31 st Street (South of Spruce Ave)	n/a	Approx. 12 homes, 113 Total	Yes
30 th Street (North of Spruce Ave)	n/a	Approx. 37 homes and 15 townhomes, 457 Total	Yes
30 th Street (South of Spruce Ave)	n/a	Approx. 10 homes and 52 townhomes, 469 Total	Yes
28 th Street (North of Spruce Ave)	n/a	Approx. 49 townhomes and 74 multifamily units, 852 Total	Yes

¹ Assuming public street connections and improvements are provided.

As shown in the table, all of the local streets within the study area are expected to carry fewer than 1,200 ADT.

INTERSECTION MITIGATION

This section of the report addresses each of the intersections identified as deficient within the analysis scenarios.

SW 27th Street / SW Highland Avenue

The traffic signal at the SW 27th Street/SW Highland Avenue intersection does not meet the state's mobility standards today and is expected to exceed capacity in year 2030 with or without the proposed development and continue to worsen in the 2035 planning level analysis. The Alternatives Analysis memo prepared for the TSP identified this intersection as not meeting performance standards in year 2040, as shown in Figure 24.



Figure 24. Future 2040 Intersection and Segment Performance with Improvements from TSP Alternatives Analysis.

The TSP does not recommend a project to improve this intersection. Project S22 to upgrade OR 126 will not increase the roadway capacity at this intersection. Adding a westbound right-turn lane and northbound right-turn lane would have the greatest impact on increasing the capacity. However, the substantial grade difference between the road and the adjacent property below in the northeast quadrant of the intersection limits the ability to construct these types of improvement options. The installation of a northbound right-turn lane alone would reduce the projected year 2030 v/c ratio from 1.17 to 1.08, but the demand volumes will still exceed capacity.

TSP Improvement Descriptions

Map ID	Facility	Improvement	Notes	2020 Cost Estimates
S22	OR 126: SW Helmholtz Way to SW 27 th St	Upgrade roadway as necessary	1.0 miles	\$8.4M

ODOT Action 1F.5 lists other potential mitigation measures such as:

- System connectivity improvements for vehicles, bicycles and pedestrians.
- Transportation demand management (TDM) methods to reduce the need for additional capacity.
- Multi-modal (bicycle, pedestrian, transit) opportunities to reduce vehicle demand.
- Operational improvements to maximize use of the existing system.
- Land use techniques such as trip caps / budgets to manage trip generation.

This provides various mitigation options. The Vollertsen Master Plan recommends creation of connections to the Dry Canyon Trail System along with transit provisions along NW Quince Avenue. The Hayden Homes project will have similar connectivity to the trail system via Spruce Avenue, which links to connections into the Dry Canyon system planned with the Dry Canyon PUD. Development of a pedestrian crossing location would help to leverage this connectivity, and the crossing could be sited nearly anywhere along the NW Northwest Way corridor given its straight and flat alignment from NW Quince Avenue to NW Upas Avenue. These improvements could be coupled with investments in area transit, which should be coordinated with CET to identify how they could be best situated to coordinate with future routing plans.

Some capacity relief will also be provided as improvements are made to parallel routes. Currently, SW Rimrock Way – SW 19th Street provides this connectivity with a signalized connection to OR 126. However, with school activity this route also experiences high levels of congestion. Improvements to the Helmholtz Way corridor and SW 35th Street corridor could serve as other viable parallel route options and help reduce the high demands on the SW 27th Street corridor. Capacity improvements at these highway intersections will be prohibitively expensive for any single project to fund (likely in the \$3M range for roundabouts and \$1.5M for traffic signals), and would best be improved through pro-rata shares as a match toward pursuit of State funding. Ideally, these cost-sharing methodologies should be formally established and equitably applied to all projects that contribute trips in western Redmond.

SW Antler Avenue Corridor

There are two locations on the SW Antler Avenue corridor that marginally meet the City's adopted performance standards, but contain high delays and queuing on specific movements. The delays projected for the stop-controlled intersection of SW Antler Avenue/SW 5th Street are likely over-stated, as the location along a one-way couplet and proximity to the SW Black Butte Avenue traffic signal will result in non-random arrivals as assumed in the traffic models, resulting in suitable gaps for the eastbound traffic headed to the US 97 right-in, right-out connection.

The SW 27th Street/SW Antler Avenue intersection also shows high delays due to the increasing volume of north-south traffic in the forecasts. The intersection has already been widened to include separate left-turn lanes on all approaches, with the next phase of capacity improvement expected to provide signalization. It is recommended that monitoring occur, particularly with the extension of the NW 27th Street connection to NW Maple Avenue, to determine when this signalization should occur. This project is already identified within the City's TSP for signalization.

MUTCD SIGNAL WARRANTS

Traffic signal warrants are the criteria identified within the Manual on Uniform Traffic Control Devices that describe the minimum conditions under which a traffic signal should be further considered. There are nine separate warrant criteria as listed below:

1. Warrant 1, Eight-Hour Vehicular Volume
2. Warrant 2, Four-Hour Vehicular Volume

3. Warrant 3, Peak Hour
4. Warrant 4, Pedestrian Volume
5. Warrant 5, School Crossing
6. Warrant 6, Coordinated Signal System
7. Warrant 7, Crash Experience
8. Warrant 8, Roadway Network
9. Warrant 9, Intersection Near a Grade Crossing

Within this study, volume-based MUTCD Signal Warrants #1, #2, and #3 were reviewed at the stop-controlled intersection of NW 19th Street/NW Maple Avenue and at the NW 27th Street/NW Antler Avenue intersection. The City's 5-Year Capital Improvement Plan indicates that a traffic signal is budgeted for fiscal year 2023 to 2024 at the NW Maple Avenue/NW 19th Street intersection if traffic signal warrants are met.

The MUTCD requires engineering judgement be used when evaluating an intersection with a minor street approach that includes a shared through/left-turn lane plus a separate right-turn lane. If the degree of conflict is minimal for the minor street right-turn movement, this volume should not be included in the analysis. Given the low conflicts with the minor street northbound right-turn movement, this volume was excluded from the analysis.

Table 10 summarizes the findings of the signal warrant analysis for the NW Maple Avenue/NW 19th Street intersection using existing 2023 traffic volumes. Results are shown for both the 100-percent and 70-percent warrant factor, which can be used where the posted speed is greater than 40 miles per hour. NW Maple Avenue has a posted speed of 45 miles per hour within the vicinity of NW 19th Street.

Table 10. Summary of MUTCD Signal Warrant Review: SW 19th Street/SW Maple Avenue

Volume-Based Warrant Summary – 2023 Existing Traffic Volumes			
Warrant No.	Description	100% Warrant Factor	70% Warrant Factor
Warrant 1:	Eight-Hour Vehicular Volume	Yes	Yes
Warrant 2:	Four-Hour Vehicular Volume	No	Yes
Warrant 3:	Peak Hour	No	Yes

As shown in the table, Warrants #1 through #3 are currently met using the 70-percent warrant factor while only Warrant #1 is met with the 100% warrant factor. It is expected that this intersection will continue to meet signal warrants at the time funding is available for signalization.

Table 11 summarizes signal warrants for the SW Antler Avenue/SW 27th Street intersection to identify whether signalization of this intersection should be considered now or near the 2030 build-out period (with the 27th Street extension). This shows that with the extension of SW 27th Street to NW Maple Avenue all three volume-based signal warrants will be met. Accordingly, City plans to complete the extension and construct the roundabout at NW Maple Avenue/NW 27th Street should also include signalization of the NW 27th Street/Antler Avenue intersection.

Table 11. Summary of MUTCD Signal Warrant Review: SW 27th Street/SW Antler Avenue

Volume-Based Warrant Summary			
Warrant No.	Description	100% Warrant Factor (2023 Conditions)	100% Warrant Factor (2030 Conditions)
Warrant 1:	Eight-Hour Vehicular Volume	No	Yes
Warrant 2:	Four-Hour Vehicular Volume	No	Yes
Warrant 3:	Peak Hour	No	Yes

LEFT-TURN LANE WARRANTS

Turn lane warrants are reviewed based on guidance within the ODOT Transportation Planning and Analysis Unit's publication *Analysis Procedures Manual*. Left-turn lane warrants are based on the posted roadway speed, bidirectional traffic volume, and percentage of the total volume turning left. The left-turn lane warrants are essentially a cost-benefit calculation of the safety benefits provided by separating through and turning traffic versus the construction costs. Left-turn lane warrants do not apply to stop-controlled minor-street approaches. A summary of the study area intersections and the applicability of left-turn lane warrants is summarized in Table 12.

Table 12. Summary of Left-Turn Lane Warrant Applicability

Intersection	Applicable?	Met?
1: Northwest Way / NW Upas Ave	Yes. Northwest Way is classified as a <i>Minor Arterial</i> . Northbound left-turn lane warrants are illustrated in Figure 25.	No
2: Northwest Way / NW Spruce Ave	Yes. Northwest Way is classified as a <i>Minor Arterial</i> . Northbound left-turn lane warrants are illustrated in Figure 25.	Yes Northbound
3: Northwest Way / NW Quince Ave	Yes. Northwest Way is classified as a <i>Minor Arterial</i> . Northbound and southbound left-turn lane warrants are illustrated in Figure 25.	Yes Northbound
4: NW 22 nd St / NW Quince Ave	No. Turn lanes not applicable to local streets.	n/a
5: NW 19 th St / NW Quince Ave	Yes. NW 19 th Street is classified as a <i>Major Collector</i> . Northbound left-turn lane warrants are illustrated in Figure 26.	No
6: Northwest Way / NW Maple Ave	No. A roundabout is included in the Capital Improvement Projects for the Northwest Way/NW Maple Avenue intersection. The intersection capacity needs will dictate whether to add a left-turn lane.	n/a
7: NW 22 nd St / NW Maple Ave	Yes. NW Maple Avenue is classified as a <i>Minor Arterial</i> . Eastbound and westbound left-turn lane warrants are illustrated in Figure 27.	Yes Eastbound
8: NW 19 th St / NW Maple Ave	No. A traffic signal is included in the Capital Improvement Projects for the NW 19 th Street/NW Maple Avenue intersection. The intersection capacity needs will dictate whether to add a left-turn lane.	n/a
9: NW 9 th St / NW Maple Ave	No. A traffic signal is included in the Capital Improvement Projects for the NW 9 th Street/NW Maple Avenue intersection. The intersection capacity needs will dictate whether to add a left-turn lane.	n/a

(Continued)

Table 12 (Continued). Summary of Left-Turn Lane Warrant Applicability

Intersection	Applicable?	Met?
10: NW 6 th St / NW Quince Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
11: NW 6 th St / NW Maple Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
12: NW 6 th St / NW Kingwood Ave	No. Existing left-turn lanes provided in northbound and southbound directions	n/a
13: NW 27 th St / NW Hemlock Ave	Yes. With the extension of NW 27 th Street, NW Hemlock Avenue is assumed to be stop-controlled as a lower order facility. Existing northbound left-turn lane provided on NW 27 th Street and it is assumed the extension will include a southbound left-turn lane. Southbound left-turn lane warrants are illustrated in Figure 28.	No
14: NW 27 th St / W Antler Ave	No, at all-way stop controlled intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
15: SW 27 th St / SW Highland Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
16: NW 19 th St – SW Rimrock Way / W Antler Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
17: SW Canyon Dr / SW Black Butte Blvd	Yes. Black Butte Boulevard is classified as a <i>Major Collector</i> . Eastbound and westbound left-turn lane warrants are illustrated in Figure 29.	Yes Westbound
18: SW 9 th St / SW Black Butte Blvd	Yes. Black Butte Boulevard is classified as a <i>Major Collector</i> . Eastbound and westbound left-turn lane warrants are illustrated in Figure 29.	No
19: NW 5 th St / NW Dogwood Ave	No. As a one-way street, left-turn movements from NW 5 th Street have no opposing conflicting traffic.	n/a
20: NW 5 th St / W Antler Ave	No. As a one-way street, left-turn movements from NW 5 th Street have no opposing conflicting traffic.	n/a
21: SW 6 th St / SW Black Butte Blvd	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
22: SW 5 th St / SW Black Butte Blvd	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a
23: SW 5 th St / SW Evergreen Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a left-turn lane.	n/a

Table 12 shows that the NW Northwest Way corridor should be planned with left-turn lanes at each of its intersections, consistent with City standards for a *Minor Arterial*. It is recommended that this design occur with the initial completion of the connections. The northbound left-turn lane at the Quince Avenue intersection will be provided with the frontage improvements planned for the Vollertsen property, but if this project is delayed reimbursement agreements could be used to ensure it is provided when needed.

The left-turn lane warrants at the NW Maple Avenue/NW 22nd Street intersection also indicate that this corridor should be developed with a three-lane section (outside of the narrow two-lane bridge), indicative of its role in connecting northwest Redmond with the downtown core area and US 97 corridor. As NW 22nd Street is a Local Street, other options (such as movement restrictions) could also be considered,

consolidating more traffic toward the planned traffic signal at NW 19th Street/NW Maple Avenue. The need for an eastbound left-turn lane onto NW 22nd Street will be lessened as other future street extensions (such as NW Oak Avenue and NW Quince Avenue) are completed, allowing trips to these neighborhoods to connect directly from NW Northwest Way. Given the existing cut-through traffic concerns on NW 22nd Street, no modifications are recommended that would encourage travel through this corridor.

Left-turn warrants were also met at the SW Black Butte Boulevard intersection with SW Canyon Drive (in existing and future conditions). This intersection is within a built-out residential area, with new curb ramps and adjacent utilities. Neither the Hayden Homes' or the Vollertsen Master Plan contributes any left-turns at this intersection.

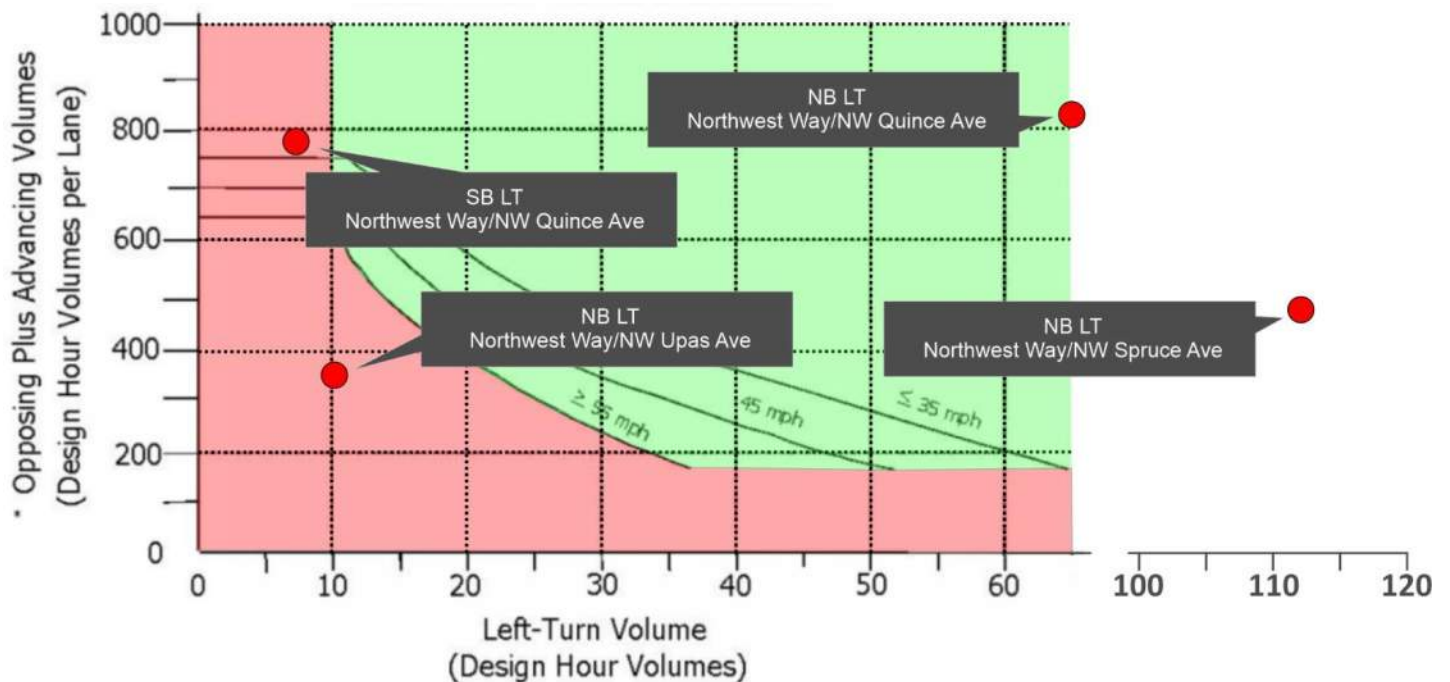


Figure 25. Northwest Way Left-Turn Lane Evaluation: 2030 Total Traffic Volumes, Weekday PM Peak Hour.

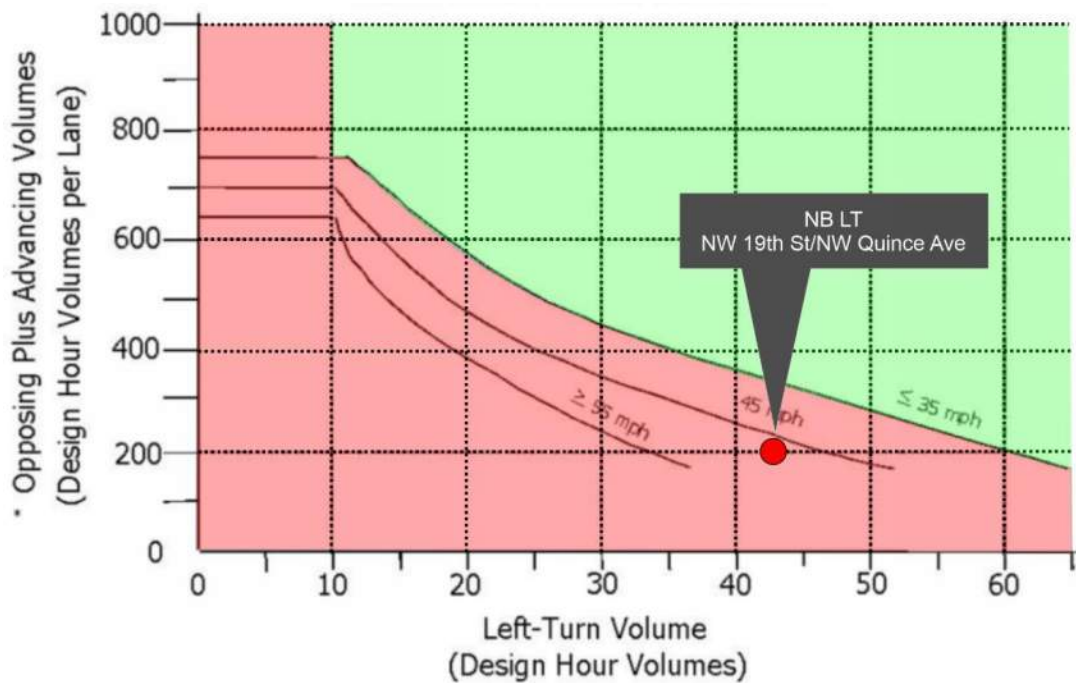


Figure 26. NW 19th Street Left-Turn Lane Evaluation: 2030 Total Traffic Volumes, Weekday PM Peak Hour.

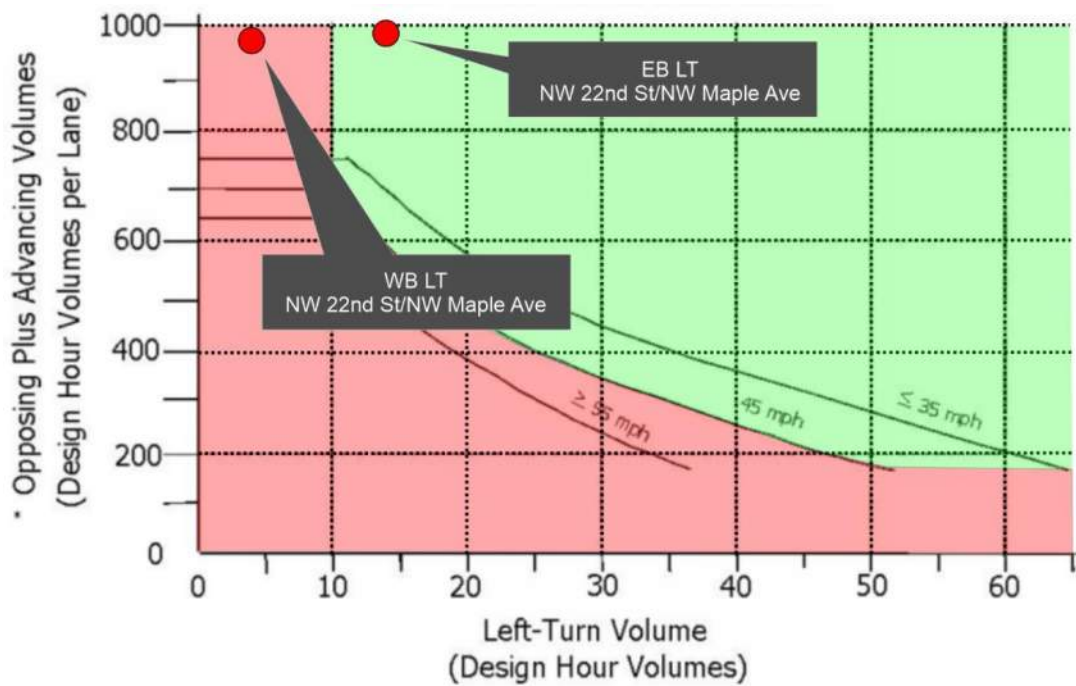


Figure 27. NW Maple Avenue Left-Turn Lane Evaluation: 2030 Total Traffic Volumes, Weekday PM Peak Hour.

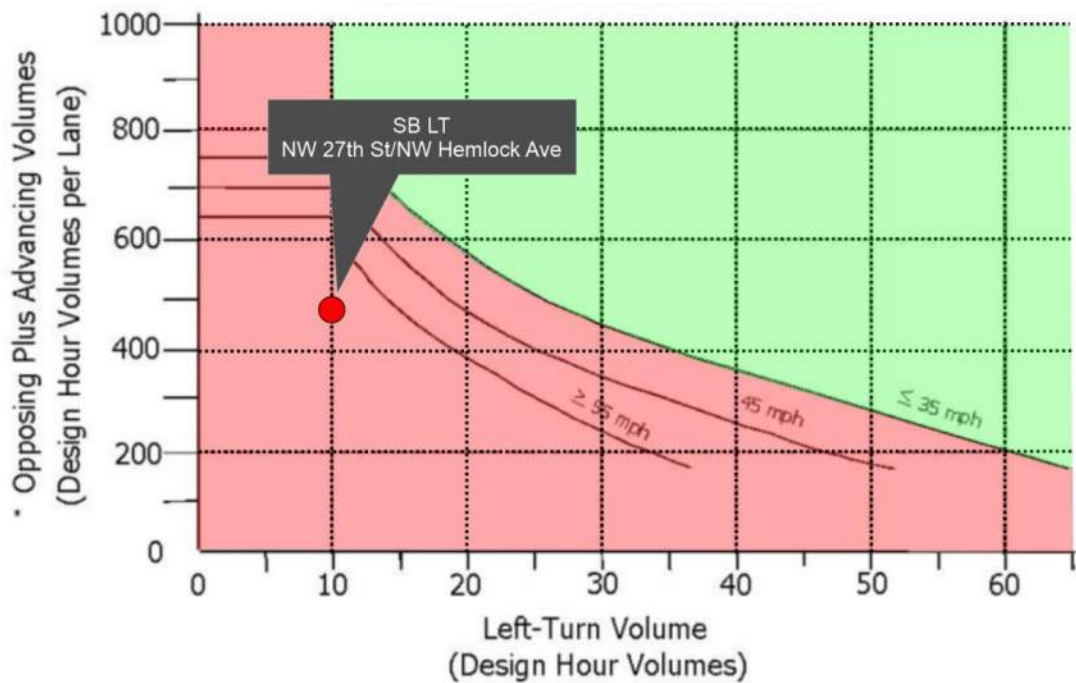


Figure 28. NW 27th Street Left-Turn Lane Evaluation: 2030 Total Traffic Volumes, Weekday PM Peak Hour.

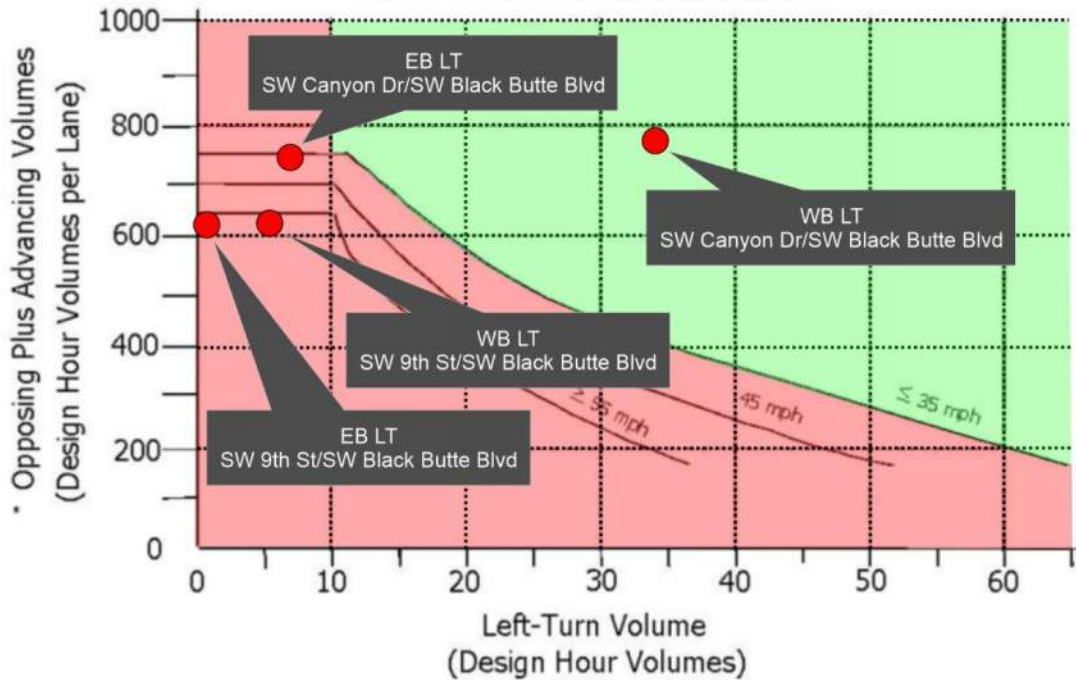


Figure 29. SW Black Butte Boulevard Left-Turn Lane Evaluation: 2030 Total Traffic Volumes, Weekday PM Peak Hour.

RIGHT-TURN LANE WARRANTS

The purpose of a right-turn lane is to improve safety and capacity of a roadway by reducing the speed differential between through vehicles and decelerating vehicles. Within an urban environment, facility design considerations should include the increased pedestrian crossing distance, higher resultant through speeds, and right-of-way/streetscape impacts. Right turn lanes are typically reviewed based on the ODOT methodology for rural highways; as such, discretion and engineering judgement is required in applying these criteria to urban roadways. In review of the area context surrounding the residential site there are very few locations that would be considered candidates for right-turn deceleration lanes and locations that are candidate sites at this time are planned for urbanization in the TSP. Table 13 summarizes this review.

Table 13. Summary of Right-Turn Lane Warrant Applicability

Intersection	Applicable?	Met?
1: Northwest Way / NW Upas Ave	Yes, this intersection is located in a rural area that currently serves few pedestrians. The TSP shows a project to urbanize Northwest Way in the future. Southbound turn lane warrants are shown in Figure 30.	No
2: Northwest Way / NW Spruce Ave	Yes, this intersection is located in a rural area that currently serves few pedestrians. The TSP shows a project to urbanize Northwest Way in the future. Southbound turn lane warrants are shown in Figure 30.	No
3: Northwest Way / NW Quince Ave	Yes, this intersection is located in a rural area that currently serves few pedestrians. The TSP shows a project to urbanize Northwest Way in the future. Northbound and southbound turn lane warrants are shown in Figure 30.	Yes Northbound
4: NW 22 nd St / NW Quince Ave	No. Turn lanes not applicable to low-volume, local streets.	n/a
5: NW 19 th St / NW Quince Ave	No, installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
6: Northwest Way / NW Maple Ave	No. A roundabout is included in the Capital Improvement Projects for the Northwest Way/NW Maple Avenue intersection. The intersection capacity needs will dictate whether to add a right-turn lane.	n/a
7: NW 22 nd St / NW Maple Ave	No. An urbanization project is included in the Capital Improvement Projects for NW Maple Avenue between NW 19 th Street and NW 27 th Street to upgrade to arterial standards with bicycle lanes and sidewalks. Installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
8: NW 19 th St / NW Maple Ave	No. A traffic signal is included in the Capital Improvement Projects for the NW 19 th Street/NW Maple Avenue intersection. The intersection capacity needs will dictate whether to add a left-turn lane.	n/a

(Continued)

Table 13 (Continued). Summary of Right-Turn Lane Warrant Applicability

Intersection	Applicable?	Met?
9: NW 9 th St / NW Maple Ave	No. A traffic signal is included in the Capital Improvement Projects for the NW 9 th Street/NW Maple Avenue intersection. The intersection capacity needs will dictate whether to add a left-turn lane.	n/a
10: NW 6 th St / NW Quince Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
11: NW 6 th St / NW Maple Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
12: NW 6 th St / NW Kingwood Ave	No, installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
13: NW 27 th St / NW Hemlock Ave	Yes, this intersection is located at the urban/rural divide. This intersection will be urbanized with the NW 27 th Street extension project listed in the 5-year Capital Improvement Projects. Northbound and southbound turn lane warrants are shown in Figure 31.	Yes Not Recommended
14: NW 27 th St / W Antler Ave	No, at all-way stop controlled intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
15: SW 27 th St / SW Highland Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
16: NW 19 th St – SW Rimrock Way / W Antler Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
17: SW Canyon Dr / SW Black Butte Blvd	No, installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
18: SW 9 th St / SW Black Butte Blvd	No, installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
19: NW 5 th St / NW Dogwood Ave	No, installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
20: NW 5 th St / W Antler Ave	No, installation of a right-turn deceleration lane would conflict with facility goals and would not be recommended.	n/a
21: SW 6 th St / SW Black Butte Blvd	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
22: SW 5 th St / SW Black Butte Blvd	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a
23: SW 5 th St / SW Evergreen Ave	No, at signalized intersections the intersection capacity needs dictate whether to add a right-turn lane.	n/a

Figures 30 and 31 depict the right-turn lane warrant evaluation at each intersection where warrants could be applicable on Northwest Way and NW 27th Street. As shown in the figures, a right-turn deceleration lane is warranted based on volume alone in the northbound direction on Northwest Way at NW Quince Avenue. The City should consider the vision for the NW Northwest Way corridor and determine if deceleration lanes and a 55 mile per hour speed is desired along this corridor long-term. While this treatment may be appropriate at major facilities (such as Spruce Avenue, a *Major Collector*) it is not recommended at Quince Avenue as a local street, and its inclusion will continue to increase through speeds on the corridor.

A right-turn lane is also warranted on NW 27th Street at NW Hemlock Avenue based on 2030 projected volumes with the site. There are few pedestrians at this intersection today. However, with the continued residential development in the area, a right-turn lane would not be appropriate at this intersection given the planned urban environment with increased numbers of pedestrian and bicyclist users.

A right-turn lane is also warranted on NW 27th Street at NW Hemlock Avenue based on 2030 projected volumes with the site and an assumed extension to NW Northwest Way. With the continued residential development planned throughout the area a right-turn lane would not be appropriate at this intersection given the planned urban environment with increased numbers of pedestrian and bicyclist users. If desired, this treatment could be installed as part of the City's Capital Improvement Project, but it would not match the surrounding roadway character.

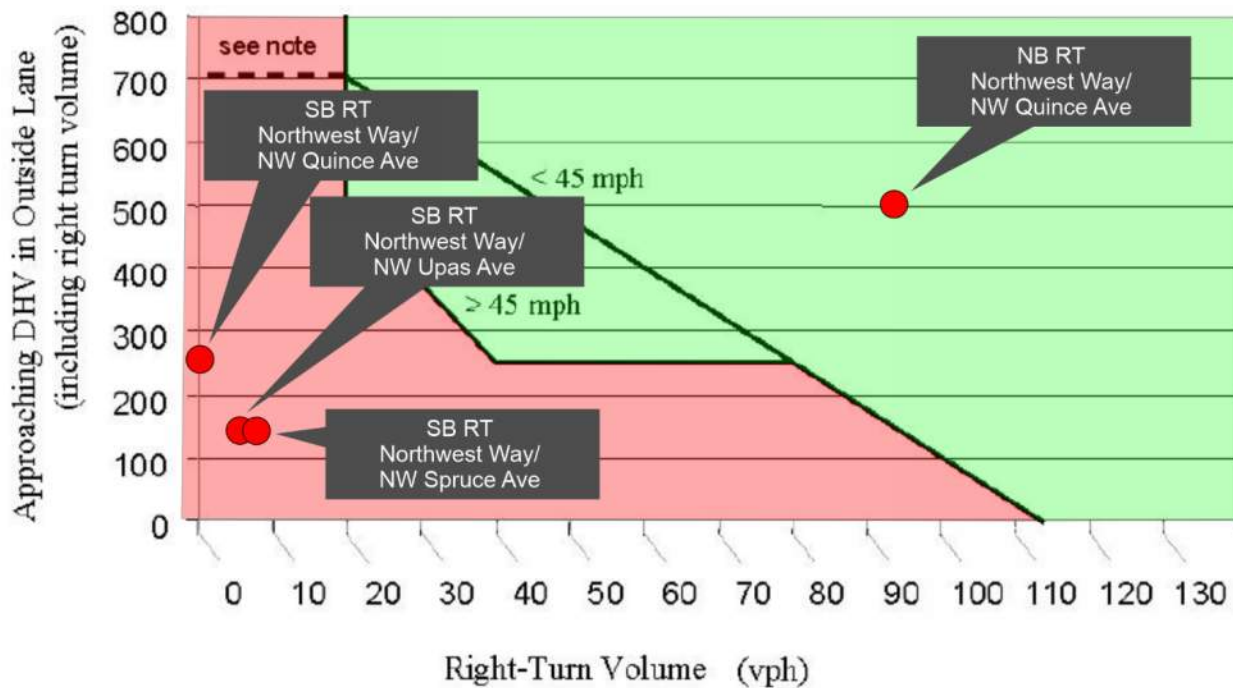


Figure 30. Northwest Way Right-Turn Warrant Assessment: Year 2030 Total Traffic Volumes, Weekday PM Peak Hour.

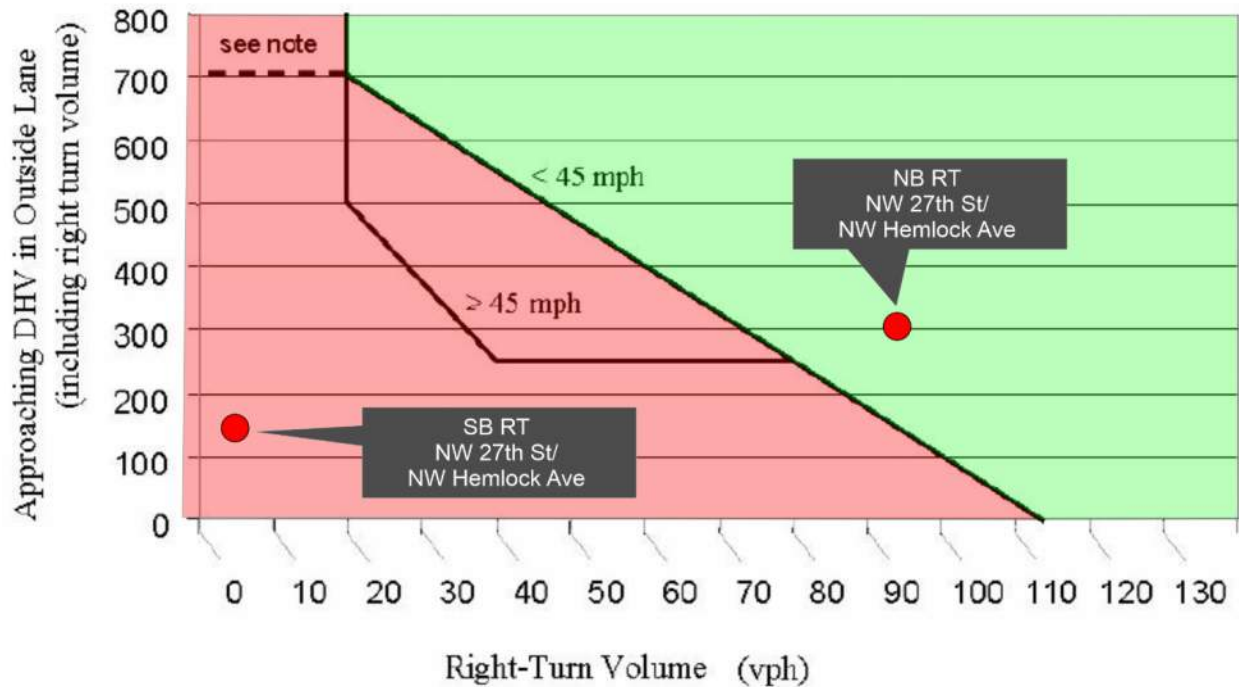


Figure 31. NW 27th Street Right-Turn Warrant Assessment: Year 2030 Total Traffic Volumes, Weekday PM Peak Hour.

ROADWAY CROSS-SECTIONS

The proposed Hayden Homes development has frontage along Northwest Way, NW Upas Avenue, and NW Quince Avenue with NW Spruce Avenue planned to bisect the site. Northwest Way is classified as a *Minor Arterial* and NW Spruce Avenue as a *Major Collector*. These roadways are intended to support higher levels of mobility within the City while NW Upas Avenue and NW Quince Avenue are *Local Streets*, which are intended to serve local needs with a higher focus on access. The attachments include the civil plan sheets containing the proposed roadway names and classifications for reference, along with larger-scale drawings to better illustrate the proposed roadway dimensions.

The existing right-of-way on Northwest Way along the site ranges from 60 to 80 feet, with a 30-foot half width along the site frontage. As part of development an additional 20 feet of right-of-way will be dedicated along Northwest Way to accommodate a multi-use trail and completing frontage improvements that are also conditioned on the adjacent Dry Canyon PUD. This streetscape continues to follow the modifications to the original NAP that were approved with Dry Canyon. Figure 32 shows the standard Minor Arterial section, and Figure 33 shows the planned cross-section for Northwest Way (street sections are included in the attachments in larger format).

The upgrade of Northwest Way between NW Maple Avenue and NW Upas Avenue to a three-lane section is also identified as a priority street capacity improvement in the City's TSP as project S7. This 1-mile long project is estimated to cost \$5.8 million in 2020 dollars. The Hayden Homes frontage improvements along Northwest Way along with the Dry Canyon PUD frontage improvements complete approximately half of this TSP project.

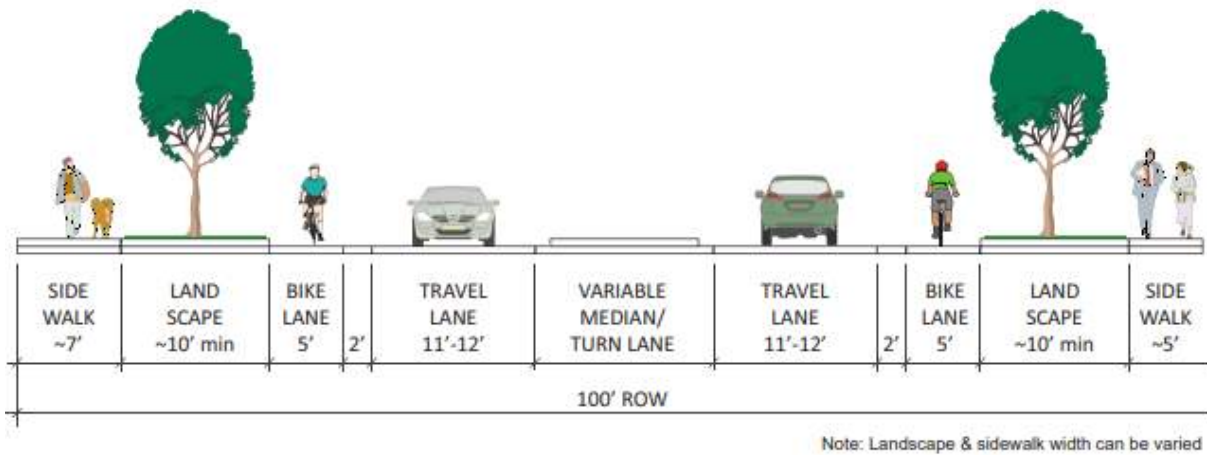


Figure 32. City of Redmond Standard *Minor Arterial* Section.

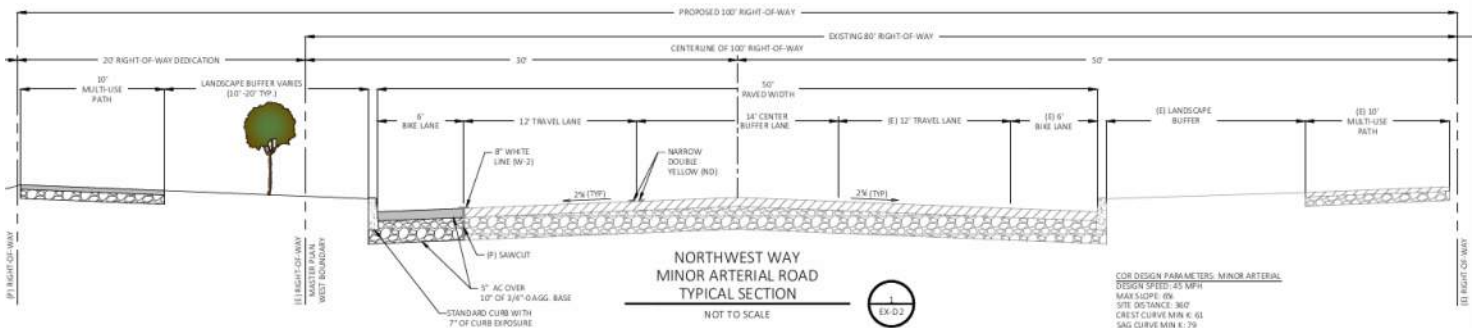


Figure 33. NW Northwest Way adjacent to the Dry Canyon PUD.

The cross-section of NW Northwest Way contains 12-foot travel lanes and 6-foot bicycle lanes, and a 10-foot wide asphalt multi-use pathways along the western frontage. Modifications to the pavement striping could be considered within the 50-foot paved width, with the flexibility to narrow both the travel lanes and center turn lane if buffered bicycle lanes were desired or to accommodate pedestrian refuge islands where enhanced pedestrian crossings are located. It is recommended that with the planned completion of the half-street improvements that this design be discussed with City of Redmond staff.

NW Spruce Avenue currently has 60 feet of right-of-way and is unimproved. Based on its classification, additional right-of-way will be dedicated providing a total of 80-feet of right-of-way. This will accommodate two travel lanes, bicycle lanes, and 10-foot wide pathways along either side of the road, separating with landscape strips of varying width. As the pavement width conforms with the City's standards, striping modifications can be considered to include buffered bicycle lanes, although with the widened pathways replacing typical sidewalks it is recommended that the design match the section already approved to the east as shown in the civil plans. With the pathways this design already achieves the lowest level of cycling stress, which is suitable for cyclists of all ages/abilities using the off-street pathways.

The construction of NW Spruce Avenue between NW 31st Street and NW 22nd Street is identified as Project S8 in the City's TSP. It was assumed to be a two-lane collector. The standard Major Collector design is provided in Figure 34.

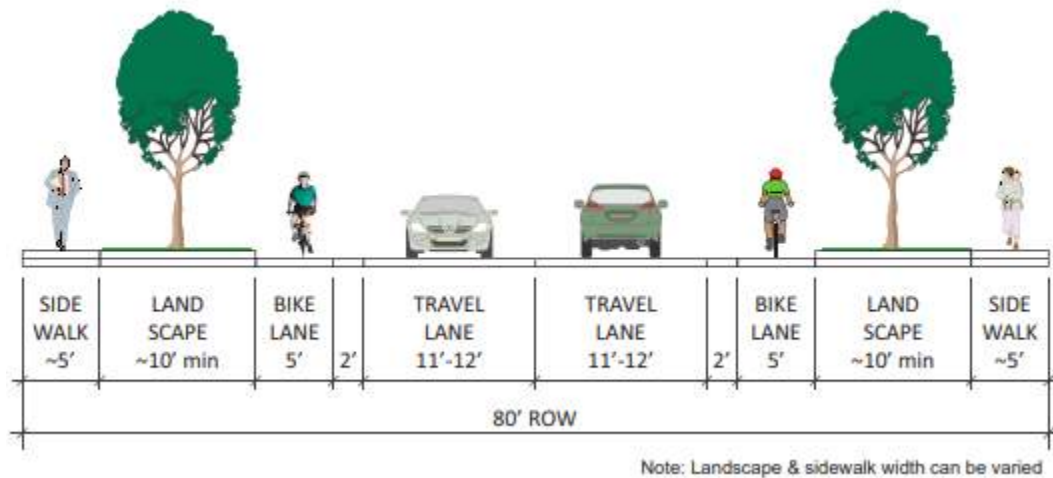


Figure 34. *Major Collector Cross-Section* illustrating the varying lane widths and buffered bicycle lanes and standard sidewalks in lieu of a paved multi-use pathway.

Source: Redmond Transportation System Plan Dated: December 2020

NW Upas Avenue contains a rural two-lane section, and is currently within Deschutes County jurisdiction. Typical complete street improvements include a 36-foot pavement width within a 60-foot public ROW, and detached sidewalks along the frontage. As previously discussed, as the project frontage does not extend to NW Northwest Way it is recommended that fee in-lieu payments be provided to the City when the urban streetscape can be completed to the intersection. In the interim, the connections to this corridor should remain gated, allowing its continued use by the surrounding rural properties. The safety/sight distance improvements identified within this report will address current safety needs at the intersection. Further discussions with the City of Redmond and Deschutes County will be required to better understand whether there are current plans to annex this street into the City.

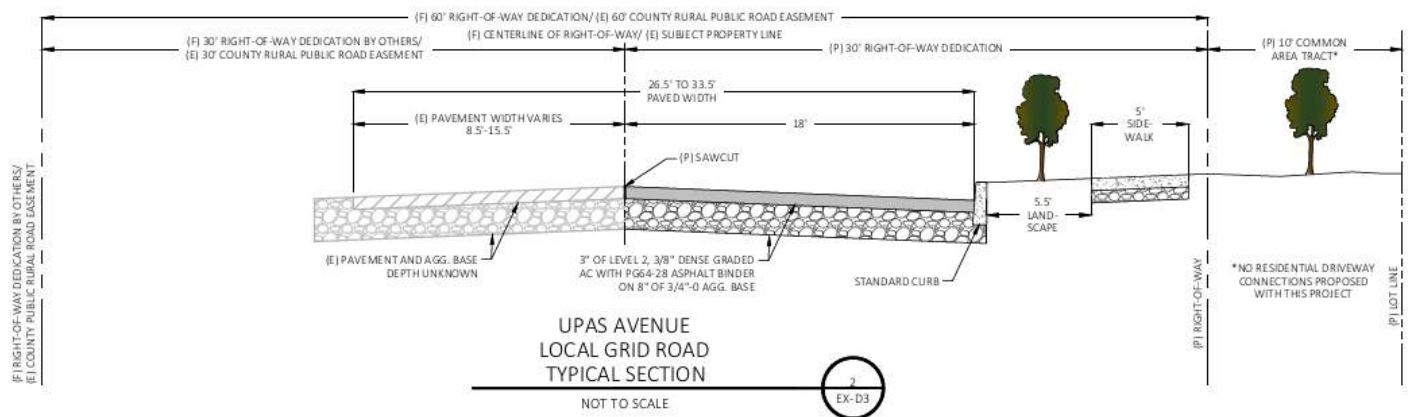


Figure 35. NW Upas Avenue half-street improvements.

Source: Know Ledge Engineering, LLC

NW Quince Avenue, which is classified as a *local street*, will be constructed along the south side of the site. Right-of-way dedication and half-street improvements are required to meet standards. The proposed $\frac{1}{4}$ street design is shown in Figure 34, including a 36-foot pavement width, curbs on both sides of the street, and northern sidewalks.

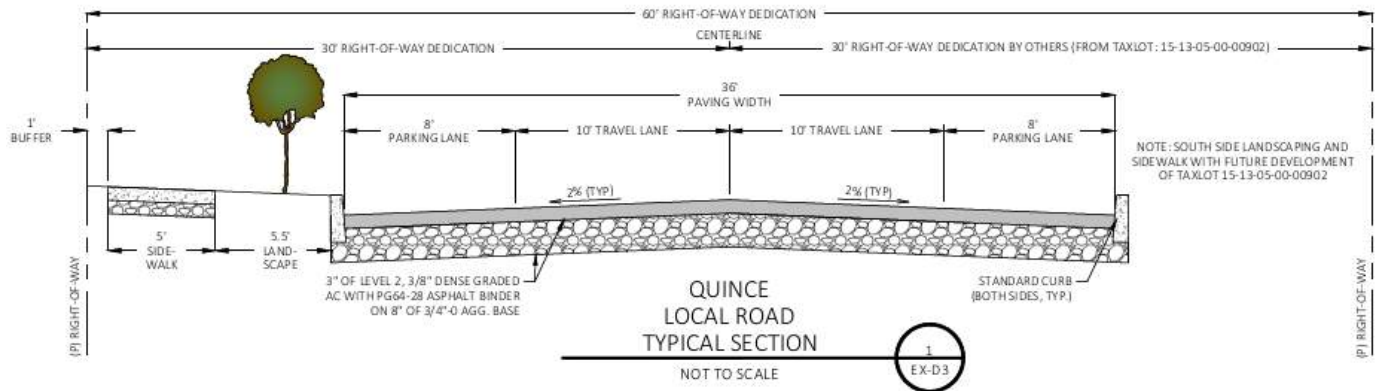


Figure 36. Proposed 1/4 street improvements on NW Quince Avenue
 Source: Know Ledge Engineering, LLC

PEDESTRIAN CONNECTIVITY AND CROSSINGS

An extensive trail system is planned throughout the project in compliance with the connections identified in the NAP. This includes an off-street trail system along the northeast corner of the property along the canal easement, a multiuse pathway along the west side of NW Northwest Way, multiuse paths along both sides of NW Spruce Avenue, and east-west pathways through the common area open space.

Two enhanced pedestrian crossings are proposed to link this project to the east, which will connect to the Dry Canyon Trail system. An enhanced crossing is proposed in the northeast corner of the property, and on the north side of NW Spruce Avenue. These crossings are being planned with the following features:

- Crosswalk signing and striping
- Overhead illumination
- Raised pedestrian refuge island

The crossing at the northern end of the site will be able to place the pedestrian refuge within the center lane, but there are left-turn lanes at the NW Spruce Avenue intersection that would create conflicts with a similar design in this location. In discussing design options with the civil team we will review layout options to place the refuge island between the northbound through and left-turn lane, similar to the design at the NE Butler Market Road/NE Wells Acres Road intersection in Bend (see Figure 37). The benefit of this configuration is that it avoids the blind spot created when views of a pedestrian are occluded for through traffic by a left-turning vehicle.



Figure 37. Example of a pedestrian crossing with a median refuge and left-turn lane (maps.google.com).

The proposed crossings will provide connections from the site to the Dry Canyon Trail system and the adjacent neighborhoods. The north-south pedestrian routes will also provide adjacent parcels this same trail system access, as well as support a more urban environment that should help reduce the posted speed from 50 miles per hour to 40 (or 35) miles per hour.

TPR COMPLIANCE

The proposed development includes relocation of R-4 and R-5 lands within the overall master plan. The overall acreage of these areas is preserved, and the relocation is only intended to better support the planned subdivision layout and density transition. As the same acreages are retained for each zoning designation following the land swap, no changes will occur to the City's Transportation System Plan that would result in changing roadway classifications or other long-term impacts. Accordingly, compliance with the Transportation Planning Rule is maintained.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Transportation Impact Analysis prepared for the proposed Northwest Area Plan Lands – Hayden Homes development identified the following:

- The proposed 76.82-acre site will consist of a total of approximately 457 new dwelling units supported by over 8 acres of open space. The units will consist of a mix of single-family detached homes, detached cottage units, attached cottage units, and apartments.
- Access to the development will be provided by mostly local streets in a grid-like pattern. Two primary access connections are provided onto NW Northwest Way at NW Quince Avenue and NW Spruce Avenue. A private driveway access to the multifamily site is also anticipated, though no specific plans are yet available for this layout.
- Secondary access is proposed to NW Upas Avenue. While ½ street right-of-way will be provided with this development, any new public connections to NW Upas Avenue should be gated until full ROW is available to improve the road to the City's urban standards between the access and NW Northwest Way. In addition to ½ street right-of-way dedication, a fee in-lieu payment is recommended for this streetscape, with improvements occurring following annexation of a full road into the City of Redmond.
- The proposed development has 60.39 acres designated as *General Residential* (R-4) and 16.43 acres designated as *High Density Residential* (R-5) development. The proposal slightly modifies the location of the R-4 and R-5 lands but maintains the same overall acreage of each. The change is consistent with the TPR. The land is located within the City's Urban Growth Boundary but outside City limits, and is currently finalizing an annexation agreement that will formally bring these lands into the City.
- The development is estimated to generate 3,634 weekday daily trips of which 320 trips (197 in, 120 out) are expected to occur during the weekday p.m. peak hour.
- The area safety review shows that the SW 27th Street/SW Highland Avenue (OR 126) intersection has been listed on the state's Safety Priority Index System. An elevated crash rate is also present at NW Northwest Way/NW Upas Avenue, and at SW Black Butte Boulevard/SW 9th Street.
- No sight distance issues were identified at the proposed new street connections to Northwest Way. At the NW Northwest Way/Upas intersection there are sight line constraints due to adjacent vegetation both north and south of the intersection, and it is recommended that this vegetation be trimmed/removed within the ROW, or within property under control of Hayden Homes.
- Per City Council direction, the study area was expanded to include those intersections also required for analysis as part of the Vollertsen Master Plan development. This allowed the TIA to consider the cumulative impacts of both projects on the system.
- Within the study area, the traffic operations analysis shows that the SW 27th Street/SW Highland Avenue intersection exceeds State operation standards under existing conditions.
- In the future, the planned extension of NW 27th Street to NW Northwest Way will further increase travel along the SW 27th Street to NW Northwest Way route, also requiring improvements to the NW 27th Street/NW Antler Avenue intersection (signalization) as identified within the adopted TSP.
- The future traffic operations analysis show that all study intersections are expected to meet City and State operation standards with buildout of the site in year 2030 with the continued exception of the SW 27th Street/SW Highland Avenue intersection. No improvements were identified for the SW 27th Street/SW Highland Avenue intersection in the TSP given its physical constraints. The TSP notes that the City and State will collaborate in adopting alternative mobility targets to address future traffic volumes as needed.

- In lieu of capacity improvements at the signalized intersection, it is recommended that mitigation be provided through improved connections to the Dry Canyon Trail system (with enhanced pedestrian crossings of NW Northwest Way), transit coordination and placement of a new bus stop near Spruce Avenue.
 - Broader system mitigation could also occur through investments in parallel routes such as SW 35th Street and SW Helmholtz Way, as identified in the City's TSP. The cost of improving these intersections is prohibitively expensive for any single project and would be best addressed through some form of City-established pro-rata contribution, which could serve as a local match in pursuing ODOT STIP funds.
- The year 2035 planning analysis showed that all intersections are expected to meet City and State standards with the continued exception noted above. While meeting City standards, additional operational issues are forecast at the following intersections within the build-out scenario:
 - NW 6th Street/NW Maple Avenue – Intersection is forecast to operate at its carrying capacity.
 - SW 27th Street/W Antler Avenue – Northbound shared through-right lane is expected to operate with long delays. Improvements are identified in the TSP.
- Left-turn lanes are warranted based on ODOT methodologies at the following intersections in 2030 with site traffic from the Vollertsen Master Plan and Hayden Homes developments:
 - Northwest Way/NW Spruce Avenue: northbound left-turn lane
 - Northwest Way/NW Quince Avenue: northbound left-turn lane

It is recommended that these left-turn lanes be installed when the connection is made/improved to NW Northwest Way.

- NW 22nd Street/NW Maple Avenue: eastbound left-turn lane

No improvements are recommended. The planned extension of new east-west streets between NW Northwest Way and the neighborhoods to the east will reduce the consolidated turns at this intersection. Regardless, widening of NW Maple Avenue to a three-lane section should be considered throughout the corridor (where possible).

- SW Canyon Drive/SW Black Butte Boulevard: westbound left-turn lane warranted in 2030 with or without the proposed developments.

As the project does not contribute any trips to this turning movement no mitigation is recommended.

- A northbound right-turn deceleration lane is warranted at the Northwest Way/NW Quince Avenue intersection in 2030 with or without site development (primarily due to the Vollertsen property). It is recommended that the City consider the streetscape vision for this corridor, as additional right-turn lanes will serve to maintain the high speeds and create conflicts with the planned bicycle lanes.
- Volume-based MUTCD signal warrant criteria are currently met at the SW 19th Street/SW Maple Avenue intersection and are expected to continue to meet these criteria at the time funding is available in 2023/2024.
- Frontage improvements will be required on Northwest Way to provide a three-lane section and multi-use trail. Improvements will also include dedication of an additional 20 feet of right-of-way to comply with City standards. Right-of-way dedication and frontage improvements will also be required on NW Upas Avenue and NW Quince Avenue to meet the City's *Local Street* standards, and NW Spruce Avenue, which bisects the site, will require additional right-of-way and improvement to the City's *Major Collector* standards. Review of the roadway striping dimensions

on the major streets should be further discussed with City staff given the inclusion of multiuse pathways that create a low-stress off-street cycling system.

- The project will contribute to the City's long-range transportation needs through payment of Transportation System Development Charges. With a 2023 transportation SDC fee of \$4,678 per weekday p.m. peak hour trip this equates to about \$1.5M in transportation improvements beyond the projects that will be constructed.

These items are summarized within Figure 35 below.



Figure 38. Summary of Area Mitigation Needs

Further discussions with the City, Deschutes County, and ODOT will be required to finalize a mitigation strategy for the OR 126/SW 27th Street intersection, coordinate with Cascades East Transit on an ideal stop location, and finalize the proposed roadway cross-sections and discussions related to NW Upas Avenue. Pending staff's initial review of these materials our team will also work on developing a mitigation/phasing plan to allocate improvements to specific phases of the development. Thank you for the opportunity to work with you on this project, please let me know if you have any questions related to the findings of this Transportation Impact Analysis at (503) 997-4473 or at joe@transightconsulting.com.

Attachments:

- Project Scoping Materials
- Crash Analysis Worksheets
- Traffic Count Worksheets
- Year 2022 Existing Conditions LOS Worksheets
- Year 2030 Background Conditions LOS Worksheets
- Year 2030 Total Traffic Conditions LOS Worksheets
- Year 2035 Background Conditions LOS Worksheets
- Year 2035 Total Traffic Conditions, LOS Worksheets
- MUTCD Signal Warrant Analysis
- Roadway Cross-Sections



TRANSPORTATION SYSTEM ANALYSIS APPLICATION

Applicability: Required when a proposed development involves either a Subdivision, Site and Design Review, Planned Unit Development, Master Plan, Comprehensive Plan Amendment, a change or expansion of use, or any other development that the City Engineer deems necessary. This application is not required for residential site plan review (4 units or less) or for partitions (3 lots or less).

This application must be approved prior to submitting a land use application for the project.

Applicant Information

Applicant: Joe Bessman Email: joe@transightconsulting.com
Company: Transight Consulting, LLC Phone: 503 997 4473
Address: 61271 Splendor Lane, Bend, OR 97702
Date Submitted: 4/21/2023

Owner Information

Owner: Megan Norris Email: mnorris@hayden-homes.com
Company: Hayden Homes Phone: 916-529-5691
Address: _____

Project Information

Project Title: Hayden Homes' Northwest Redmond Tax Lot Number(s): 1513050000800, 1513050000804, 1513050000600
Project Address: 2515 Northwest Way
Zone: R-4/R-5 Area (SF): 76.82 Acres
Existing Use: Rural/Agricultural
Proposed Use(s) and code(s) per the Institute of Transportation Engineer's (ITE) Manual, 11th Edition:
See attached
Total PM Peak Trips: 320 Average Daily Trips (ADT): 3634

Reserved for City of Redmond Approval

Reviewed by: _____
Approved (date): _____
Approved PM Peak Trips: _____
Approved ADT: _____





Date:	April 21, 2023
To:	David Pilling, City of Redmond
From:	Joe Bessman, PE
Project Reference No.:	1361
Project Name:	Northwest Area Plan Lands – Hayden Homes



This memorandum updates the March 2022 scoping materials and follows the January 2022 TPR compliance materials for the Northwest Area Plan lands with the current site layout and unit mix. The purpose of this memorandum is to evaluate the scope of what will be required in the upcoming Transportation Impact Analysis in accordance with Redmond Development Code 8.2815, for the proposed Hayden Homes development located within the Northwest Area Plan Lands in Redmond, Oregon.

AREA AND PROPERTY DESCRIPTION

The overall site consists of 76.82 acres of land west of NW Northwest Way that is bisected by Spruce Avenue (see Figure 1). The site covers three parcels (tax lots 1513050000600, 1513050000804, and 1513050000800) of which 60.39 acres are designated *General Residential* (R-4) and 16.43 acres are designated for *High Density Residential* (R-5) development. The proposal will slightly modify the location of the R-4 and R-5 lands but will maintain the same overall acreage of each. The lands were recently rezoned (consistent with the adopted Transportation System Plan) and there is a recorded annexation agreement in place with the City of Redmond, with annexation taking place following master plan approval.



Figure 1. Site vicinity map. *Source: Deschutes County DIAL.*

This site is included in the Northwest Area Plan (NAP) that was prepared in August 2007 as a supplement to the City's Transportation System Plan. The purpose of the plan was to identify general land use designations and future zoning to be incorporated as part of future annexation efforts. This plan established the anticipated amounts and character of residential, commercial, and employment lands, and was also intended to identify financing strategies. Implementation of the plan was intended to be expedited if plans were consistent with the NAP framework, as the subarea was adopted as an element of the City's Comprehensive Plan.

The NAP, in Figure 2, shows street extensions through the site to include NW Spruce Avenue, a new east-west street north of NW Spruce Avenue and a new north-south street west of NW Northwest Way. The NAP also includes a plan for proposed trail corridors through the site as shown in Figure 3. This shows a proposed off-street trail adjacent to the Central Oregon Irrigation District (COID) canals in the northeast corner of the site that would connect in the future to the Dry Canyon Park and trail system to the east of the site.

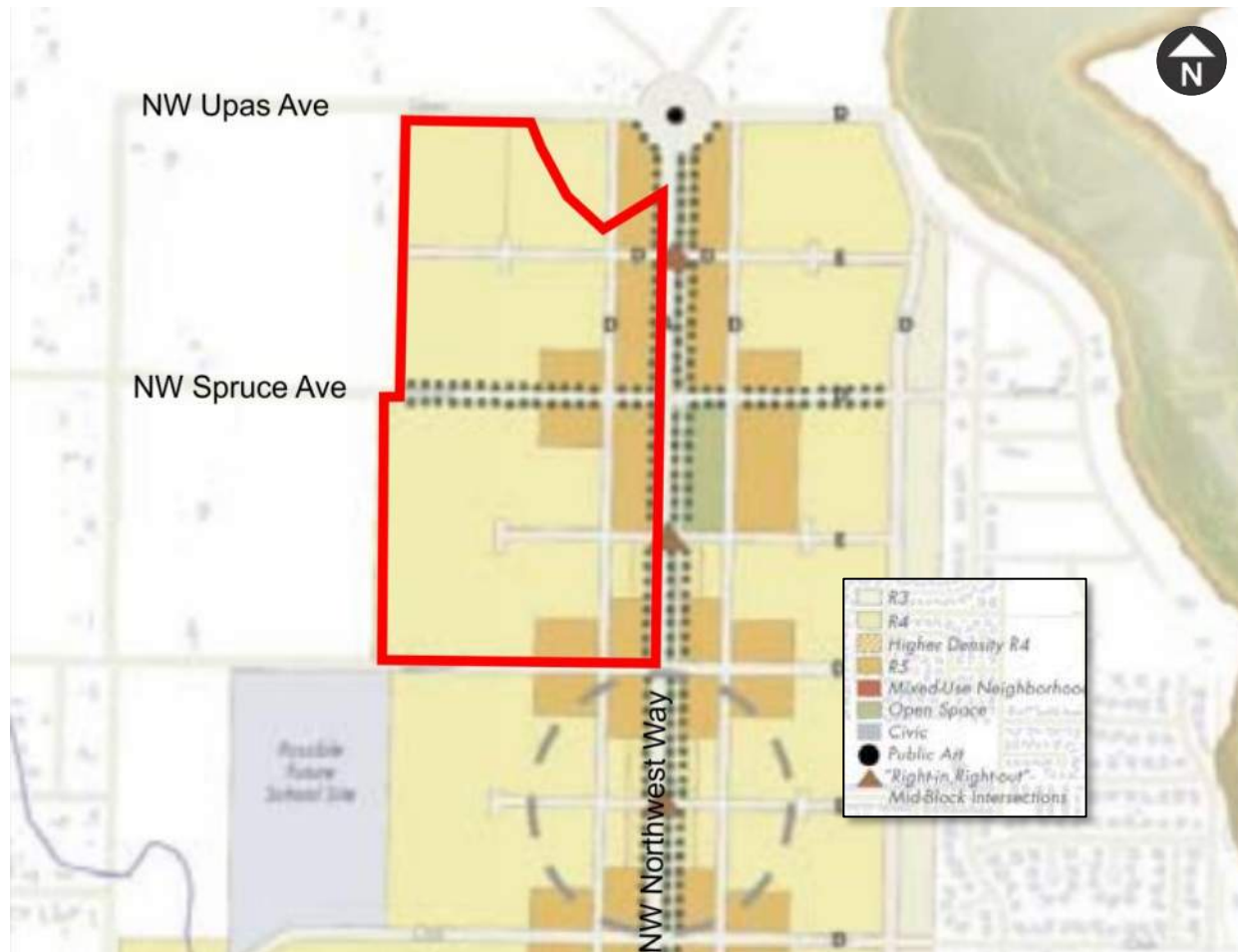


Figure 2. Northwest Area Plan



Figure 3. Northwest Area Plan Existing and Proposed Trail Corridors.

PROPOSED DEVELOPMENT PLAN

The proposed development plan for the property will slightly revise the location but maintains the acreage of the existing R-4 and R-5 zoning designations. The revised development plan for the property maintains the acreage of the existing R-4 and R-5 zoning designations and includes a net density of 10.54 dwelling units per acre, totaling 457 residential units. This is broken down to include the following:

- 175 single-family detached residential units (38%)
- 182 attached cottage/townhome units (40%)
- 100 apartment units (22%)

These changes reduce the number of single-family homes and increase the cottage/townhome product mix.

The preliminary site layout is provided in Figure 4 illustrating the circulation and access plan for these lands. As shown, this plan includes placement of the higher-density lands along the NW Northwest Way

corridor, with reducing density toward the west. Parks lands surround the adjacent taxlot on the north side of the site, and additional parks and green space are interspersed throughout the development.

The streets are laid out in a grid pattern with two proposed north-south streets (30th Street and 31st Street) connecting NW Upas Avenue to NW Quince Avenue. NW Spruce Avenue, an east-west street, will be built through the center of the site connecting to NW Northwest Way on the east edge of the site and stubbed to the west to connect to future development. Similarly, NW Upas Way and NW Quince Avenue will be improved along the site frontage and will provide east-west connections. A trail system is included throughout the site connecting the neighborhood parks to the 30th Street and NW Spruce Avenue trail corridors, and the trails along the COID canal.

Access to the subdivision will be provided by NW Upas Avenue, NW Spruce Avenue, and NW Quince Avenue, with access primarily from NW Northwest Way.



Figure 4. Preliminary site plan. Source: KnowLedge Engineering, dated 4/6/2023.

TRIP GENERATION ESTIMATES

Preliminary trip generation estimates were prepared to assess the overall trip generation potential of the proposed project. These estimates remain preliminary subject to more detailed site layout review; the specific density may vary slightly throughout the development review process.

Trip generation estimates were based on national data within the Institute of Transportation Engineers' standard reference *Trip Generation, 11th Edition*. This reference provides cordon-area trip generation surveys of similar uses throughout the US. For the subject site located on the west edge of Redmond the *General Urban/Suburban* data has been applied.

Based on the different unit types, the following ITE land use classifications were applied to the housing products:

- Single-family detached units: (ITE Land Use 210) - A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.
- Attached Cottage/Townhome Units: (ITE Land Use 215) - Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space. The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).
- Apartment units: (ITE Land Use 220) - Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.
 - A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.
 - A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.
 - A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.
 - A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Using these land use descriptions as summarized above, Table 3 provides the estimated trip generation for the proposed development. Note that ITE's average rate equations were applied to each of the housing types.

Table 1. Trip Generation Estimates (ITE 11th Edition, General Urban/Suburban Area Classification)

ITE Land Use	ITE Code	Size (Units)	Weekday Daily Trips	Weekday PM Peak Hour		
				Total	In	Out
Single Family Detached Housing <i>ITE Trip Rate</i>	210	175 Units	1,650 <i>(9.43/Unit)</i>	165 <i>(0.94/Unit)</i>	104 63%	61 37%
Single Family Attached Housing <i>ITE Trip Rate</i>	215	182 Units	1,310 <i>(7.20/Unit)</i>	104 <i>(0.57/Unit)</i>	61 57%	43 43%
Multifamily Housing (Low-Rise) <i>ITE Trip Rate</i>	220	100 Units	674 <i>(6.74/Unit)</i>	51 <i>(0.51/Unit)</i>	32 63%	19 37%
Total		457 Units	3,634	320	197	123

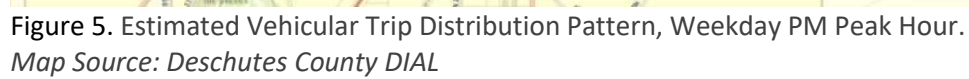
Table 1 shows that the residential development will produce about 3,634 trips on a weekday daily basis, with approximately 320 trips during the weekday p.m. peak hour (78 fewer weekday p.m. peak hour trips than the original plan). This translates to about 4.2 weekday p.m. peak hour trips per gross acre. The Redmond Development Code requires a Transportation Impact Analysis for all new developments expected to generate more than 20 weekday p.m. peak hour trip ends. Therefore, a traffic study is required for this development.

TRIP DISTRIBUTION AND TRIP ASSIGNMENT

The distribution pattern for residential uses on the northwest side of the City will largely be oriented toward the south and east as shown in Figure 5. Trips heading to the north will largely occur along Maple Avenue to cross the Dry Canyon until the Northwest Way extension is completed north of the site. Longer term with this connection, trips will reroute to Pershall Way to access US 97 north.

The City's 5-year Capital Improvement Plan includes an arterial connection of NW 27th Street between NW Maple Avenue and NW Hemlock Avenue in Fiscal Year 2025 to 2026. While vehicles are unable to drive this route today, this connection will be in place at the time of buildout, which is estimated to be in 2030. Vehicles heading south and east of the site will be using NW 27th Street, NW Maple Avenue, and W Antler Avenue to head to their destinations.

City of Redmond Code requires that the Traffic Study Area include all site-access points to the public roadway system via either a driveway or private roadway, along with Collector and Arterial intersections affected by 25 or more weekday p.m. peak hour trips. This requires the analysis of an extensive number of intersections throughout the City. Longer-term, as area roads are developed and more supportive uses are provided within proximity of the site, trips will be better internalized, and trips that do extend from the Northwest Area Plan boundaries will become more dispersed on the system. For analysis purposes, Figure 6 illustrates the impacts of full site build-out could create on the current system.



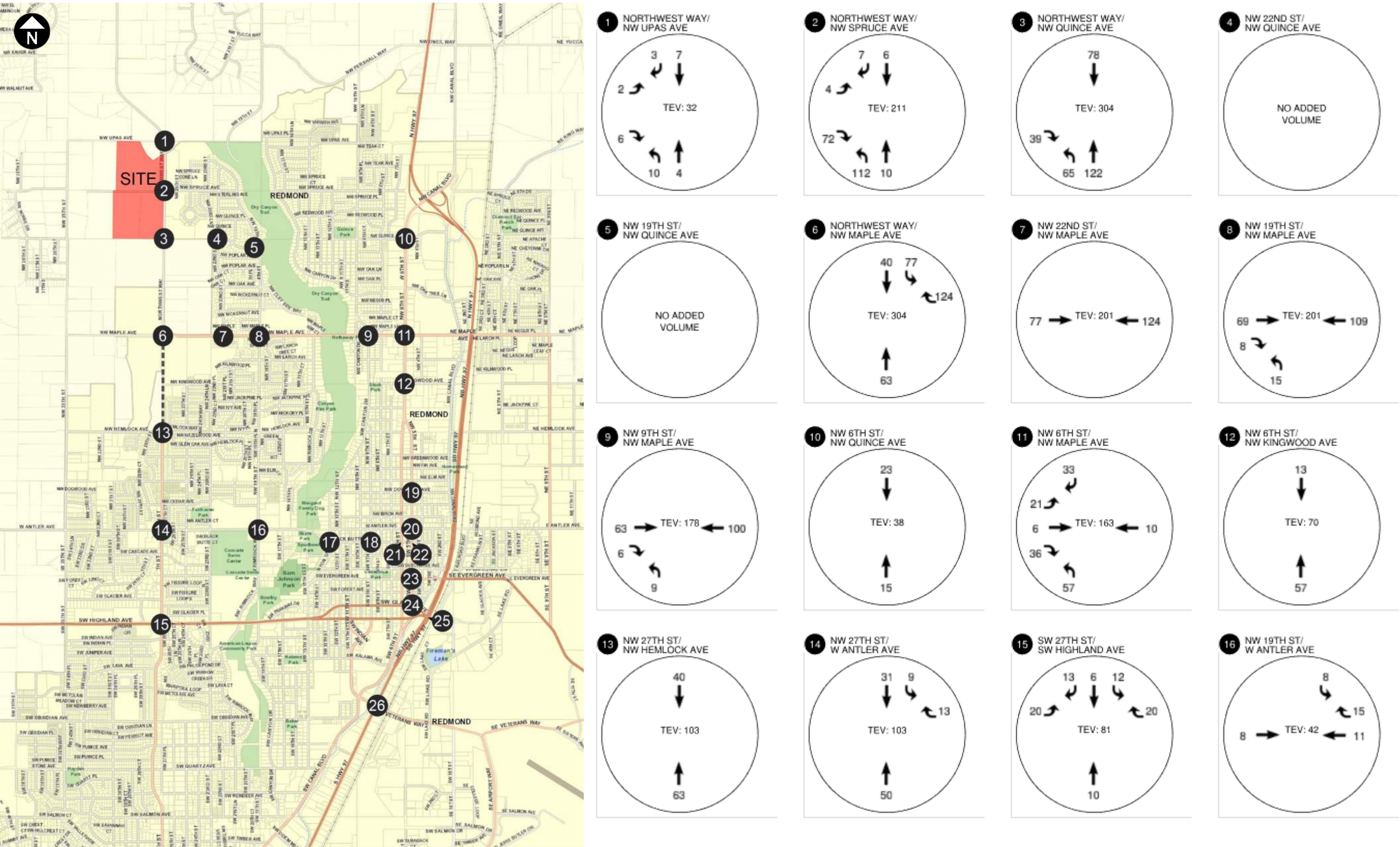


Figure 6. Estimated Vehicular Trip Assignment, Weekday PM Peak Hour.
Map Source: Deschutes County DIAL

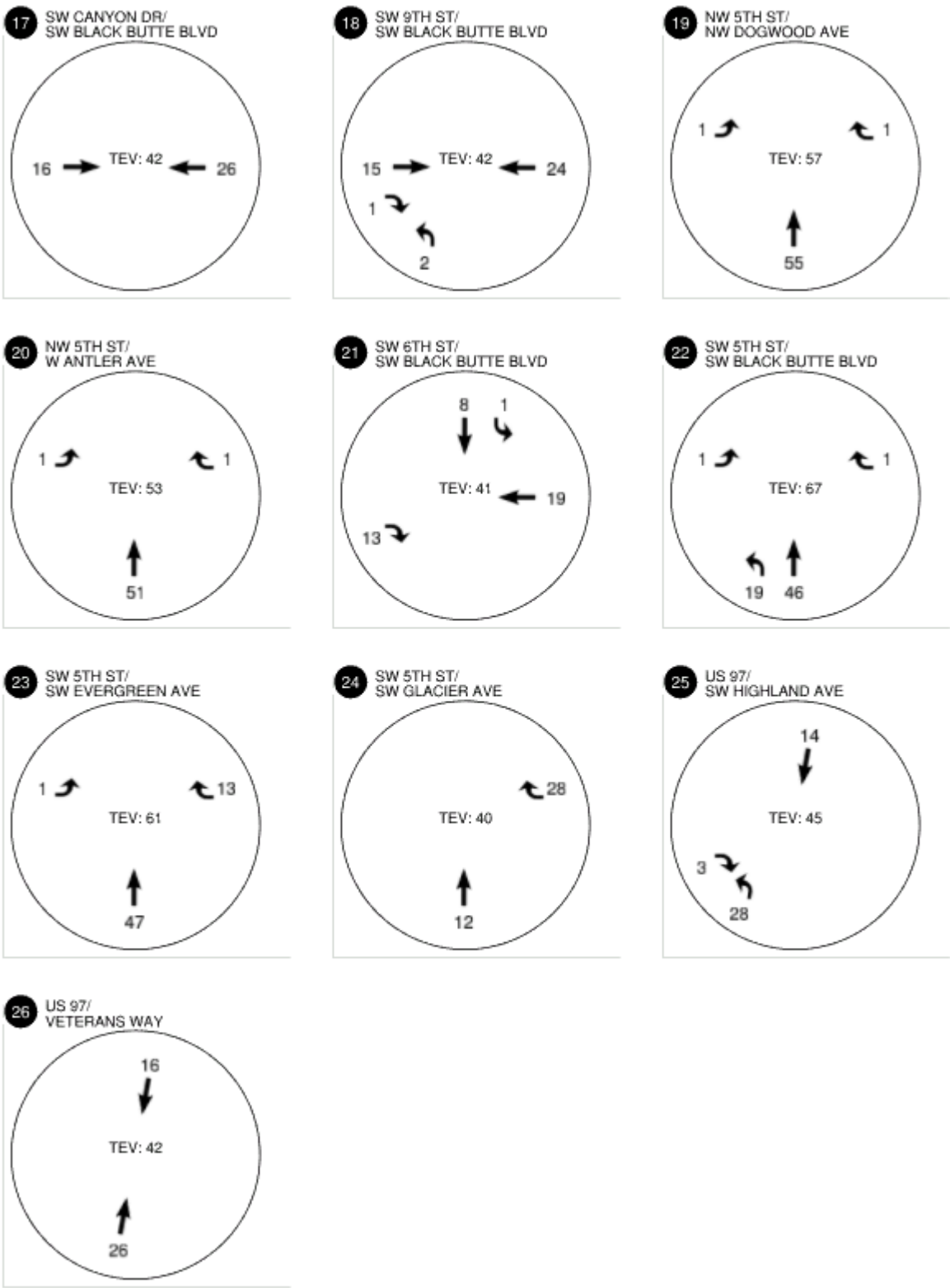


Figure 6 (cont.). Estimated Vehicular Trip Assignment, Weekday PM Peak Hour.

Redmond Development Code 8.3035.8B requires the TIA to study:

1. All site access intersections
2. Nearest intersecting collector or arterial street upstream and downstream of the development.
3. Any other collector or arterial street intersection that would experience an increase of 25 additional peak hour trips.
4. Additional intersections requested by staff.

Many of the trips are expected to utilize intersections under ODOT jurisdiction. ODOT analysis criteria commonly considers 50 or more weekday p.m. peak hour trips as its threshold of significance.

Based on these requirements, the TIA scope includes:

- Intersection 1: Northwest Way/NW Upas Avenue (*site access*)
- Intersection 2: Northwest Way/NW Spruce Avenue (*site access*)
- Intersection 3: Northwest Way/NW Quince Avenue (*site access*)
- Intersection 6: Northwest Way/NW Maple Avenue (*nearest arterial downstream from the development, >25 new trips*)
- Intersection 8: NW 19th Street/NW Maple Avenue (*>25 new trips*)
- Intersection 9: NW 9th Street/NW Maple Avenue (*>25 new trips*)
- Intersection 10: NW 6th Street/NW Quince Avenue (*>25 new trips*)
- Intersection 11: NW 6th Street/NW Maple Avenue (*>25 new trips*)
- Intersection 12: NW 6th Street/NW Kingwood Avenue (*>25 new trips*)
- Intersection 13: NW 27th Street/NW Hemlock Avenue (*>25 new trips*)
- Intersection 14: NW 27th Street/W Antler Avenue (*>25 new trips*)
- Intersection 15: SW 27th Street/SW Highland Avenue (*>50 new trips*)
- Intersection 16: NW 19th Street – SW Rimrock Way/W Antler Avenue (*>25 new trips*)
- Intersection 17: SW Canyon Drive/SW Black Butte Boulevard (*>25 new trips*)
- Intersection 18: SW 9th Street/SW Black Butte Boulevard (*>25 new trips*)
- Intersection 19: NW 5th Street/NW Dogwood Avenue (*>25 new trips*)
- Intersection 20: NW 5th Street/W Antler Avenue (*>25 new trips*)
- Intersection 21: SW 6th Street/SW Black Butte Boulevard (*>25 new trips*)
- Intersection 22: SW 5th Street/SW Black Butte Boulevard (*>25 new trips*)
- Intersection 23: SW 5th Street/SW Evergreen Avenue (*>25 new trips*)

Per City Council request, the analysis for the Hayden Homes development has been coordinated with the Vollertsen Master Plan to the southeast, as shown in Figure 1. While both applications are being concurrently prepared, the TIAs for each project will consider the cumulative impact of both projects on the system, providing a coordinated mitigation trigger for any locations unable to support build-out of both projects. As such, the study intersections for the Hayden Homes development have been expanded to include those also required for study in the Vollertsen Master Plan development and are listed below:

- Intersection 4: NW 22nd Street/NW Quince Avenue (*Vollertsen Master Plan study Intersection*)
- Intersection 5: NW 19th Street/NW Quince Avenue (*Vollertsen Master Plan study Intersection*)
- Intersection 7: NW 22nd Street/NW Maple Avenue (*Vollertsen Master Plan study Intersection*)

FUTURE CONDITIONS

Redmond Development Code 8.2815 requires that the study analyze a five-year forecast beyond the final phase. Based on an estimated completion of 2030, the traffic study will also analyze 2035 weekday p.m. peak hour traffic conditions.

TRANSPORTATION IMPACT ANALYSIS SCOPE

The information provided within this report is intended to provide an overview of the Hayden Homes development in Northwest Redmond. To prepare the Transportation Impact Analysis the following information is requested from the City:

- Confirmation that the study intersections comprise an adequate “study area” for the TIA.
- Confirmation on the trip generation and distribution patterns shown within this scoping letter.
- Confirmation that weekday p.m. peak period analysis is adequate.
- Growth assumptions will be based on volume projections from the 2020 Transportation System Plan (which are based on the Bend-Redmond travel demand modeling).
- Information on City-planned roadway improvement projects
- Information on approved in-process developments that will impact the study area intersections or facilities.

For additional project context, materials for the Hayden Homes’ NWAP lands have previously been sent to and reviewed by City staff, with this coordination and work efforts extending back to 2019. Final materials previously approved by City staff have been attached to this report to provide additional context with these discussions.

Thank you for the opportunity to submit these materials for initial review and discussion. Please let me know if you have any questions or comments on these transportation materials and scope at (503) 997-4473 or via email at joe@transightconsulting.com.

Attachments:

- TPR Compliance Materials



REGISTERED PROFESSIONAL
ENGINEER
70661PE
w Bess
OREGON
June 14, 2021
JOSEPH W. BESSMAY
EXPIRES: 12/31/2023

The purpose of this memorandum is to address Transportation Planning Rule compliance for the proposed Hayden Homes development located within the Northwest Area Plan lands. The overall site consists of 76.82 acres of land west of NW Northwest Way that is bisected by Spruce Avenue (see Figure 1). The land is designated for 60.39 acres of *General Residential* (R-4) and 16.43 acres of *High Density Residential* (R-5) development. The proposal will slightly modify the location of the R-4 and R-5 lands but will maintain the same overall acreage of each. The land is located within the City's Urban Growth Boundary but outside City limits, and is currently finalizing an annexation agreement that will formally bring these lands into the City.



Figure 1. Site vicinity map. *Source: Deschutes County DIAL.*



Figure 2. Preliminary site plan. Source: KnowLedge Engineering

The proposed development plan for the property will slightly revise the location but maintained the acreage of the existing R-4 and R-5 zoning designations. The preliminary plans include a net density of 11.1 dwelling units per acre, with 498 total units. This is broken down to include the following:

- 277 single-family detached residential units
- 49 detached cottage units
- 66 attached cottage units
- 106 apartment units

The preliminary site layout is provided in Figure 2 illustrating the circulation and access plan for these lands. As shown, this plan includes placement of the higher-density lands along the NW Northwest Way corridor, with reducing density toward the west. Parks lands surround the adjacent taxlot on the north side of the site, and additional parks and green space is interspersed throughout the development.

PRELIMINARY TRIP GENERATION ESTIMATES

Preliminary trip generation estimates were prepared to assess the overall trip generation potential of the proposed project. These estimates remain preliminary subject to more detailed site layout review; the specific density may vary slightly throughout the development review process.

Trip generation estimates were based on national data within the Institute of Transportation Engineers' standard reference *Trip Generation, 11th Edition*. This reference provides cordon-area trip generation surveys of similar uses throughout the US. For the subject site located on the west edge of Redmond the *General Urban/Suburban* data has been applied.

Based on the different unit types, the following ITE land use classifications were applied to the housing products:

- Single-family detached units and Detached Cottage Units: (ITE Land Use 210) - A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.
- Attached Cottage Units: (ITE Land Use 215) - Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space. The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).
- Apartment units: (ITE Land Use 220) - Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.
 - A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.
 - A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.
 - A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Using these land use descriptions as summarized above, Table 1 provides the estimated trip generation for the proposed development. Note that ITE's average rate equations were applied to each of the housing types.

Table 1. Trip Generation Estimates (ITE 11th Edition, General Urban/Suburban Area Classification)

ITE Land Use	ITE Code	Size (Units)	Weekday Daily Trips	Weekday PM Peak Hour		
				Total	In	Out
Single Family Detached Housing <i>ITE Trip Rate</i>	210	326 Units	3,074 <i>(9.43/Unit)</i>	306 <i>(0.94/Unit)</i>	193 <i>63%</i>	113 <i>37%</i>
Single Family Attached Housing <i>ITE Trip Rate</i>	215	66 Units	475 <i>(7.20/Unit)</i>	38 <i>(0.57/Unit)</i>	21 <i>57%</i>	17 <i>43%</i>
Multifamily Housing (Low-Rise)	220	106 Units	714 <i>(6.74/Unit)</i>	54 <i>(0.51/Unit)</i>	34 <i>63%</i>	20 <i>37%</i>
Total		498 Units	3,655	398	248	150

Table 1 shows that the residential development will produce about 3,655 trips on a weekday daily basis, with nearly 400 trips during the weekday p.m. peak hour. This translates to about 5.2 weekday p.m. peak hour trips per gross acre.

CITY OF REDMOND TRANSPORTATION SYSTEM PLAN

In 2019 our overall team worked with the City of Redmond to ensure that the 2020 Transportation System Plan was being developed to account for the Northwest Area Plan lands. A travel demand model request was obtained from ODOT's Transportation and Planning Analysis Unit (TPAU) in 2019 to review the development assumptions for the overall lands. This entire site is contained within Transportation Analysis Zone 617 (see Figure 3).

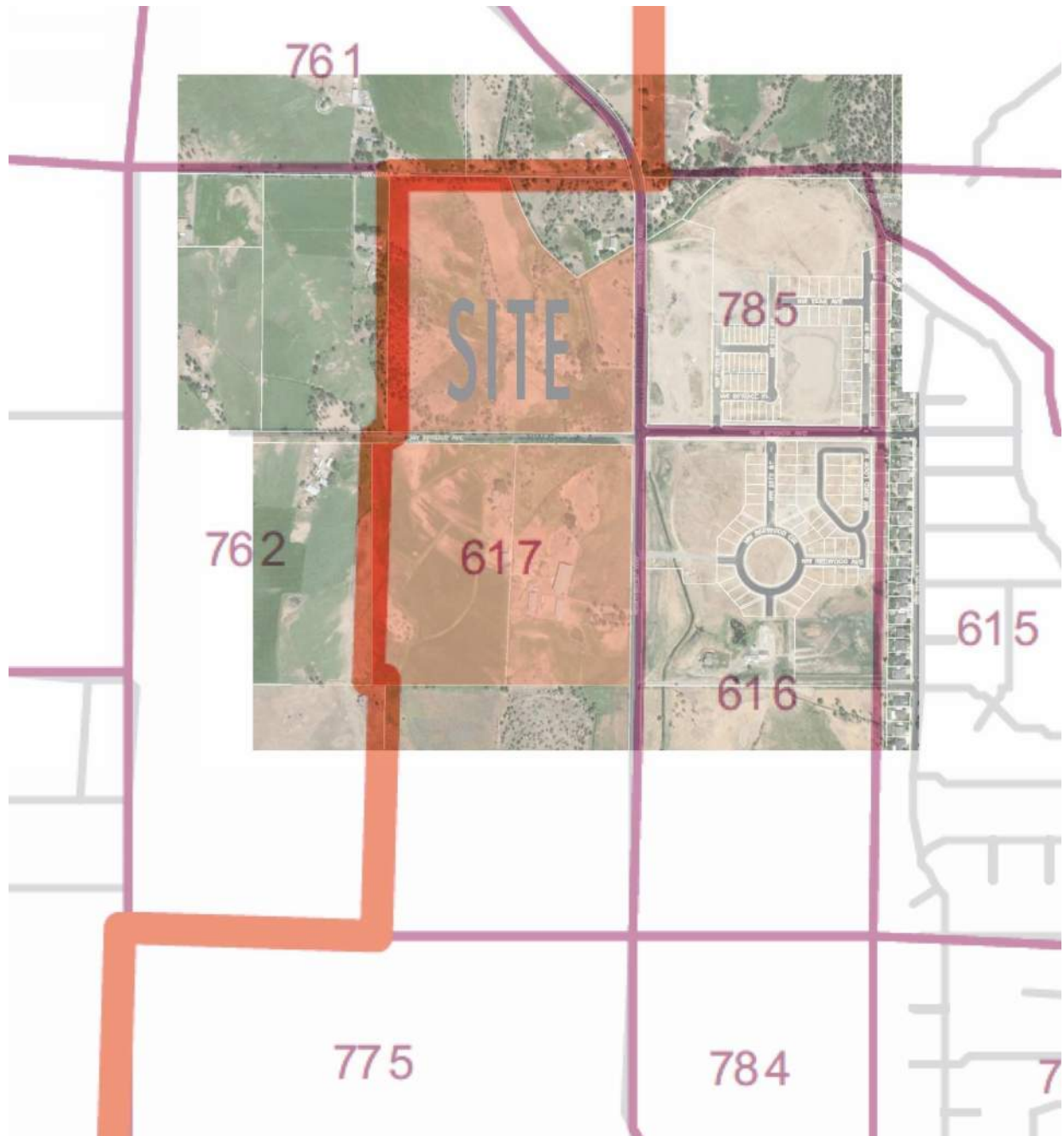


Figure 3. City of Redmond Transportation Analysis Zone overlaid on aerial.

Based on review of the population and employment within the travel demand modeling for this area, these lands were planned for the growth shown in Table 2. This indicates that there would be an increase of 319 housing units within this TAZ.

Table 2. Summary of Growth within TAZ 617

TAZ	Base Households (2010)	Future Households (2040)	Base Employees (2010)	Future Employees (2040)
617	4	323	0	0

The modeling further breaks down housing by type, showing that despite the lower number of total housing units that a quarter of the housing would be two person units, a quarter would be three-person units, and half would be occupied by four or more persons per unit. The modeling also identifies 372 persons within K-12 education within the area. As Figure 4 shows, this TAZ extends beyond the boundary of the specific site, with the subject property comprising about 64% of land area within TAZ 617. This indicates that despite being identified as the highest-growth area in Redmond within the City's long-range planning, the actual density of this area, projecting a similar density across the remaining lands within this TAZ, could result in about 140% more units than was assumed in the plan.

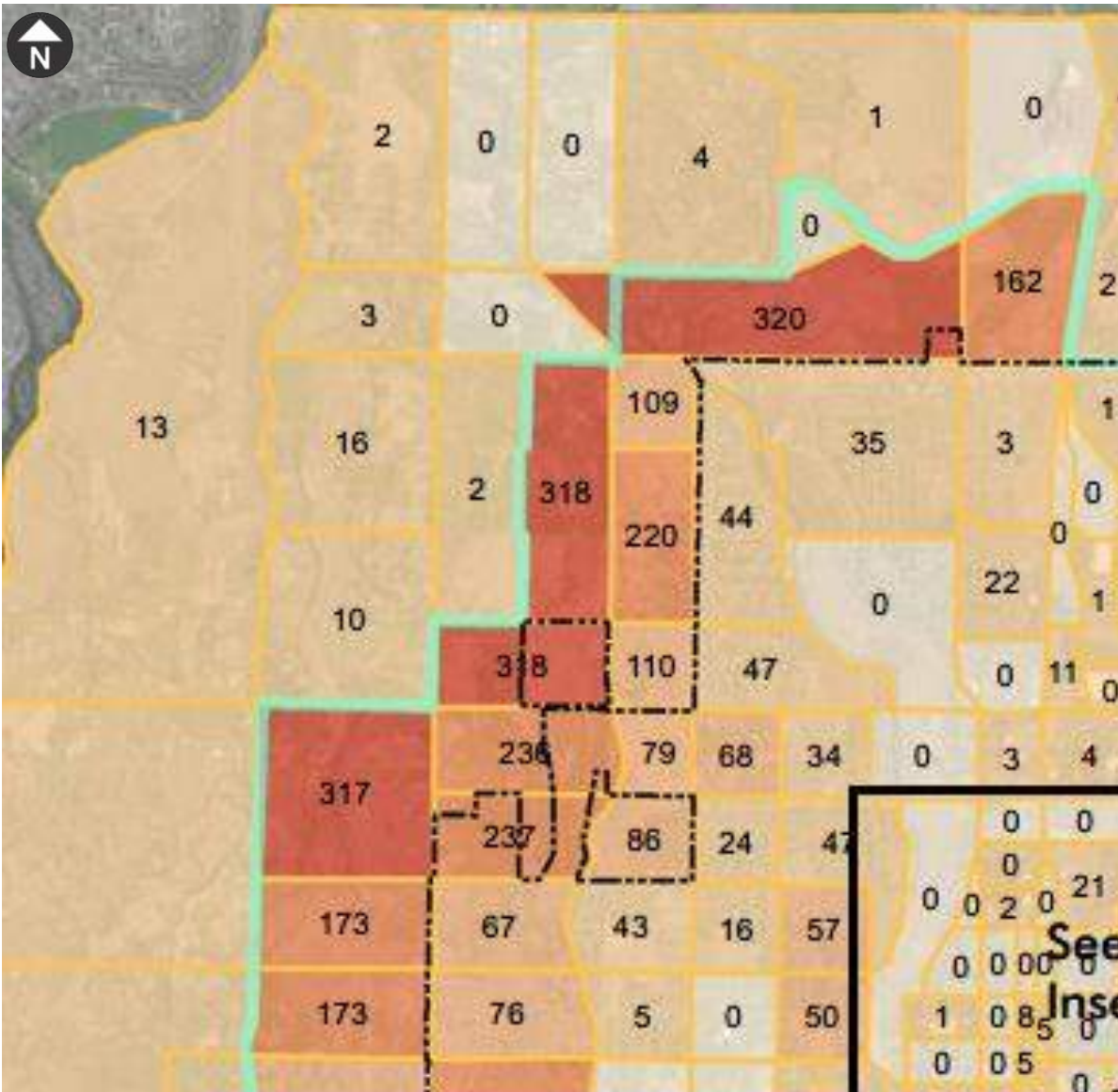


Figure 4. City of Redmond Transportation System Plan land use assumptions illustrating the forecast change in households (2010 to 2040). *Source: TSP Appendices.*

TRANSPORTATION PLANNING RULE COMPLIANCE

As the Northwest Area Plan lands were already accounted for in the land use assumptions of the City's adopted Transportation System Plan a rezone analysis will not be required. The subject NWAP lands have R4 and R5 Comprehensive Plan designations and general location and total acreages of the designated lands will not change. Furthermore, the TSP planned for development at the Comprehensive Plan designated densities. Given that the TSP anticipated development at Comprehensive Plan designated R-4 and R-5 densities, a TPR Analysis will result in no significant impact. Pending review by staff of these TPR compliance materials, we understand that a formal Transportation Impact Analysis will be required per City of Redmond Code requirements within RDC 8.2815. This report will be separately scoped with staff.

Thank you for the opportunity to provide these transportation materials, if you have any questions I can be reached at (503) 997-4473 or via email at joe@transightconsulting.com.

Joe Bessman

From: Deborah McMahon <Deborah.McMahon@ci.redmond.or.us>
Sent: Wednesday, September 4, 2019 12:34 PM
To: Joe Bessman
Subject: FW: Redmond Travel Demand Model Land Use Update
Attachments: Redmond_EMP_By_Category_Maps_Optimized.pdf;
Redmond_EMP_Growth_By_Category_Maps_Optimized.pdf;
Redmond_EMP_Maps_Optimized.pdf; Redmond_HH_Maps_Optimized.pdf; Redmond
Model Data - for City Review.xlsx; TAZ_numbers.pdf; Employment Growth.pdf;
Household Growth.pdf



Deborah McMahon | Planning Manager
City of Redmond

Phone 541.923.7724
Email deborah.mcmahon@ci.redmond.or.us

City Hall 411 SW 9th Street Redmond, Oregon 97756

From: Matt Kittelson <mkittelson@kittelson.com>
Sent: Wednesday, September 04, 2019 12:17 PM
To: Deborah McMahon <Deborah.McMahon@ci.redmond.or.us>
Subject: FW: Redmond Travel Demand Model Land Use Update

: This email originated from outside of the city. Do not click links or open attachments unless you recognize the sender and know the con

Hi Deborah,

Sorry to keep missing you. I got your message. Here is the best information I have. I have also exported the 2010-2040 HH Growth and 2010-2040 Employment Growth figures that tell the clearest story as to what was included in the model.

Based on what you have described, I THINK everything was included, but you'll want to look and verify. As you recall, the model development work was done prior to the TSP so I don't have a lot of context about the specifics as to what was included or not.

I'm around a little bit this afternoon and most of tomorrow. Feel free to give me a call and we can walk through this.

Thanks!

Matt

Matt Kittelson
Senior Engineer

Kittelson & Associates, Inc.

Transportation Engineering / Planning

541.639.8614 (direct)

503.936.3629 (cell)

From: Deborah McMahon <Deborah.McMahon@ci.redmond.or.us>

Sent: Friday, April 13, 2018 3:01 PM

To: Matt Kittelson <mkittelson@kittelson.com>; Mike Caccavano <Mike.Caccavano@ci.redmond.or.us>

Subject: FW: Redmond Travel Demand Model Land Use Update

Mike, I missed you yesterday but also wanted to send an email that Matt needs the latest version of this data – I am sure there is a more recent spreadsheet but I do not have it.



Deborah McMahon | Planning Manager
City of Redmond

Phone 541.923.7724

Email deborah.mcmahon@ci.redmond.or.us

City Hall 411 SW 9th Street Redmond, Oregon 97756

From: Mat Dolata [<mailto:mjd@dksassociates.com>]

Sent: Tuesday, June 23, 2015 9:06 AM

To: Deborah McMahon <Deborah.McMahon@ci.redmond.or.us>; Mike Caccavano <Mike.Caccavano@ci.redmond.or.us>; BRYANT James R <James.R.BRYANT@odot.state.or.us>; Tyler Deke <tdeke@bendoregon.gov>

Cc: Julie Sosnovske <jxs@dksassociates.com>; Steve Hansen <steveh@migcom.com>; Chris Maciejewski <csm@dksassociates.com>; Aaron Berger <adb@dksassociates.com>

Subject: Re: Redmond Travel Demand Model Land Use Update

Hi all,

Attached are the maps of the draft TAZ allocations we've identified for the 2028 and 2040 land use data. Please review and provide desired edits by the end of the week. I've also attached the spreadsheet that includes all the raw data, but the maps are in an easier-to-digest format. If you have any questions, please let me know.

I am available for a conference call to go over the data if that would be helpful. Let me know and we'll get something scheduled promptly.

Thanks!

Mat

Mat Dolata, P.E., PTP

Transportation Engineer / Transportation Planner / Project Manager

Ph: (503) 243-3500 | Direct: (503) 972-1210 | Email: mjd@dksassociates.com



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On Wed, Jun 10, 2015 at 8:17 AM, BRYANT James R <James.R.BRYANT@odot.state.or.us> wrote:

Julie – I spoke to both Deborah and Tyler and they are fine with the new numbers. Please proceed with revise the TAZ level land uses.

Thanks

Jim

From: Julie Sosnovske [mailto:jxs@dksassociates.com]

Sent: Tuesday, June 09, 2015 11:33 AM

To: BRYANT James R; Tyler Deke; Steve Hansen; Deborah.McMahon@ci.redmond.or.us; Chris Maciejewski; Mat Dolata; Mike.Caccavano@ci.redmond.or.us

Subject: Re: Redmond Travel Demand Model Land Use Update

This is just a reminder that I am waiting to revise TAZ level land use until all parties have agreed to the revised land use control totals.

Thank you,

Julie

Julie Sosnovske, P.E.

Ph: [\(503\) 243-3500](tel:(503)243-3500) | Direct: [\(503\) 972-1288](tel:(503)972-1288) | Mobile: [\(503\) 522-2701](tel:(503)522-2701) | Email: jxs@dksassociates.com



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On Thu, Jun 4, 2015 at 3:18 PM, Julie Sosnovske <jxs@dksassociates.com> wrote:

Since I revised the numbers slightly, please confirm again if you are in agreement with these numbers. Once I have heard from all, I will proceed with the TAZ-level revisions.

Thank you,

Julie

Julie Sosnovske, P.E.

Ph: [\(503\) 243-3500](tel:5032433500) | Direct: [\(503\) 972-1288](tel:5039721288) | Mobile: [\(503\) 522-2701](tel:5035222701) | Email: jxs@dksassociates.com



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On Thu, Jun 4, 2015 at 10:59 AM, Julie Sosnovske <jxs@dksassociates.com> wrote:

Based on PSU's more detailed "Deschutes_Proposed_Forecasts_2015-03" spreadsheet and "Population_Interpolation_Template" (thanks Jim!), I've revised the control totals as follows:

Population and Employment Control Totals

Year:	2010	2028	2040
Employment:	10,019	16,485	20,709
Population:	26,226	35,169	43,399
Population Increase (from 2010):	-	34%	65%
Extent:	City Boundary	Current UGB	UGB & Expansion zones

As previously stated, the only Expansion Zones (2040) are between Highway 97 and the fairgrounds.

Please let me know if you agree with these totals, or if you have any questions.

Thank you,

Julie Sosnovske, P.E.

Ph: [\(503\) 243-3500](tel:5032433500) | Direct: [\(503\) 972-1288](tel:5039721288) | Mobile: [\(503\) 522-2701](tel:5035222701) | Email: jxs@dksassociates.com



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On Wed, Jun 3, 2015 at 11:27 AM, Julie Sosnovske <jxs@dksassociates.com> wrote:

Hi all,

I'm helping Mat while he's out on paternity leave.

I've revised the Population and Employment Control Totals based on the recently published PSU Draft Coordinated Population Forecast for Deschutes County (attached).

These control totals are based on the 2015 population base for Redmond (27,715) and the growth rates (1.8% for 2015-2035) and (1.6% for 2035-2040) reported in the PSU data. 2010 totals were unchanged, although PSU reports them differently.

Please reply with any questions or comments or an acceptance of these control totals. Once we have everyone's agreement, we will proceed with revising the 2028 and 2040 land use input data (by TAZ).

Population and Employment Control Totals

Year:	2010	2028	2040
Employment:	10,019	16,485	20,709
Population:	26,226	34,949	42,869
Population Increase (from 2010):	-	33%	63%
Extent:	City Boundary	Current UGB	UGB & Expansion zones

Thank you,

Julie Sosnovske, P.E.

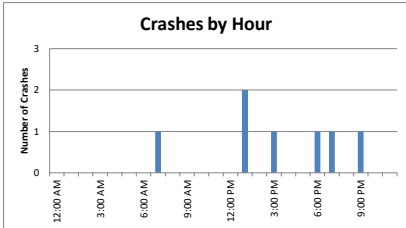
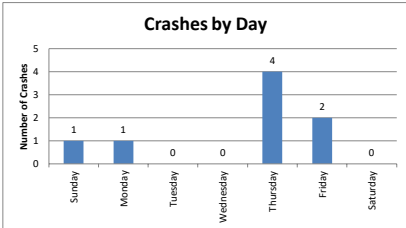
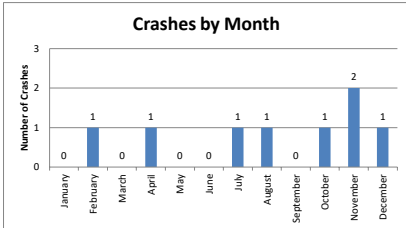
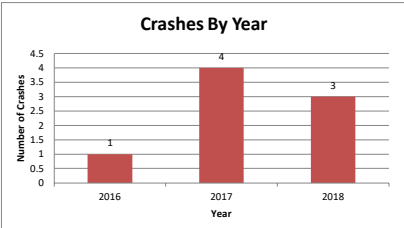
Ph: [\(503\) 243-3500](tel:5032433500) | Direct: [\(503\) 972-1288](tel:5039721288) | Mobile: [\(503\) 522-2701](tel:5035222701) | Email: jxs@dksassociates.com

Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 5th_Antler
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

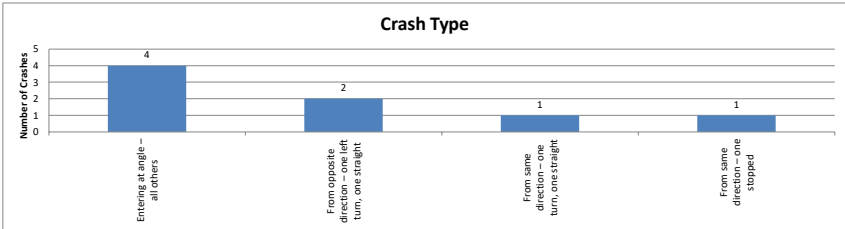
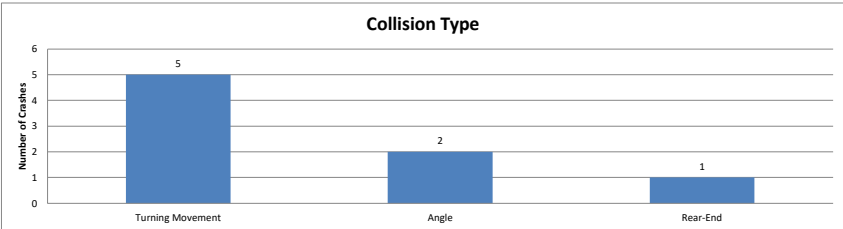
NW 5th Street/ W Antler Avenue

(January 2016 through December 2020)

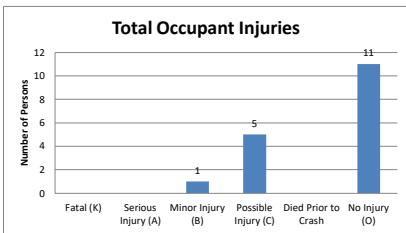
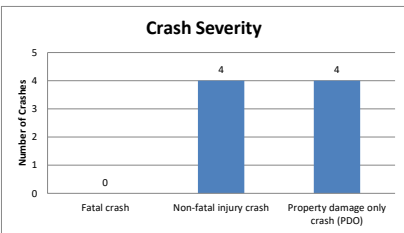
Crash Summary by Date and Time



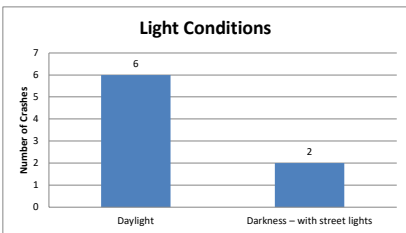
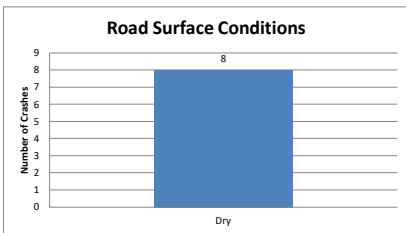
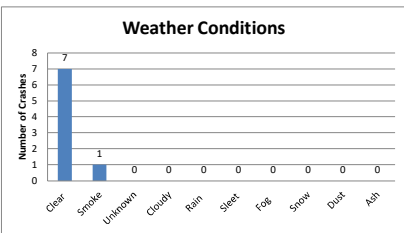
Crash Summary by Type



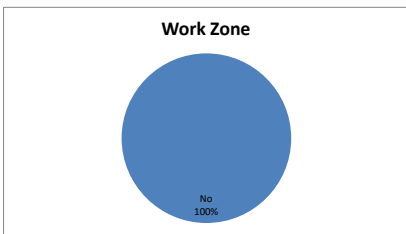
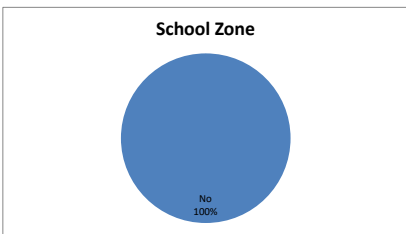
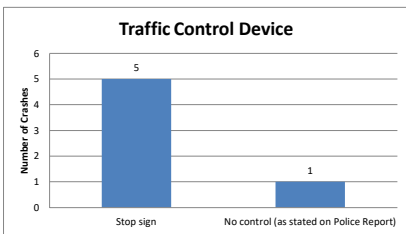
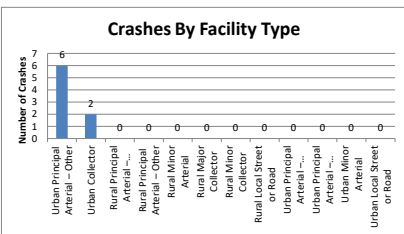
Crash Severity



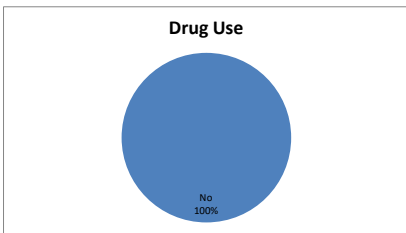
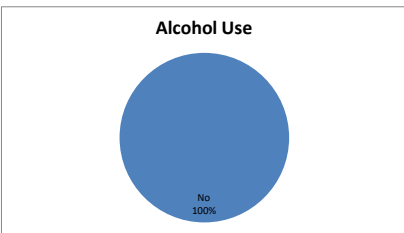
Crash Environment Characteristics



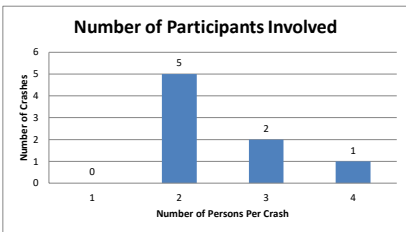
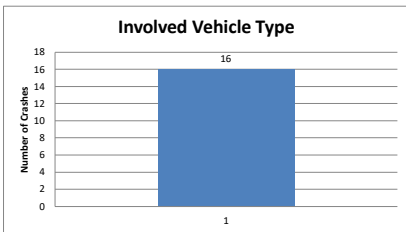
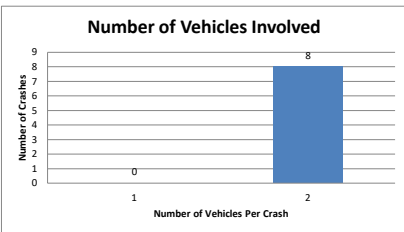
Crash Area Characteristics



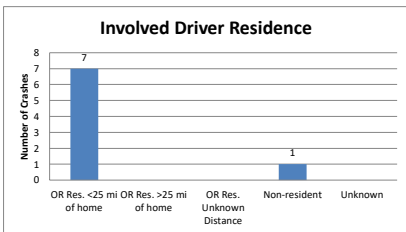
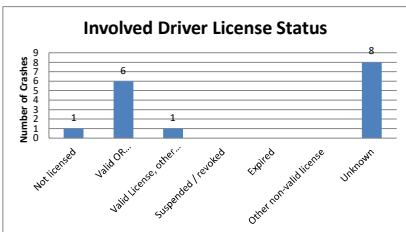
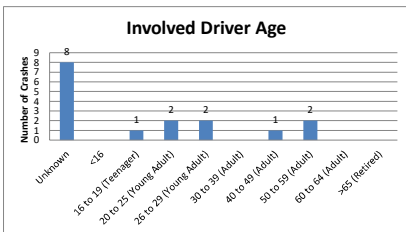
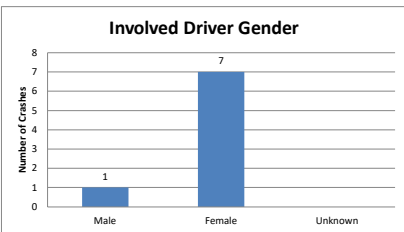
Driving Impairments



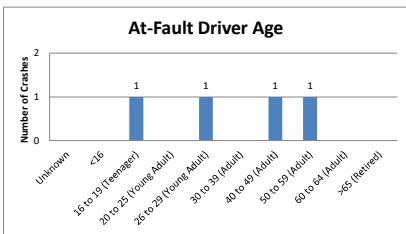
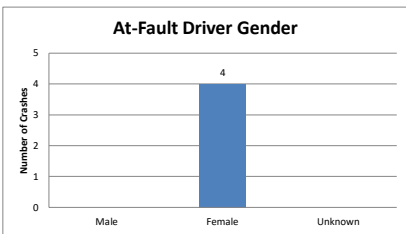
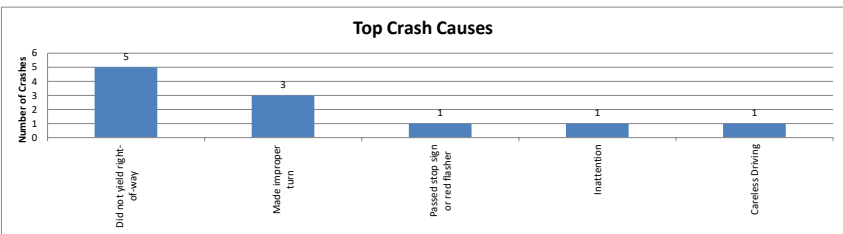
Vehicles and Occupants



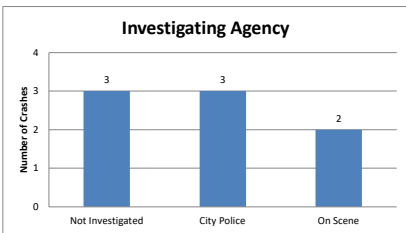
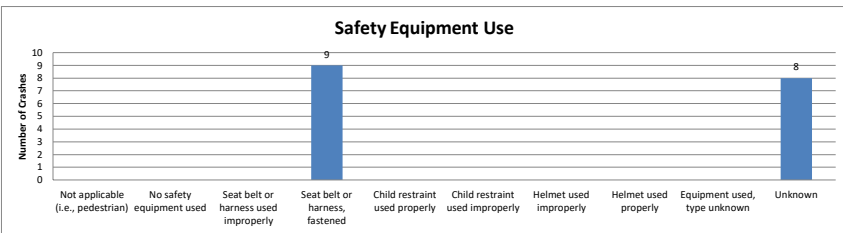
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

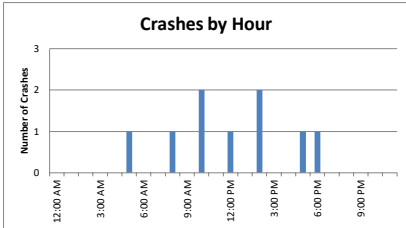
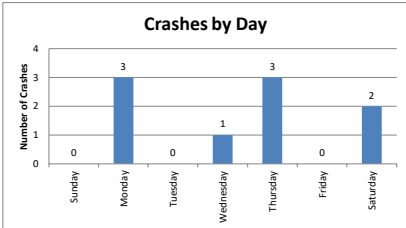
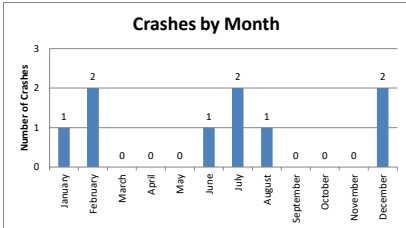
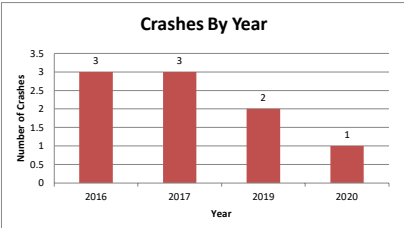


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 5th_BlackButte
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

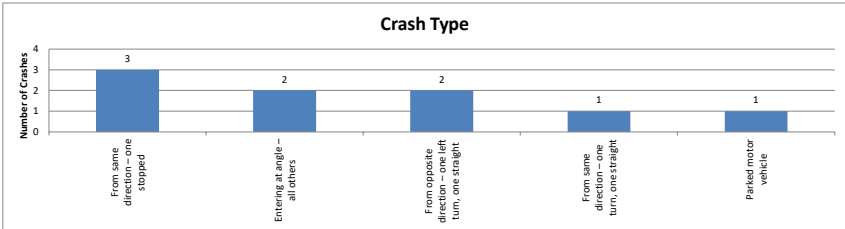
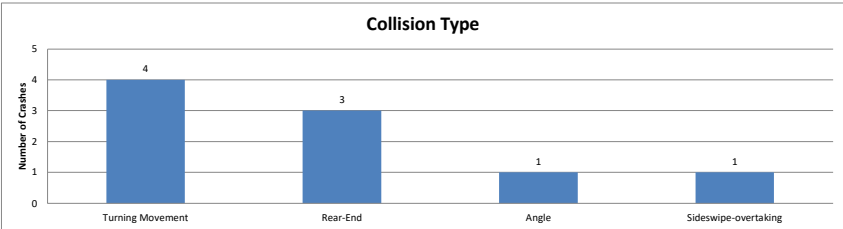
SW 5th Street/ SW Black Butte Boulevard

(January 2016 through December 2020)

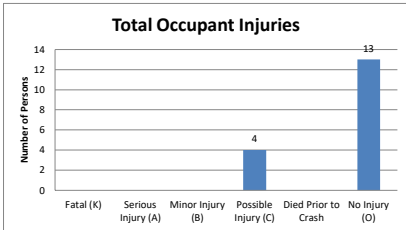
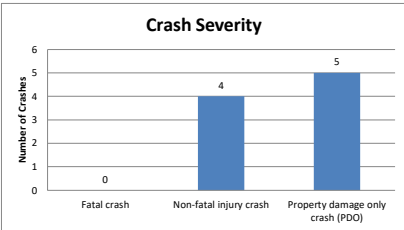
Crash Summary by Date and Time



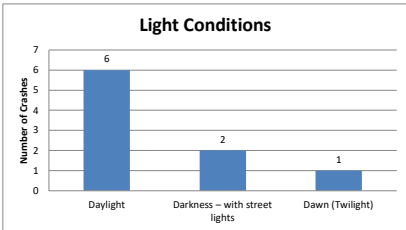
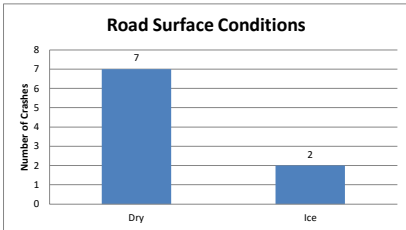
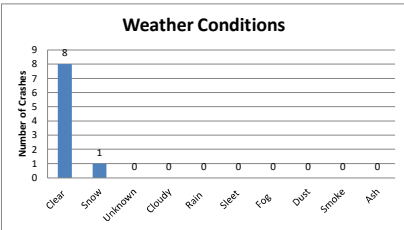
Crash Summary by Type



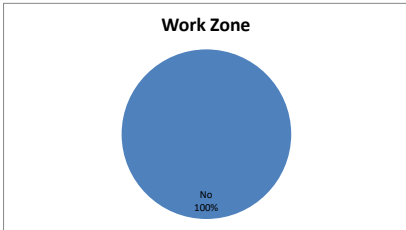
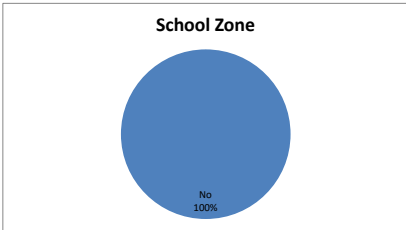
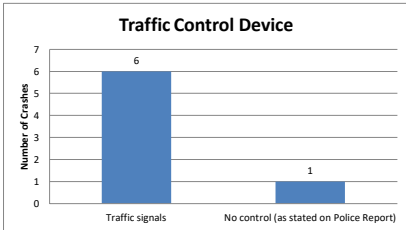
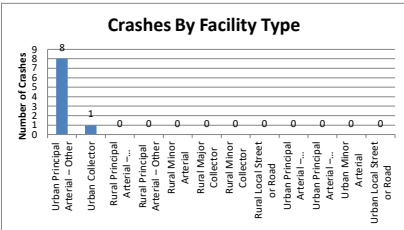
Crash Severity



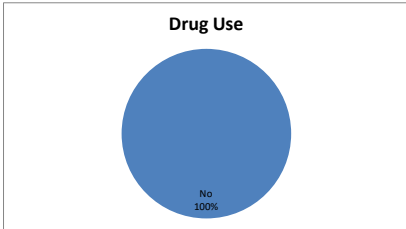
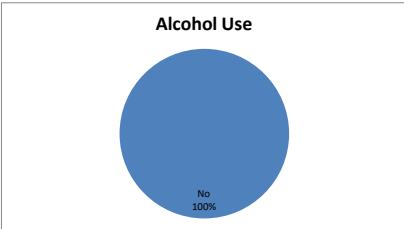
Crash Environment Characteristics



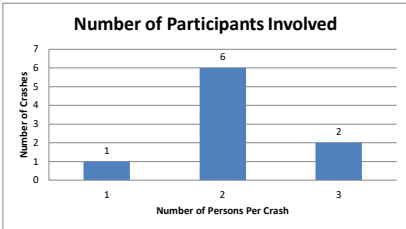
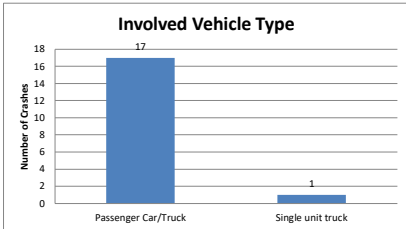
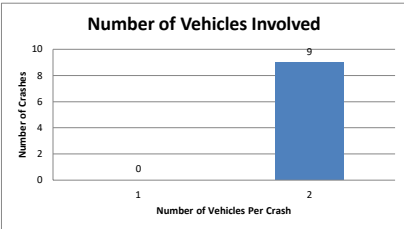
Crash Area Characteristics



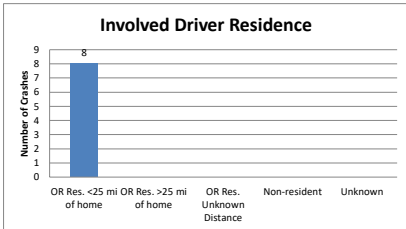
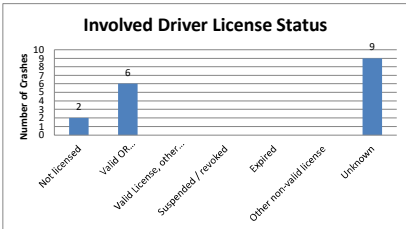
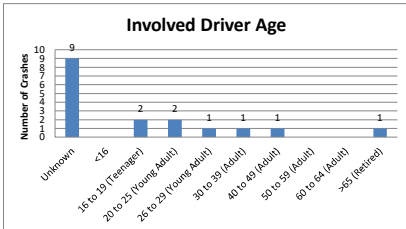
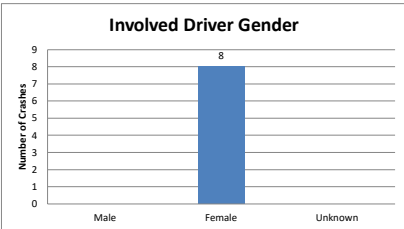
Driving Impairments



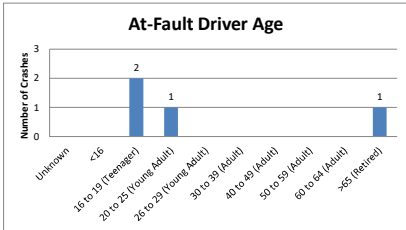
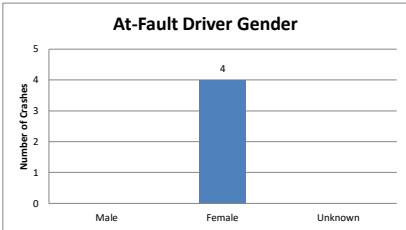
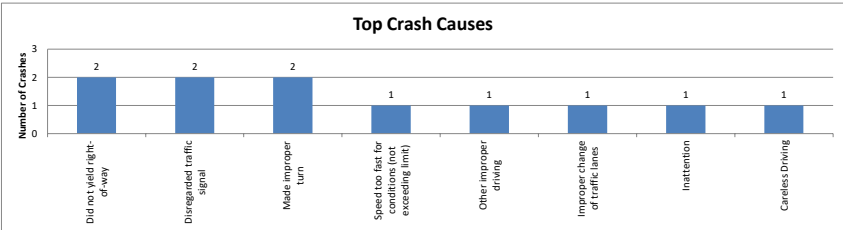
Vehicles and Occupants



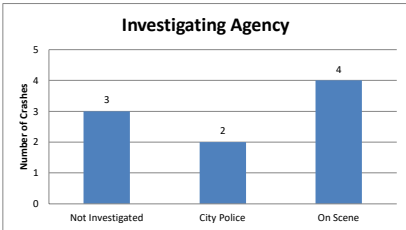
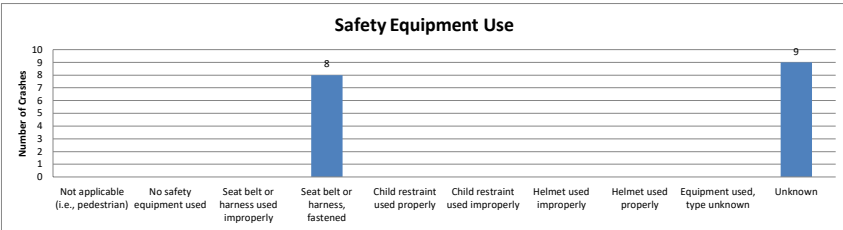
Involved Driver Characteristics



At-Fault Driver Characteristics



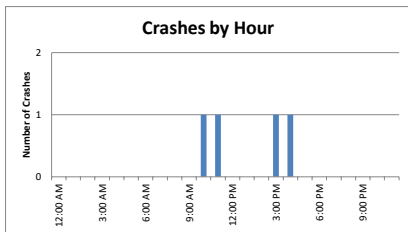
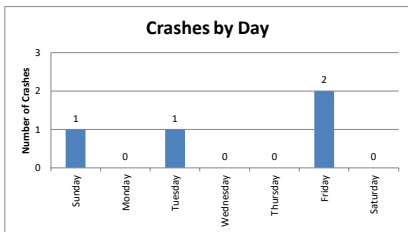
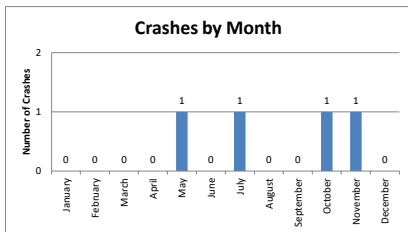
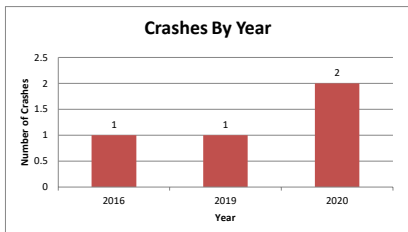
Other Crash Characteristics



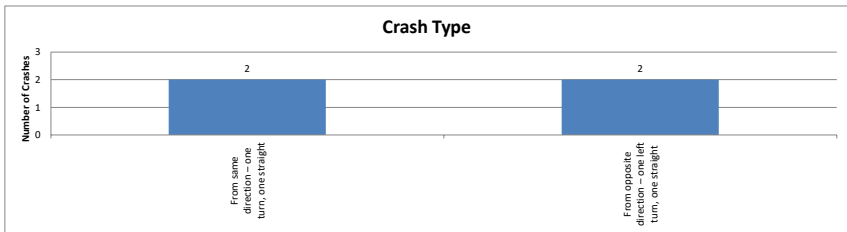
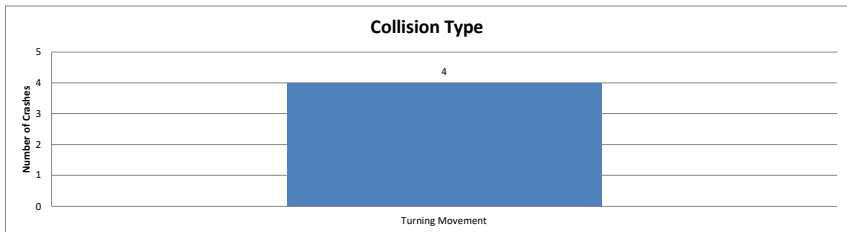
Project Name:	Hayden Homes Northwest Redmond
Project Number	1361
Query Information:	5th_Dogwood
Date Queried:	January 2016 - December 2020
Data Provider:	ODOT Crash Analysis Reporting Unit
Analyst:	JWW
Summary Date:	8/17/2022
Text File Name:	
Filters Applied:	:: County: DeschutesCollision Type: Turning Movement

**NW 5th Street/
NW Dogwood Avenue**
(January 2016 through December 2020)

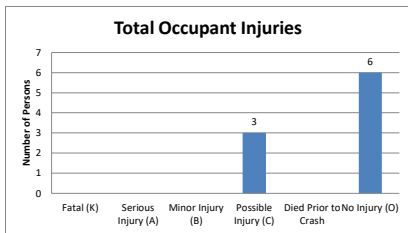
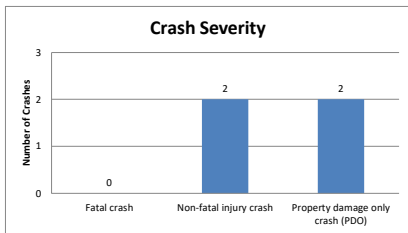
Crash Summary by Date and Time



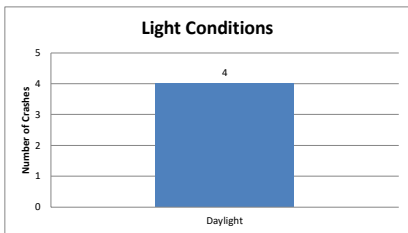
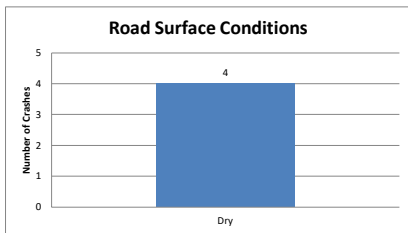
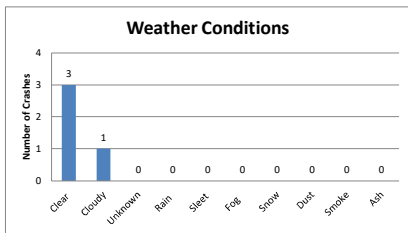
Crash Summary by Type



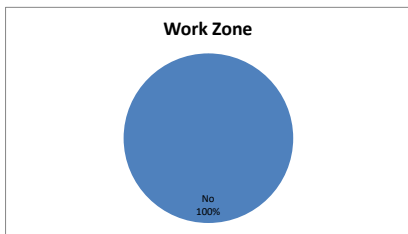
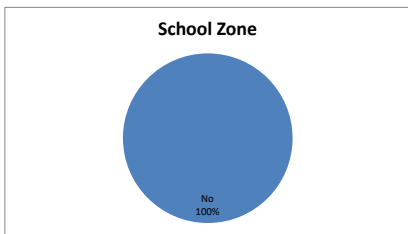
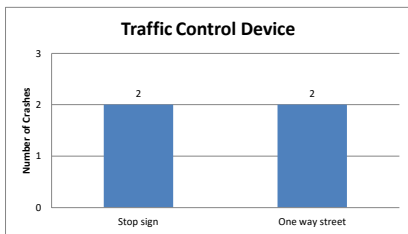
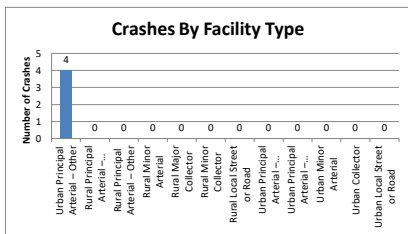
Crash Severity



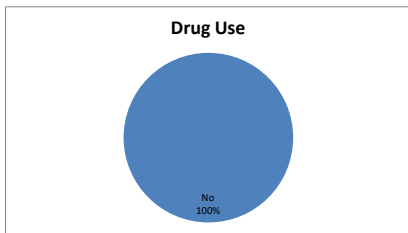
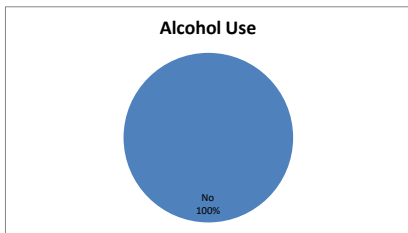
Crash Environment Characteristics



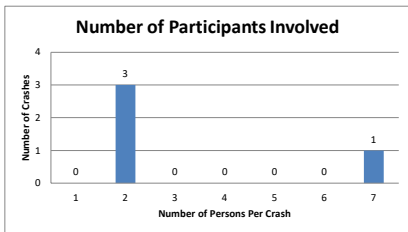
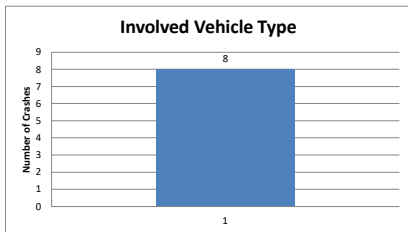
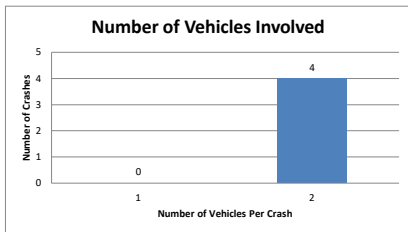
Crash Area Characteristics



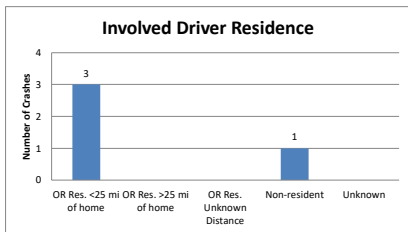
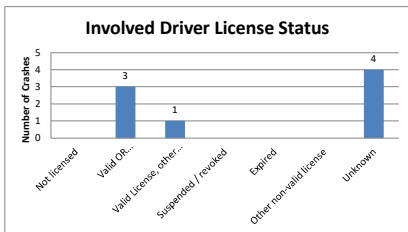
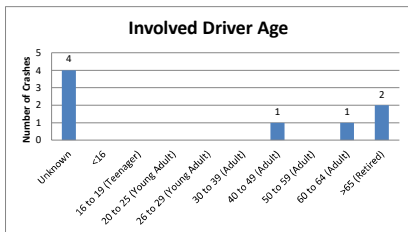
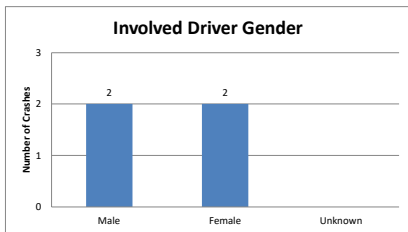
Driving Impairments



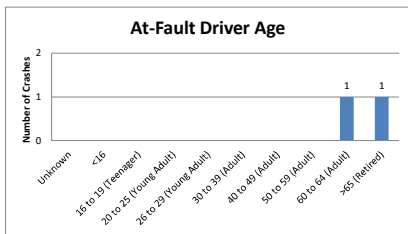
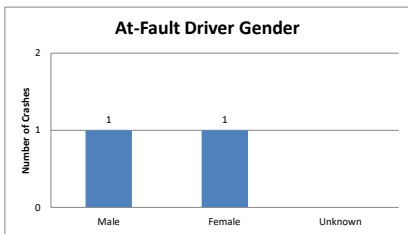
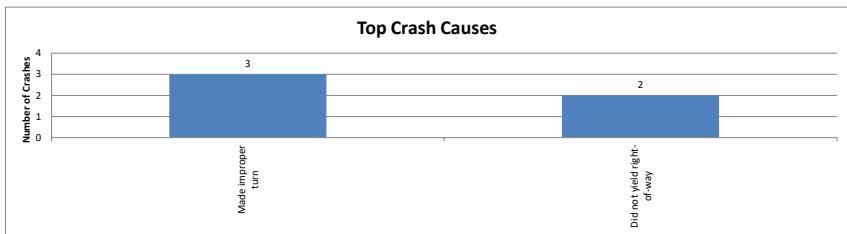
Vehicles and Occupants



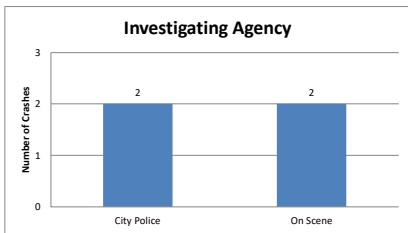
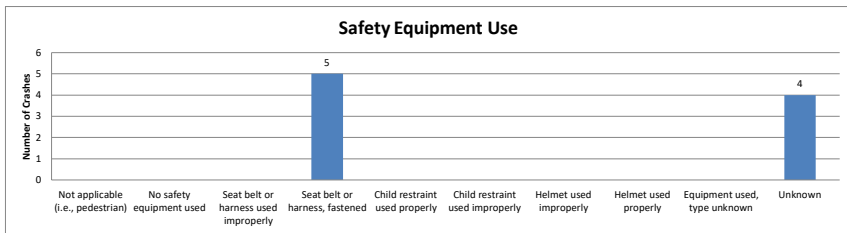
Involved Driver Characteristics



At-Fault Driver Characteristics



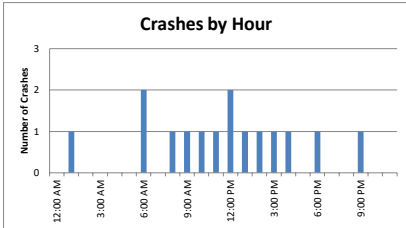
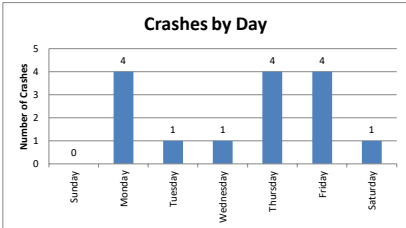
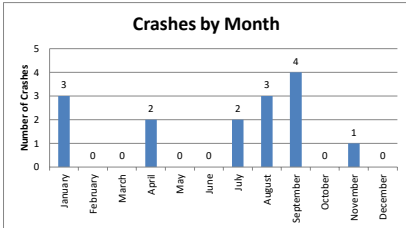
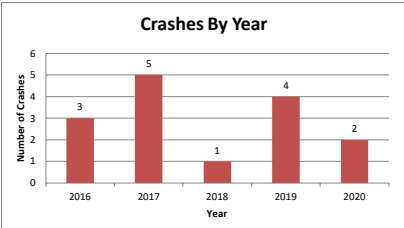
Other Crash Characteristics



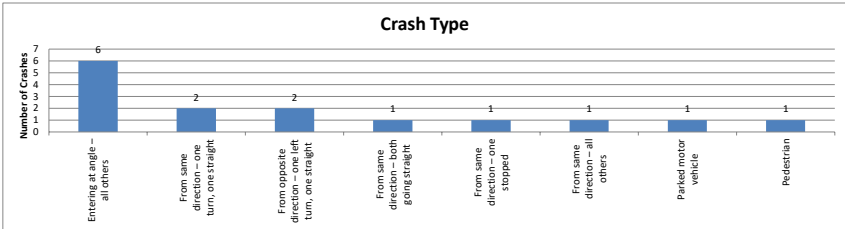
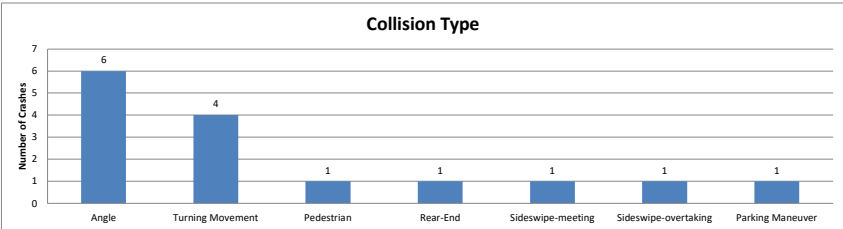
Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 5th_Evergreen
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

SW 5th Street/ SW Evergreen Avenue (January 2016 through December 2020)

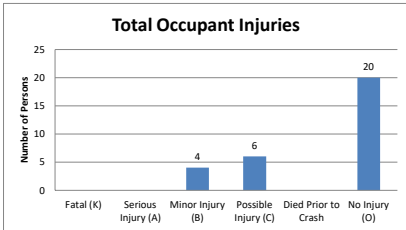
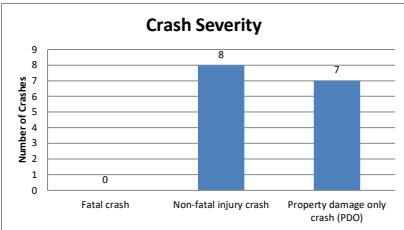
Crash Summary by Date and Time



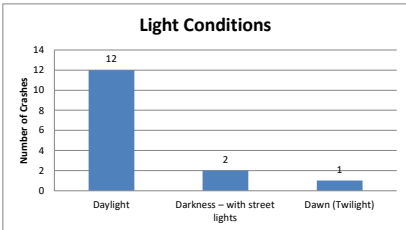
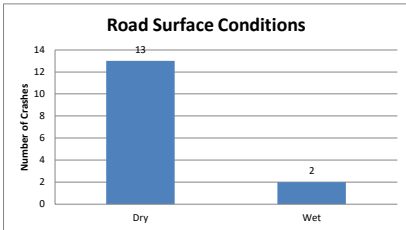
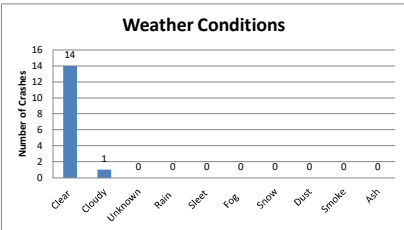
Crash Summary by Type



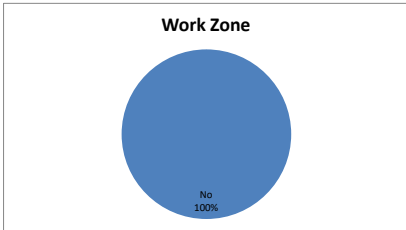
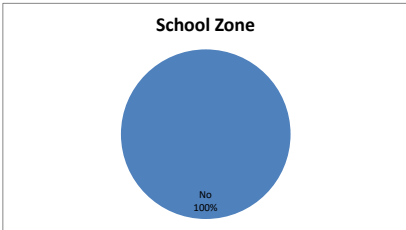
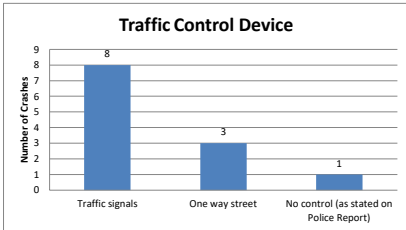
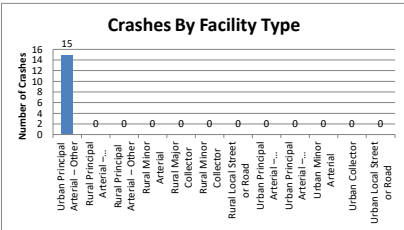
Crash Severity



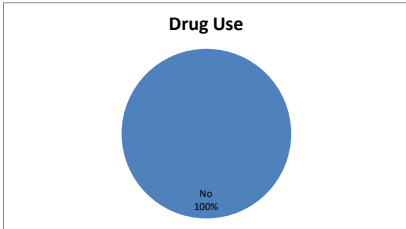
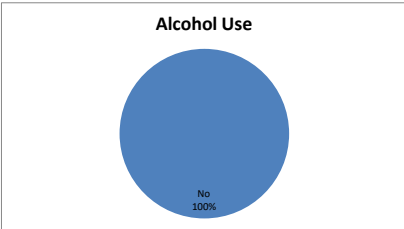
Crash Environment Characteristics



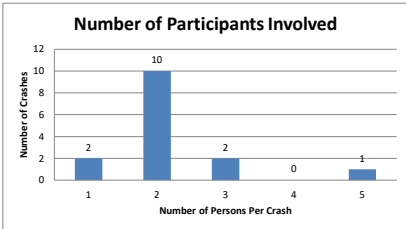
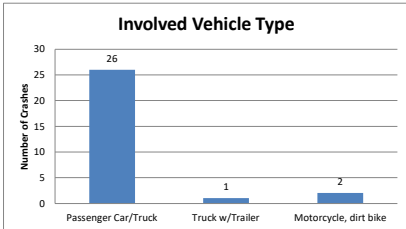
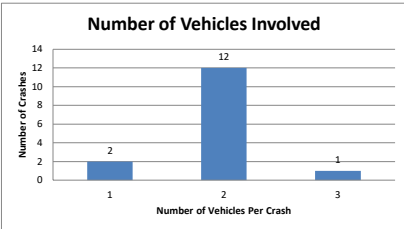
Crash Area Characteristics



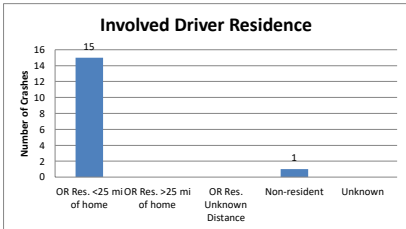
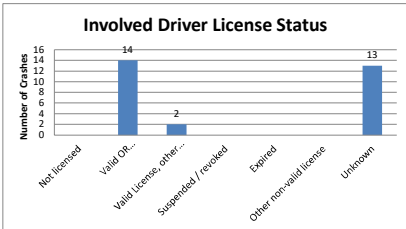
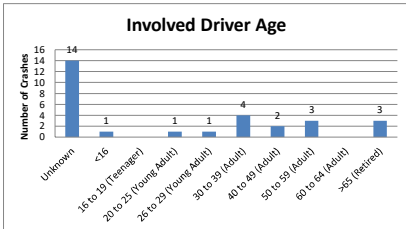
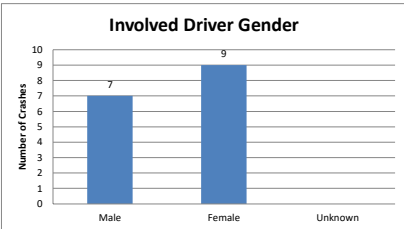
Driving Impairments



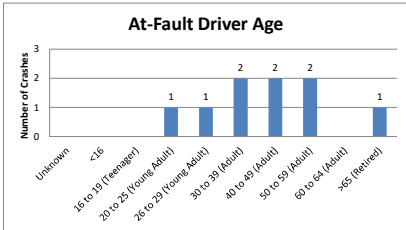
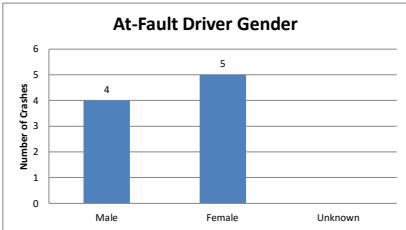
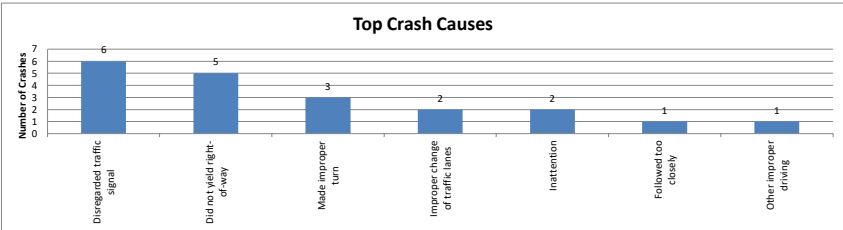
Vehicles and Occupants



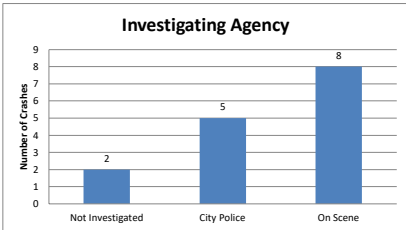
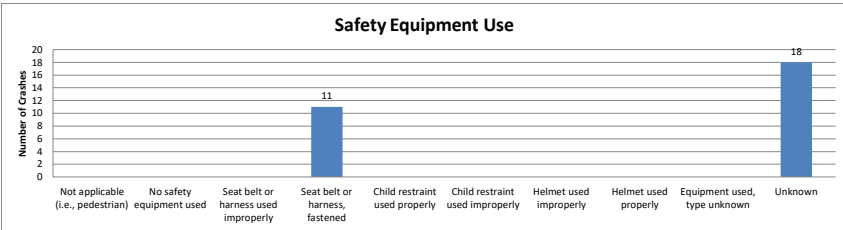
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

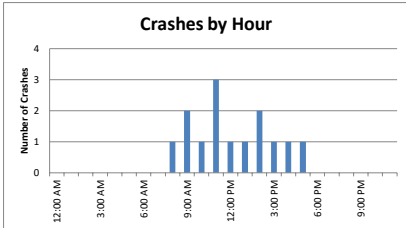
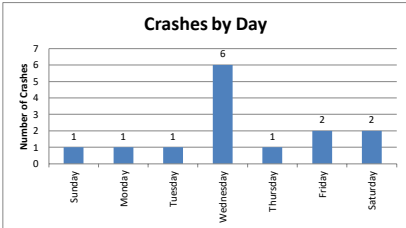
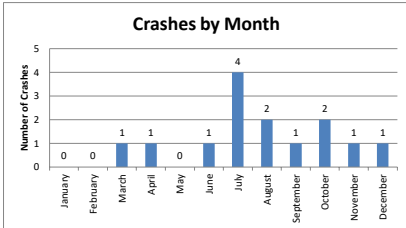
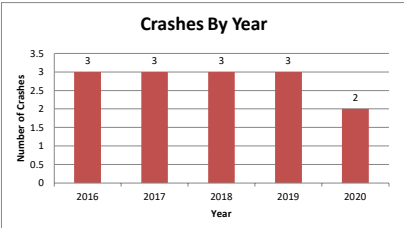


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 5th_Glacier
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

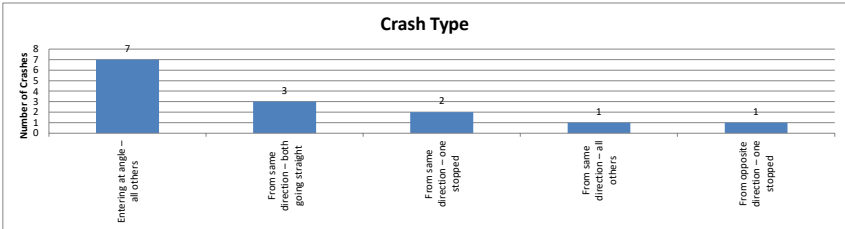
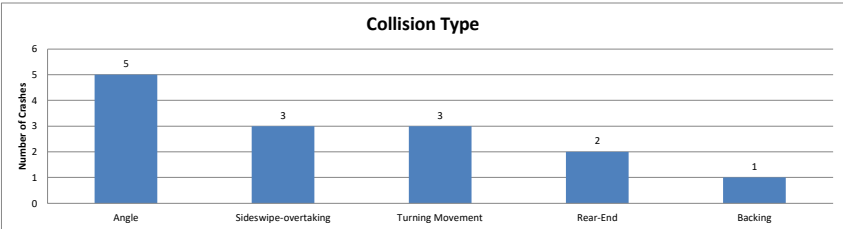
SW 5th Street/ SW Glacier Avenue

(January 2016 through December 2020)

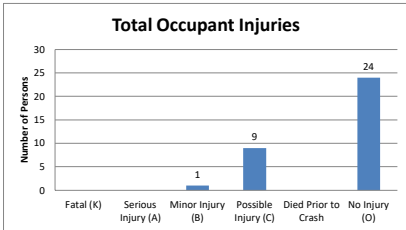
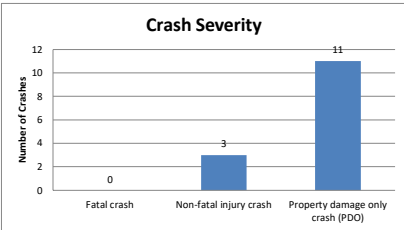
Crash Summary by Date and Time



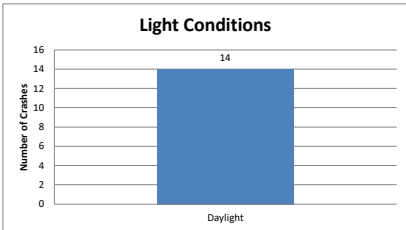
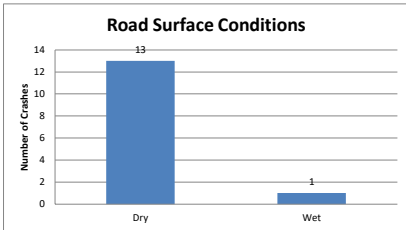
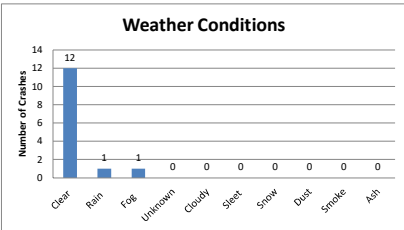
Crash Summary by Type



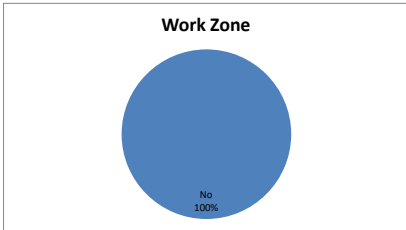
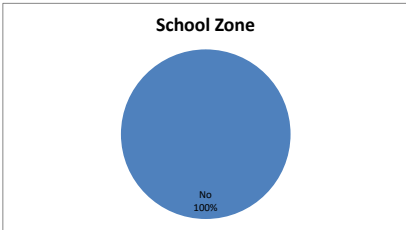
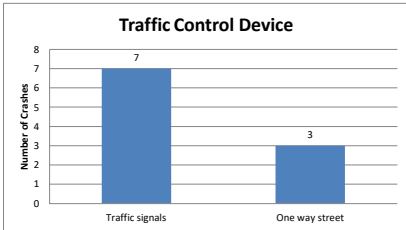
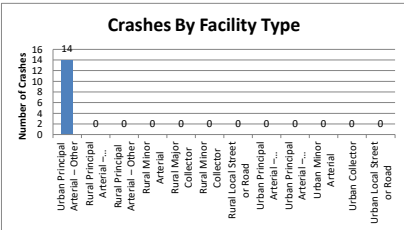
Crash Severity



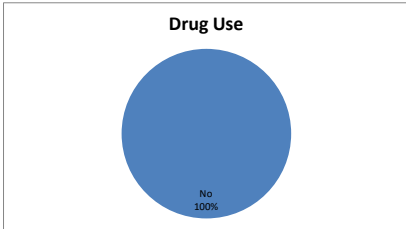
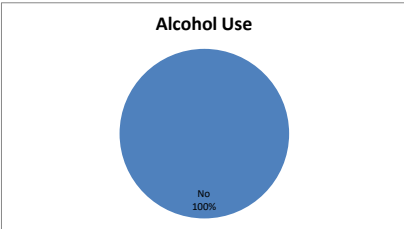
Crash Environment Characteristics



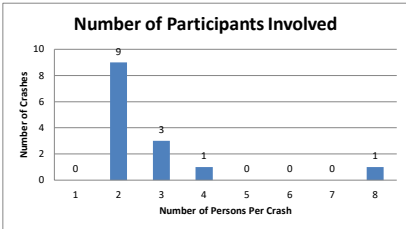
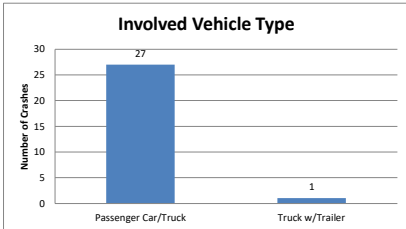
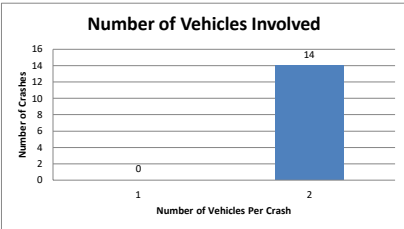
Crash Area Characteristics



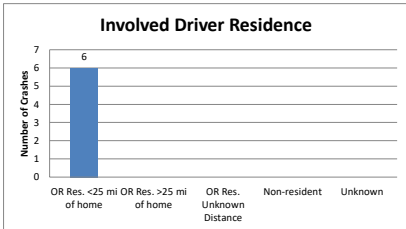
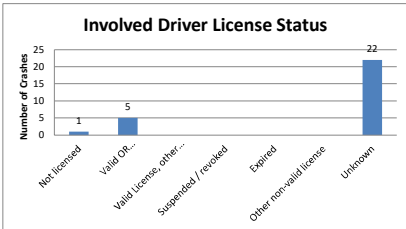
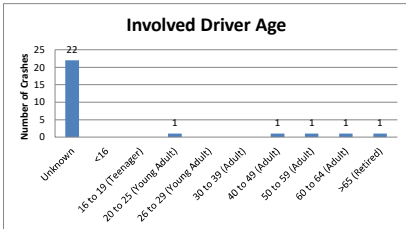
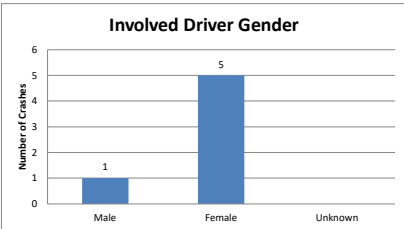
Driving Impairments



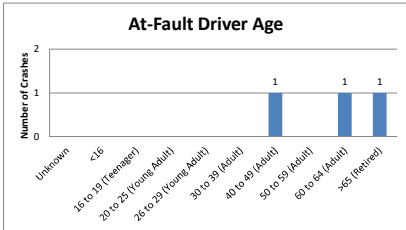
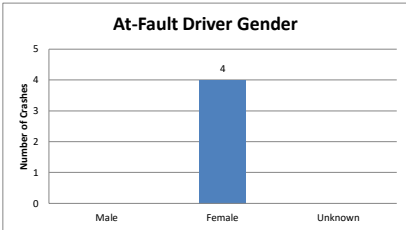
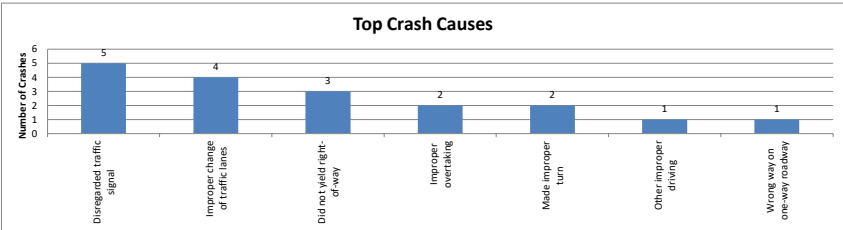
Vehicles and Occupants



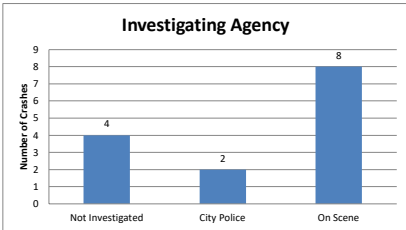
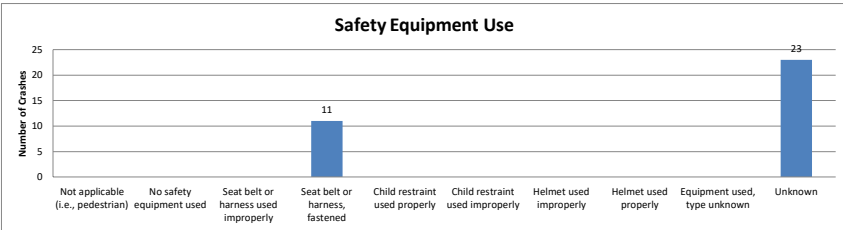
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

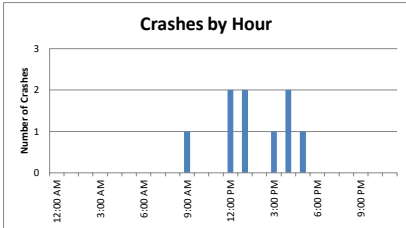
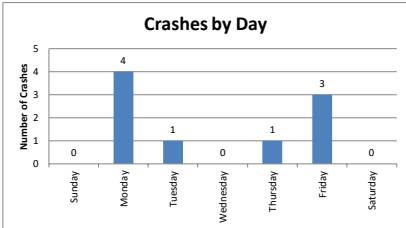
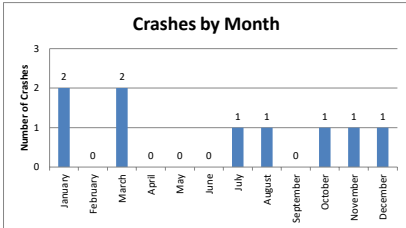
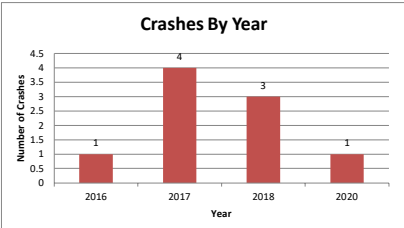


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 6th_BlackButte
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

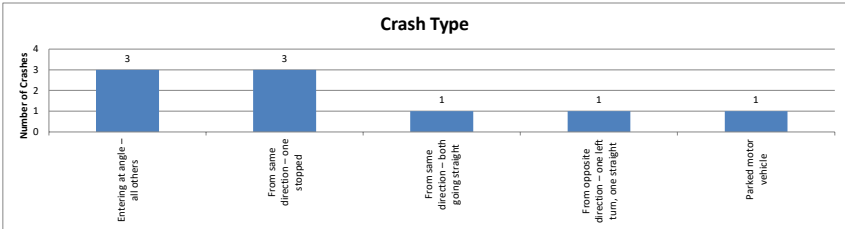
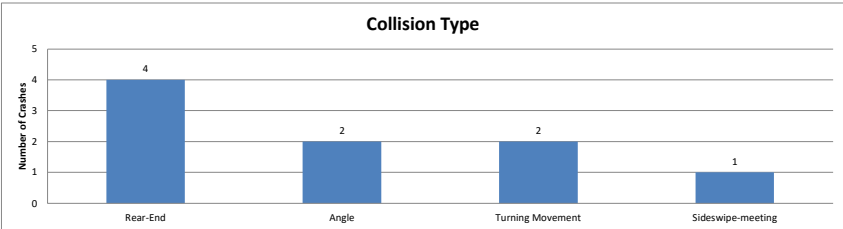
SW 6th Street/ SW Black Butte Boulevard

(January 2016 through December 2020)

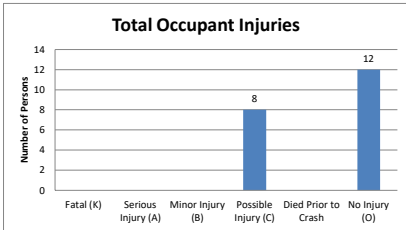
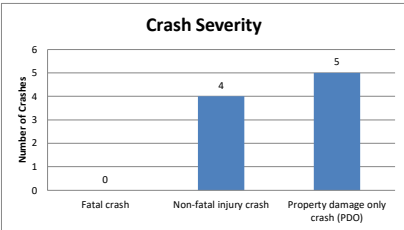
Crash Summary by Date and Time



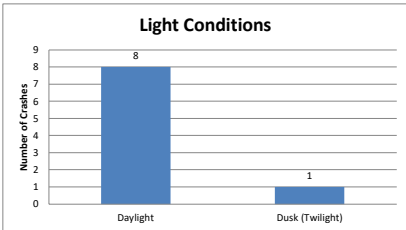
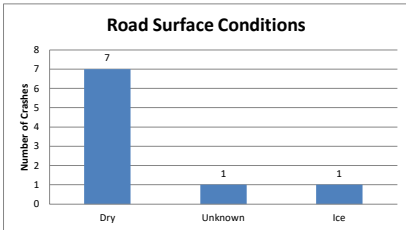
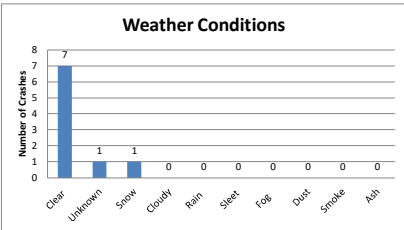
Crash Summary by Type



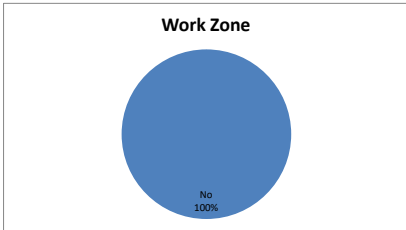
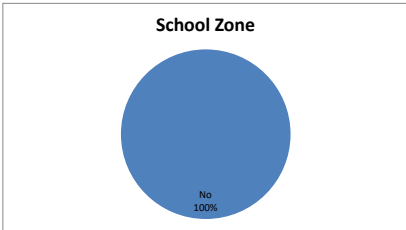
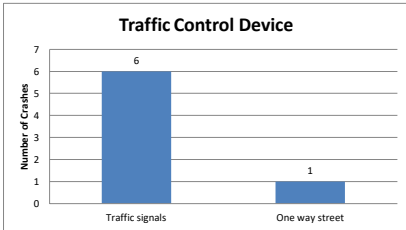
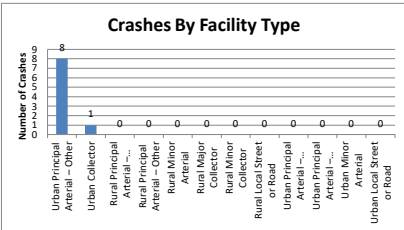
Crash Severity



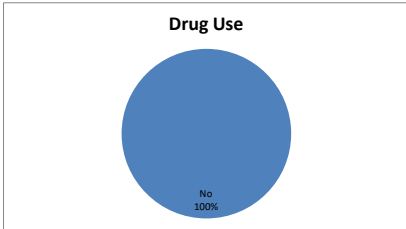
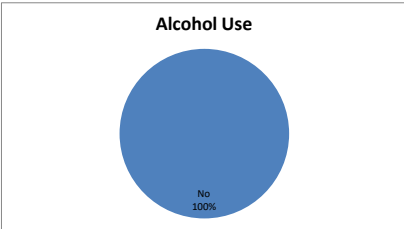
Crash Environment Characteristics



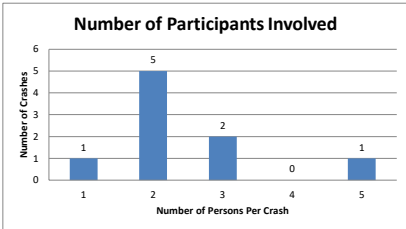
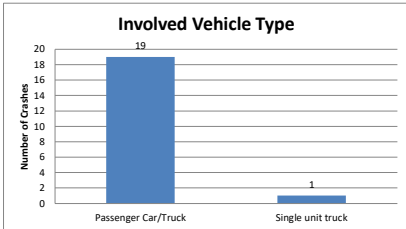
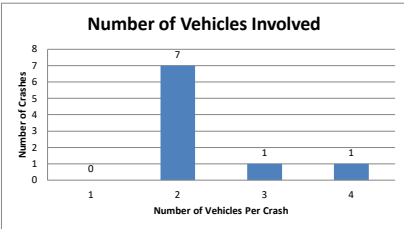
Crash Area Characteristics



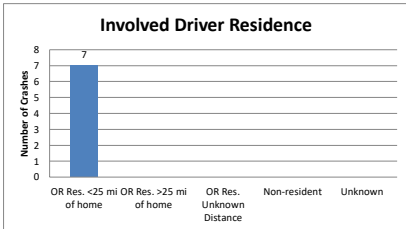
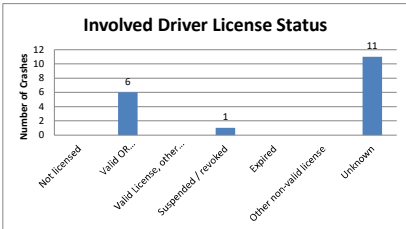
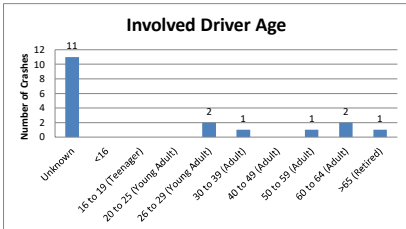
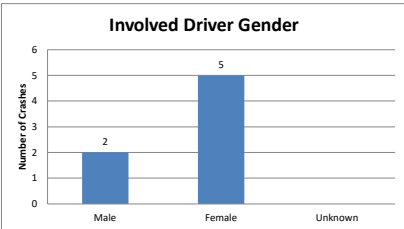
Driving Impairments



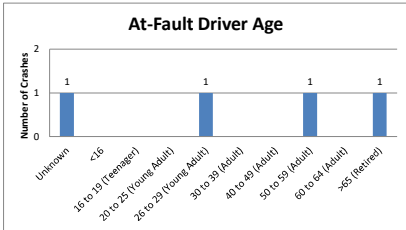
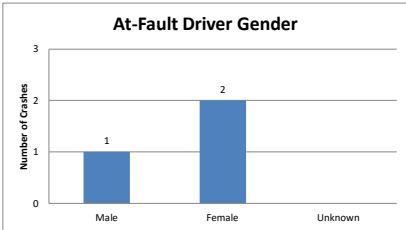
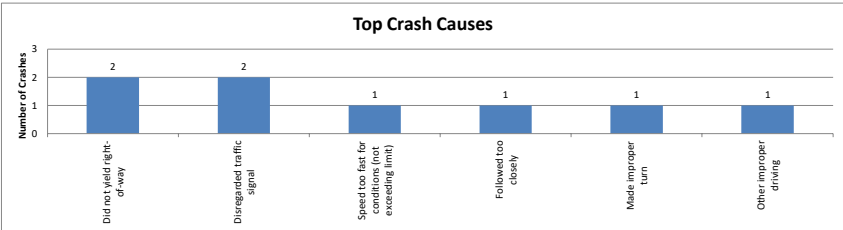
Vehicles and Occupants



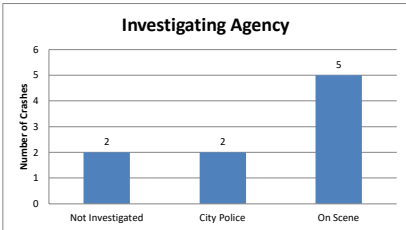
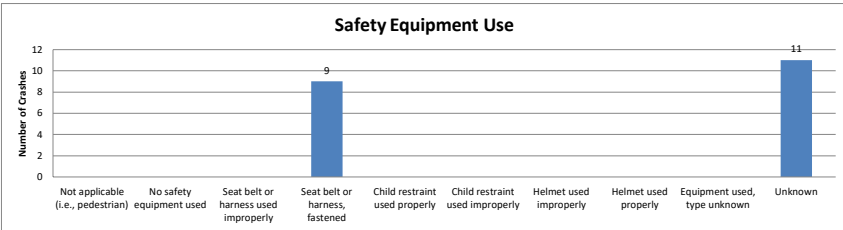
Involved Driver Characteristics



At-Fault Driver Characteristics



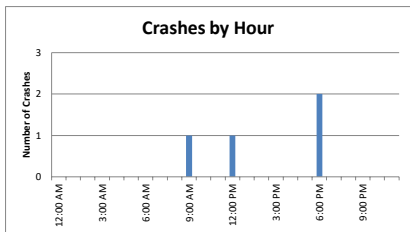
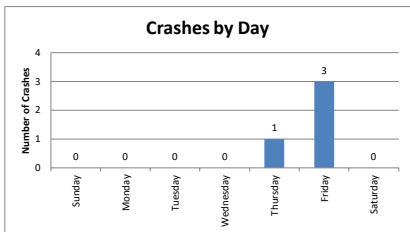
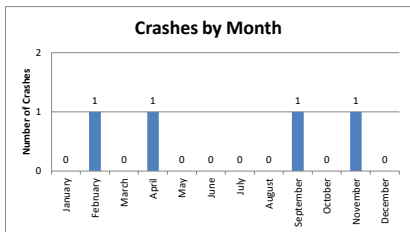
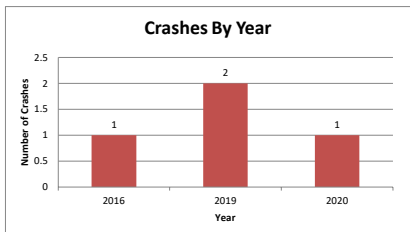
Other Crash Characteristics



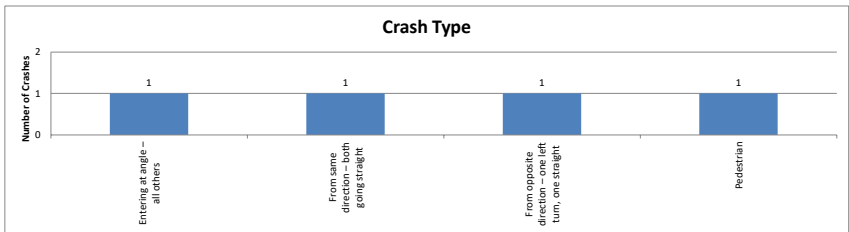
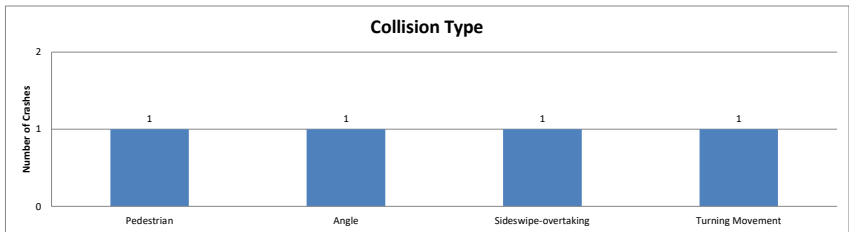
Project Name:	Hayden Homes Northwest Redmond
Project Number	1361
Query Information:	6th_Kingwood
Date Queried:	January 2016 - December 2020
Data Provider:	ODOT Crash Analysis Reporting Unit
Analyst:	JWW
Summary Date:	8/17/2022
Text File Name:	
Filters Applied:	:: County: Deschutes

**NW 6th Street/
NW Kingwood Avenue**
(January 2016 through December 2020)

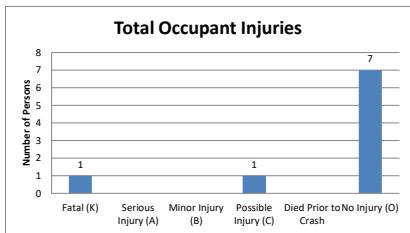
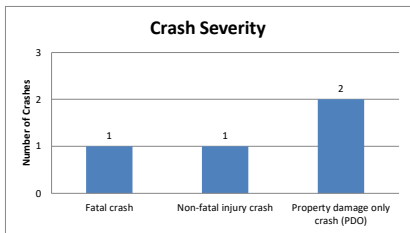
Crash Summary by Date and Time



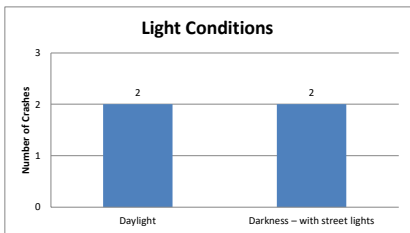
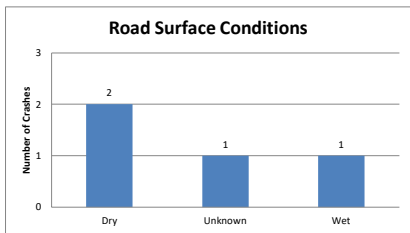
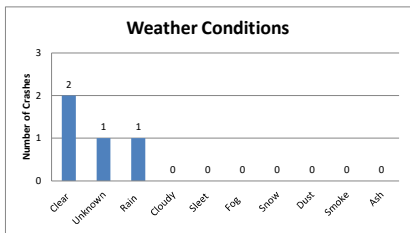
Crash Summary by Type



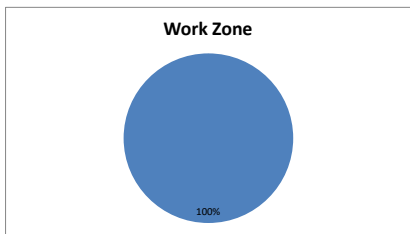
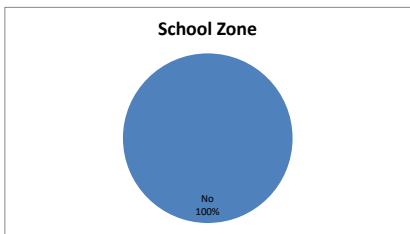
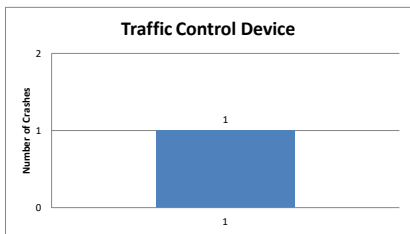
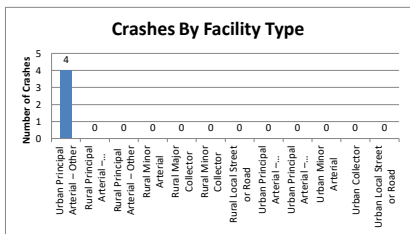
Crash Severity



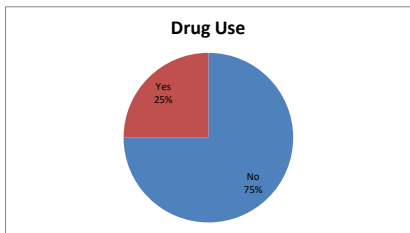
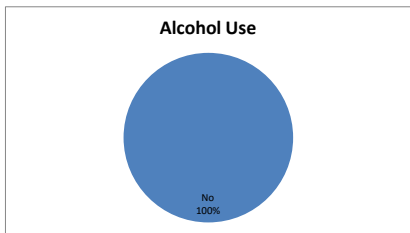
Crash Environment Characteristics



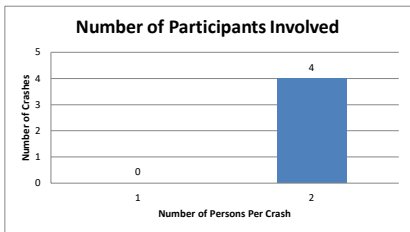
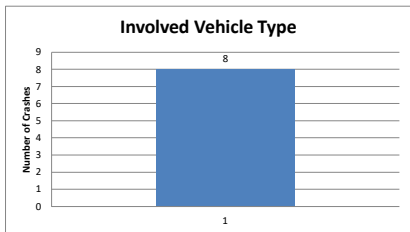
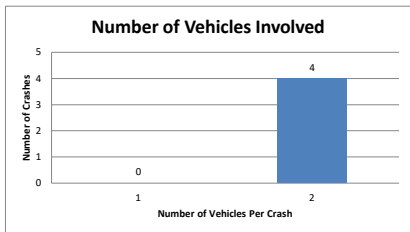
Crash Area Characteristics



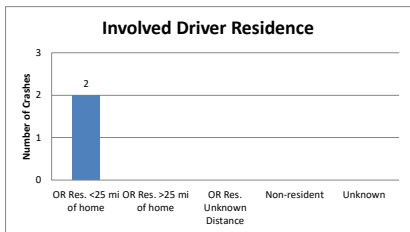
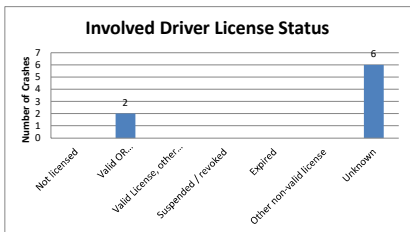
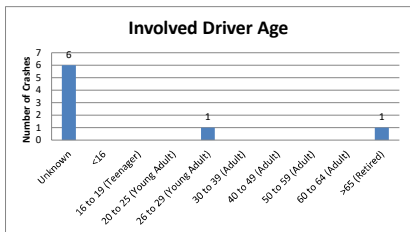
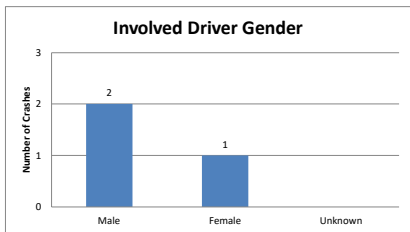
Driving Impairments



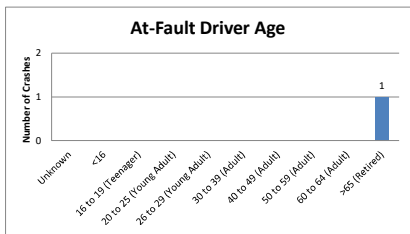
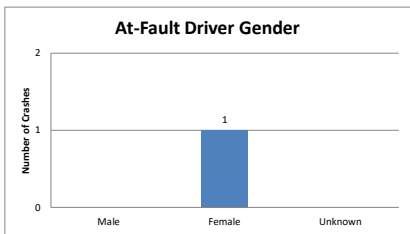
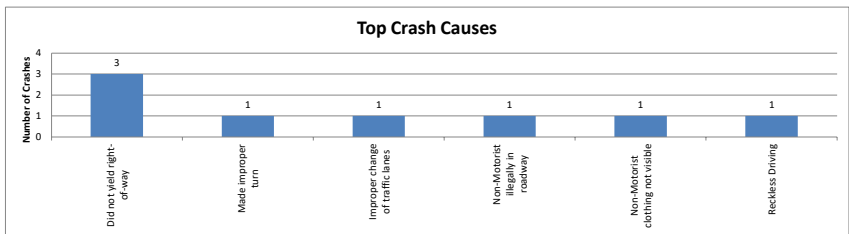
Vehicles and Occupants



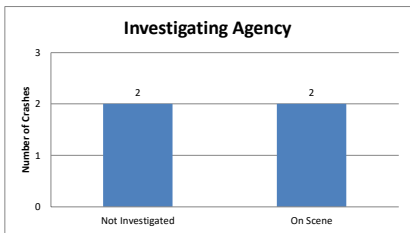
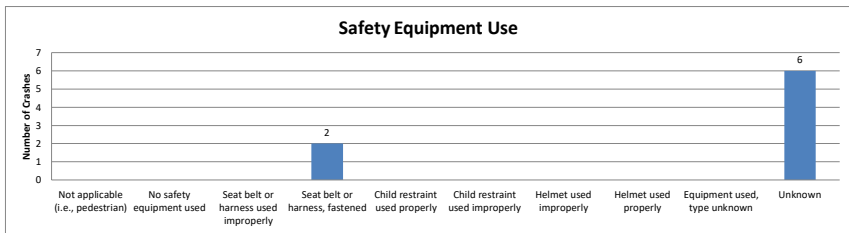
Involved Driver Characteristics



At-Fault Driver Characteristics



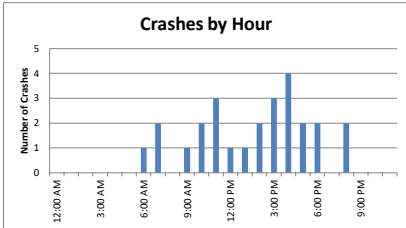
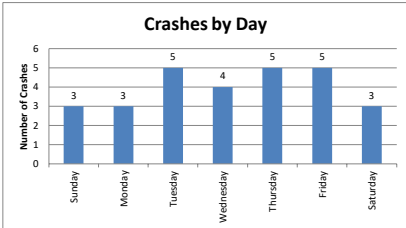
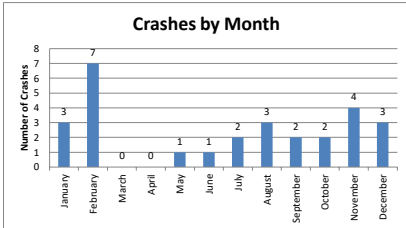
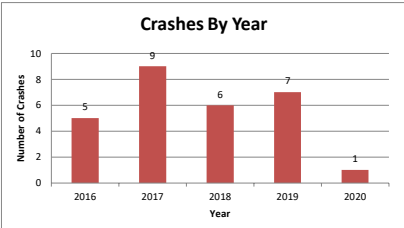
Other Crash Characteristics



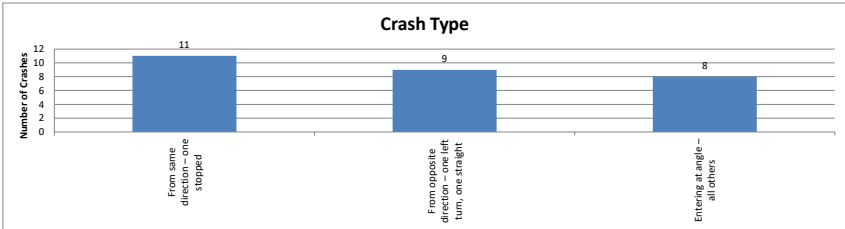
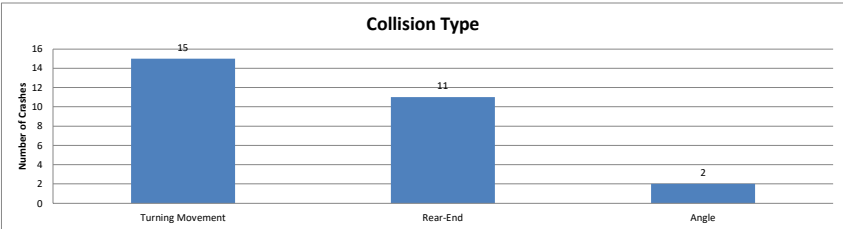
Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 6th_Maple
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

NW 6th Street/ NW Maple Avenue (January 2016 through December 2020)

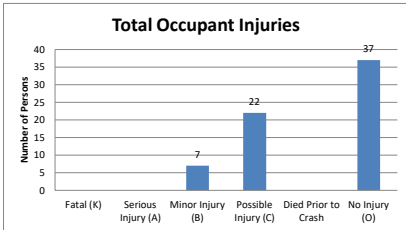
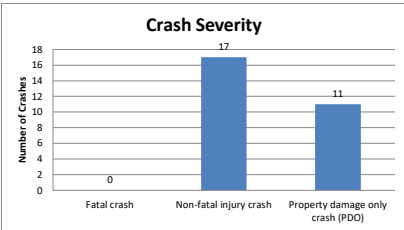
Crash Summary by Date and Time



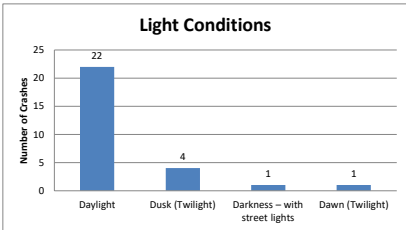
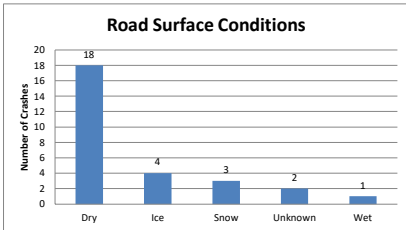
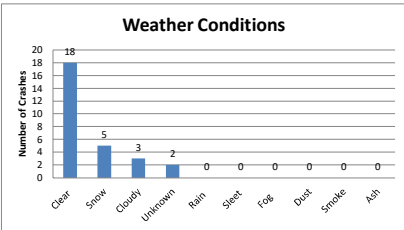
Crash Summary by Type



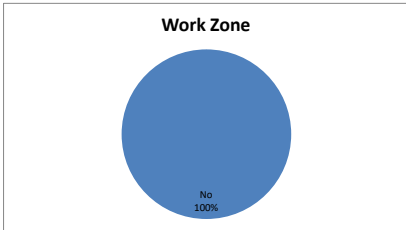
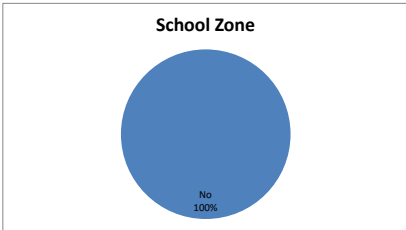
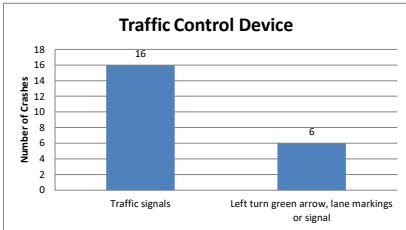
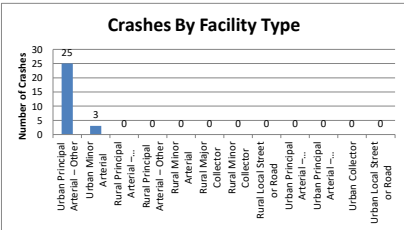
Crash Severity



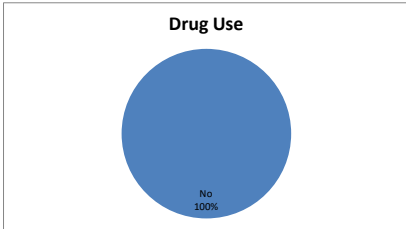
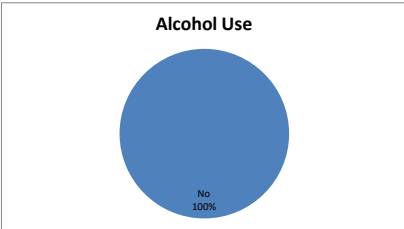
Crash Environment Characteristics



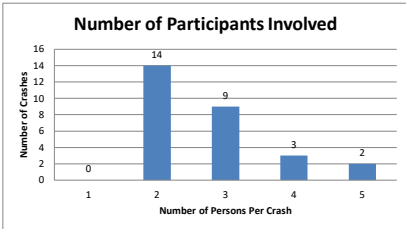
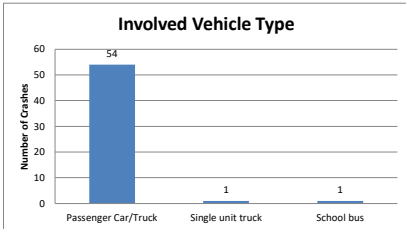
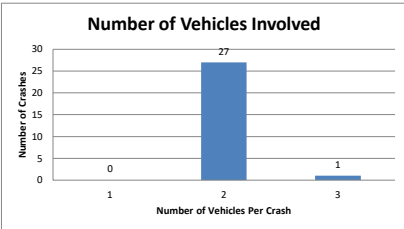
Crash Area Characteristics



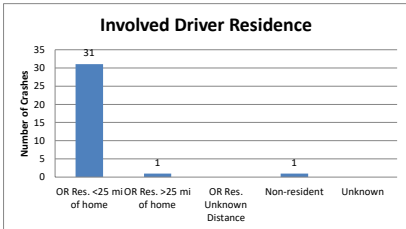
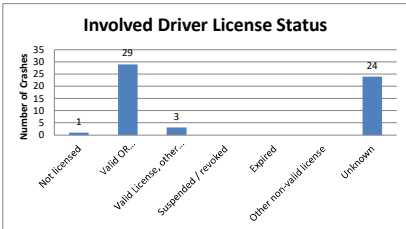
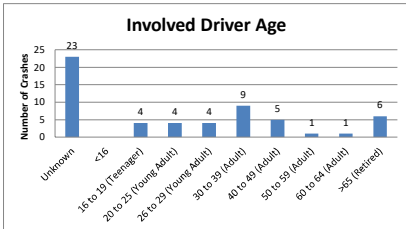
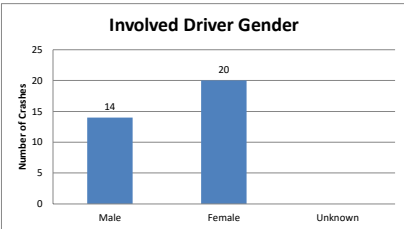
Driving Impairments



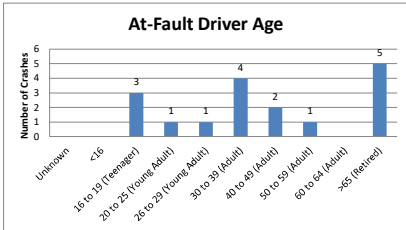
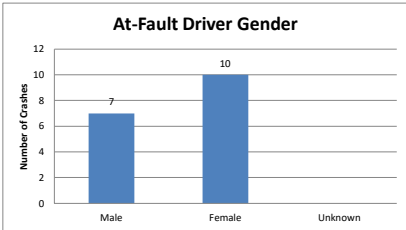
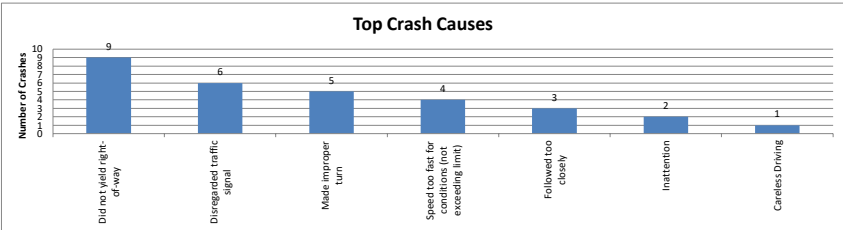
Vehicles and Occupants



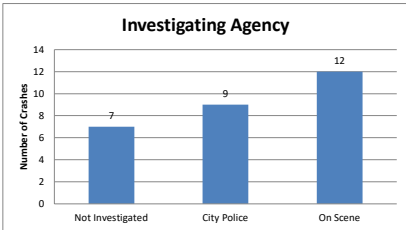
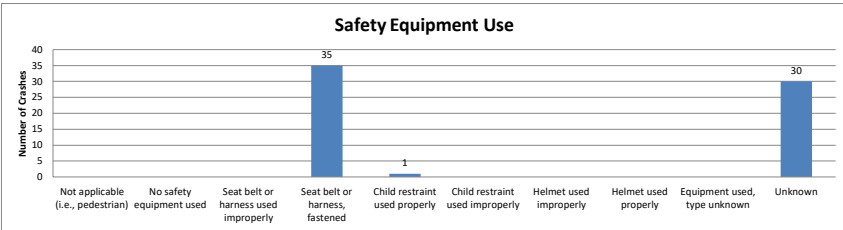
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

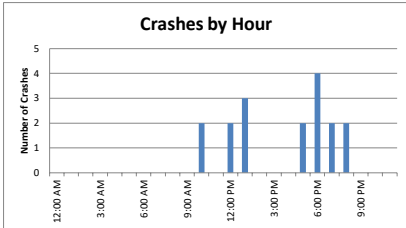
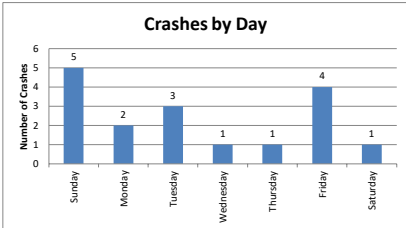
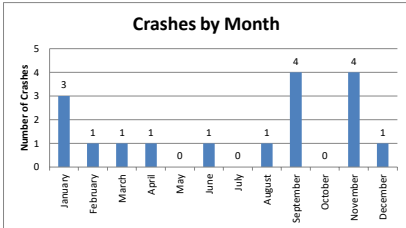
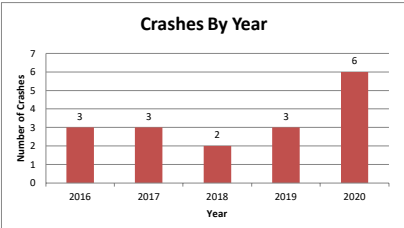


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 6th_Quince
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

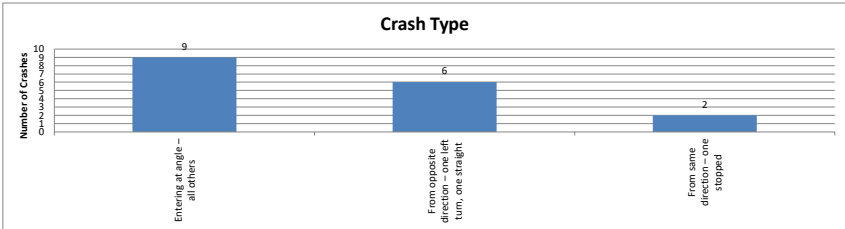
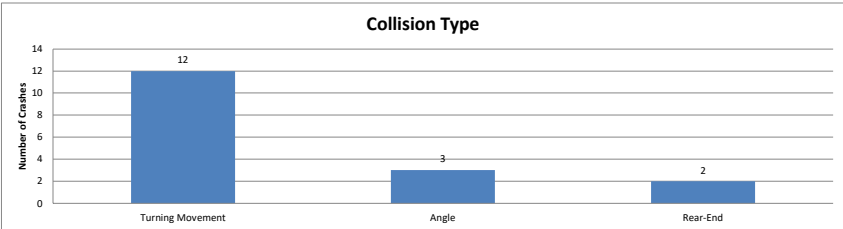
NW 6th Street/ NW Quince Avenue

(January 2016 through December 2020)

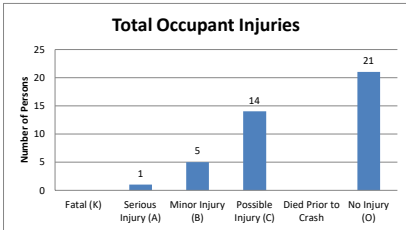
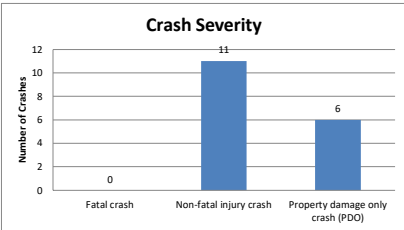
Crash Summary by Date and Time



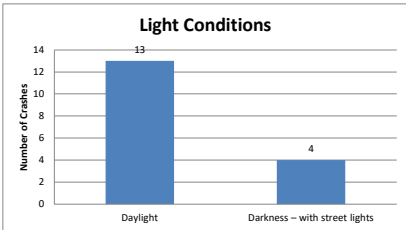
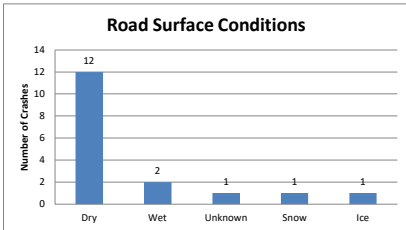
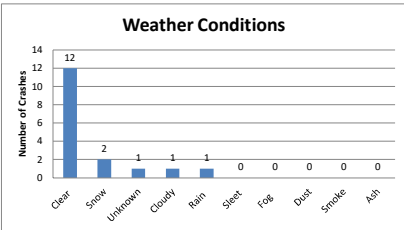
Crash Summary by Type



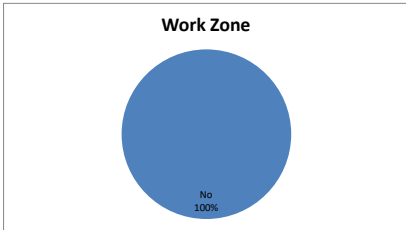
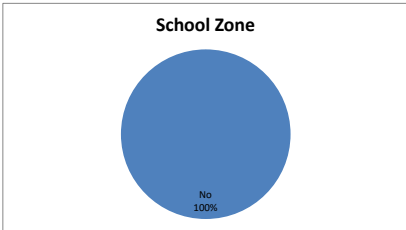
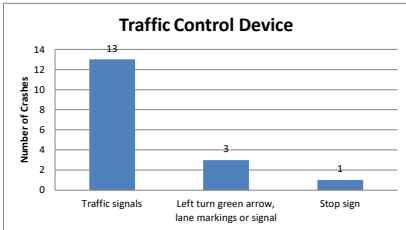
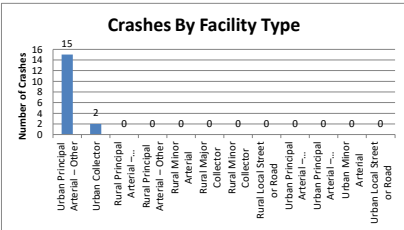
Crash Severity



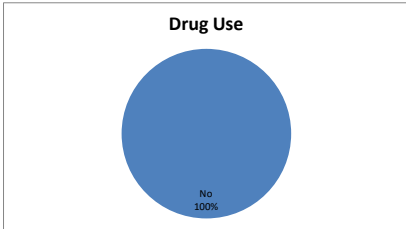
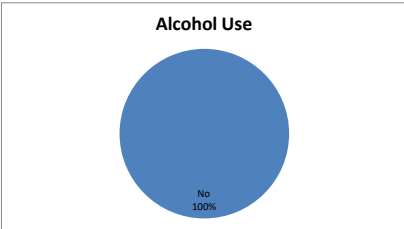
Crash Environment Characteristics



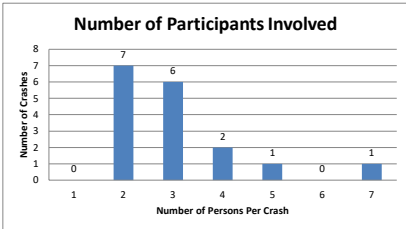
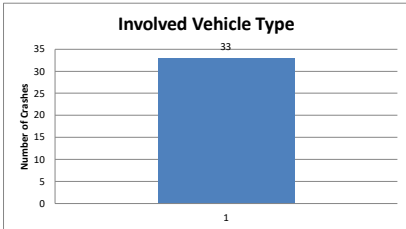
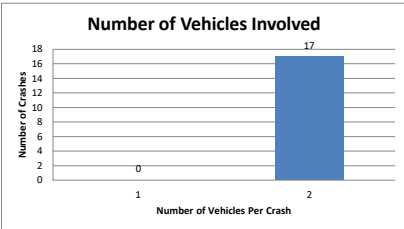
Crash Area Characteristics



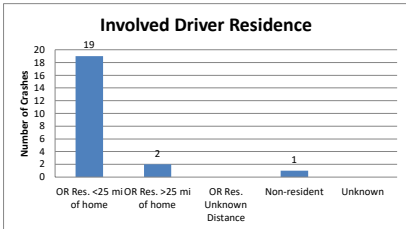
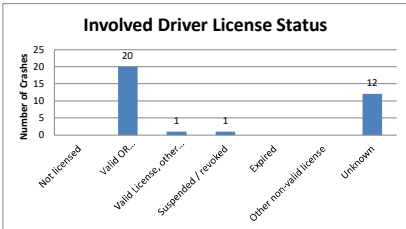
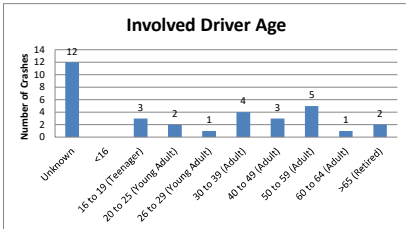
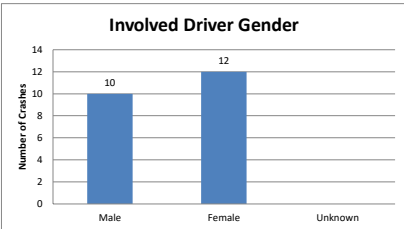
Driving Impairments



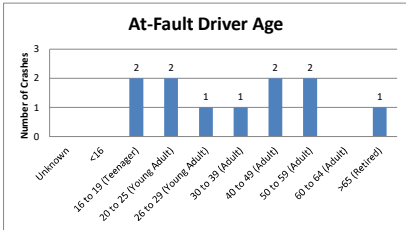
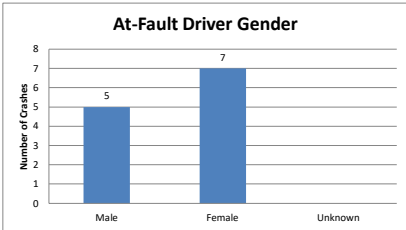
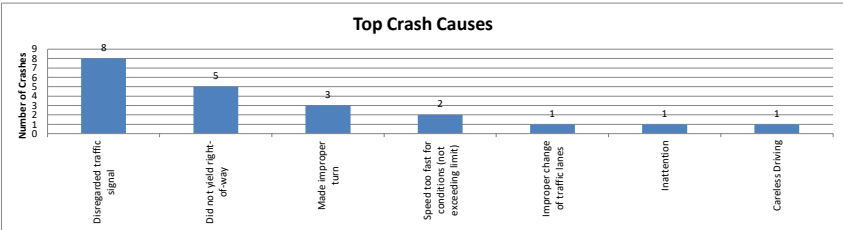
Vehicles and Occupants



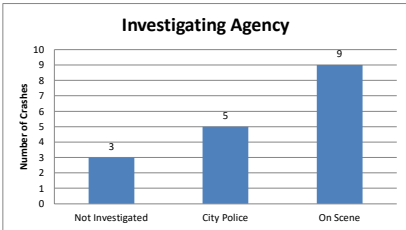
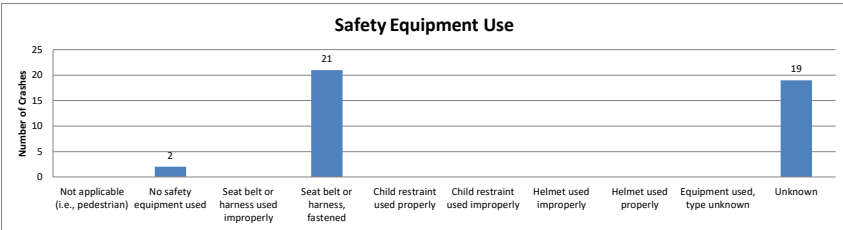
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

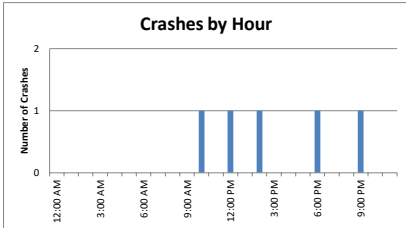
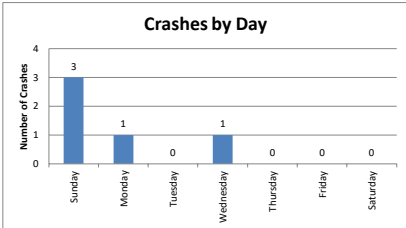
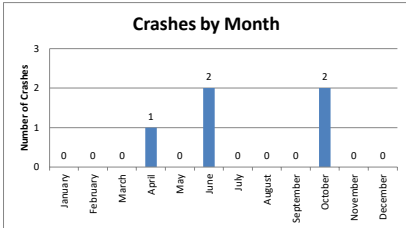
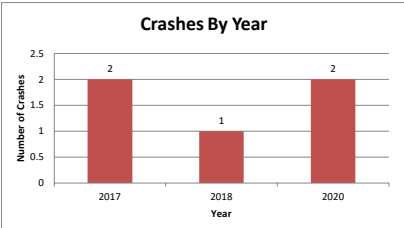


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 9th_BlackButte
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

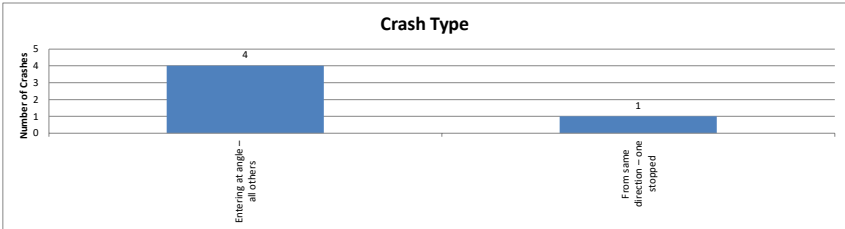
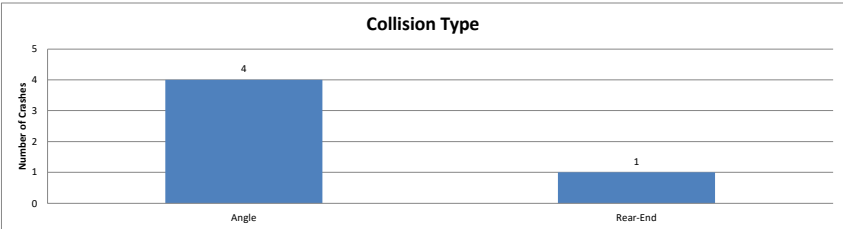
SW 9th Street/ SW Black Butte Boulevard

(January 2016 through December 2020)

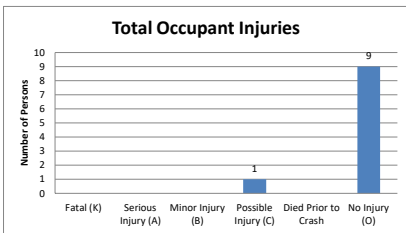
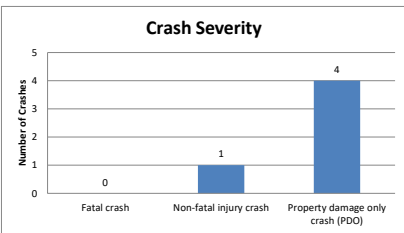
Crash Summary by Date and Time



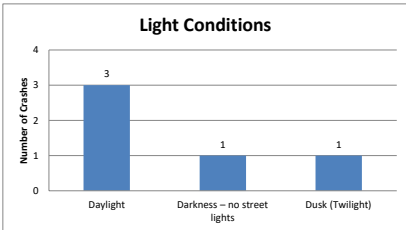
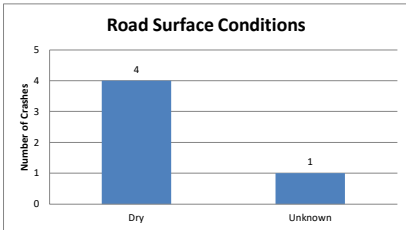
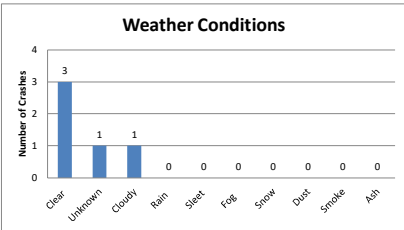
Crash Summary by Type



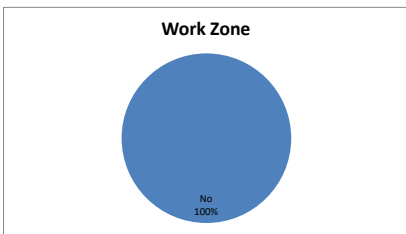
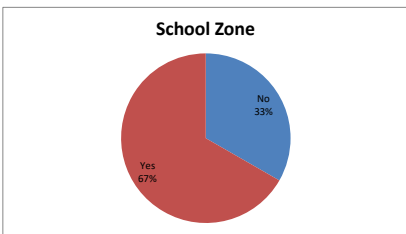
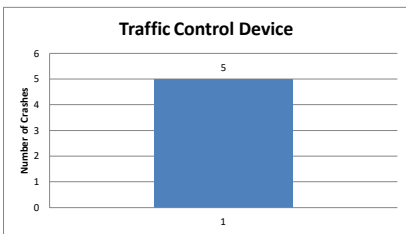
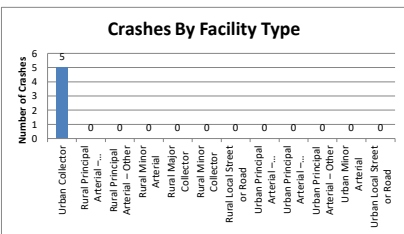
Crash Severity



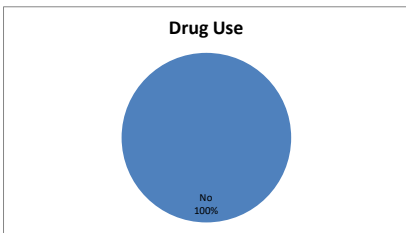
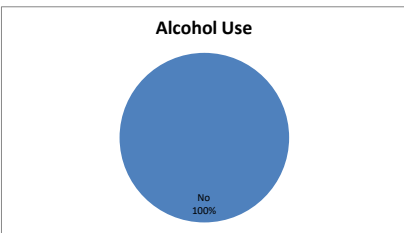
Crash Environment Characteristics



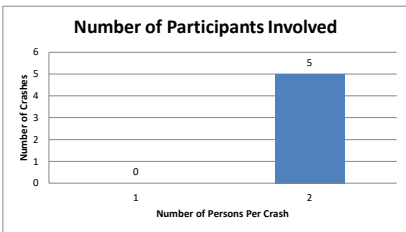
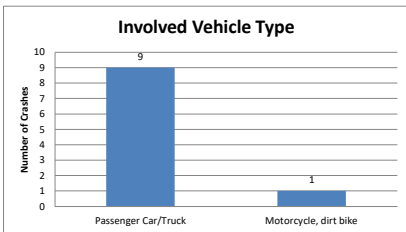
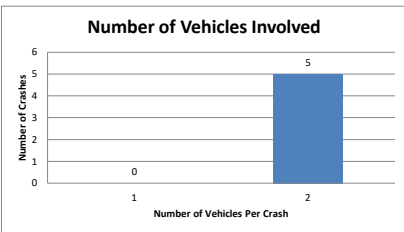
Crash Area Characteristics



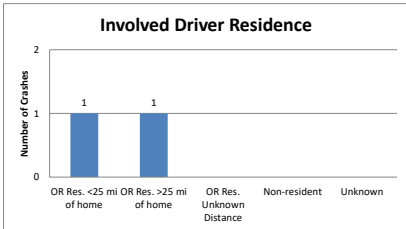
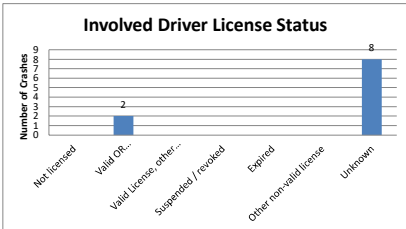
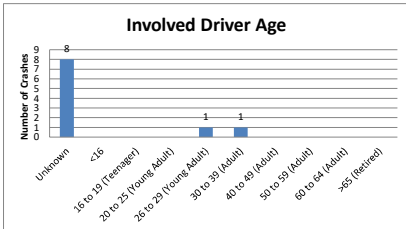
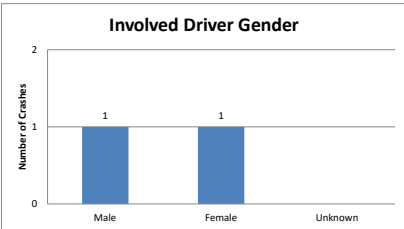
Driving Impairments



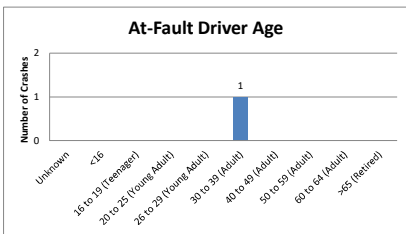
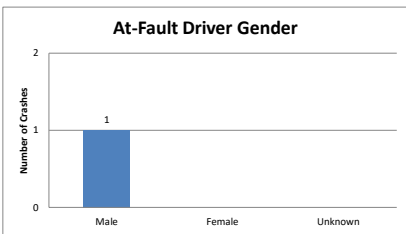
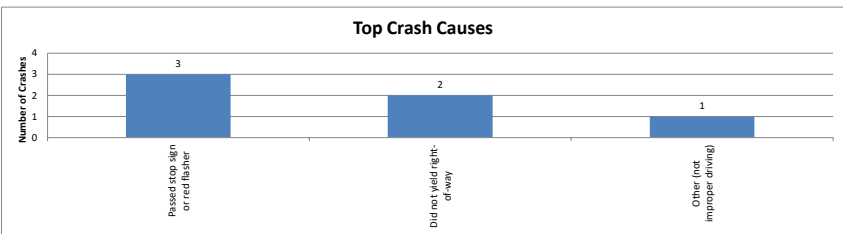
Vehicles and Occupants



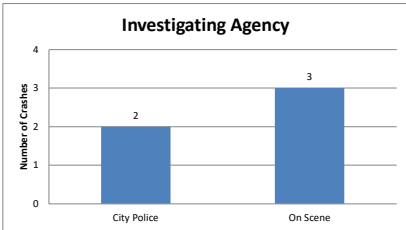
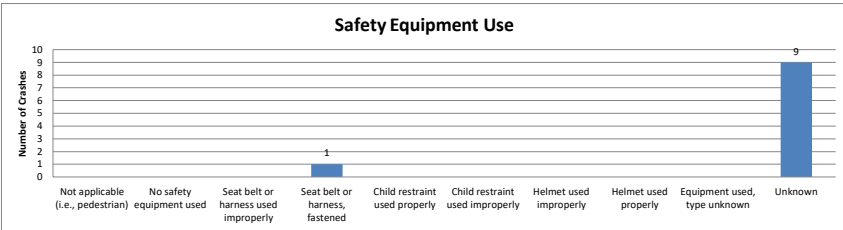
Involved Driver Characteristics



At-Fault Driver Characteristics



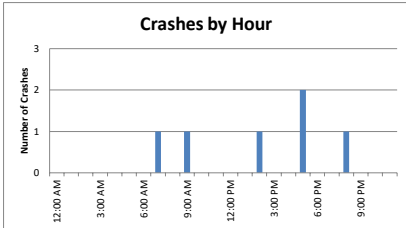
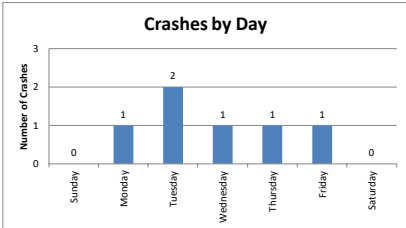
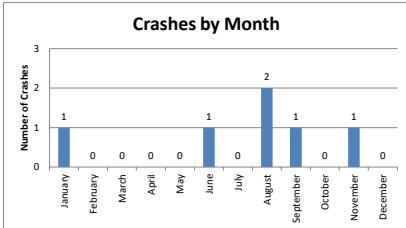
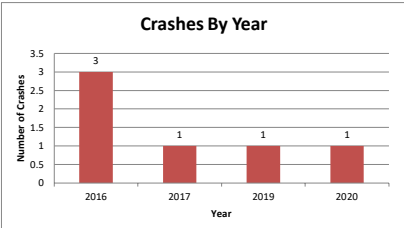
Other Crash Characteristics



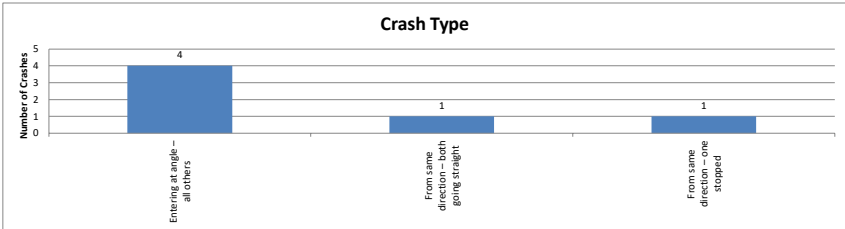
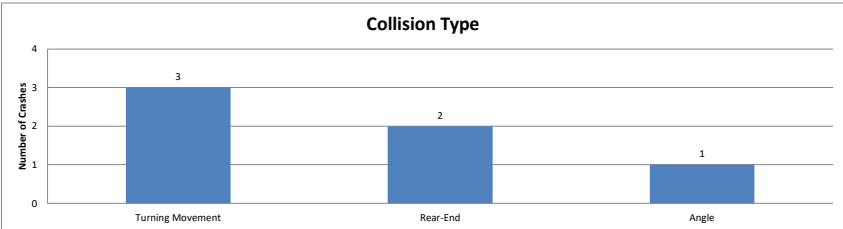
Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 9th_Maple
Date Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: DeschutesWeather Condition: Clear

NW 9th Street/ NW Maple Avenue (January 2016 through December 2020)

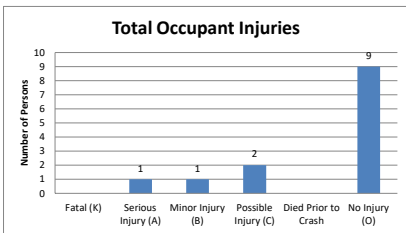
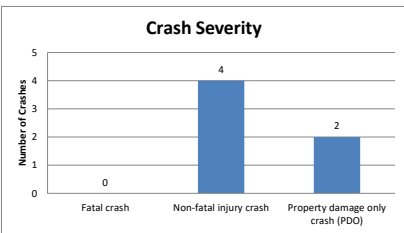
Crash Summary by Date and Time



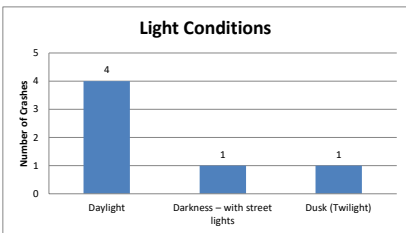
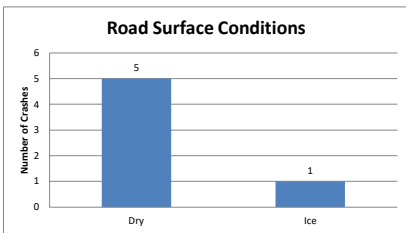
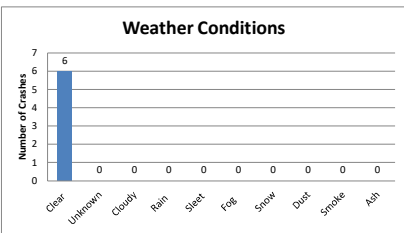
Crash Summary by Type



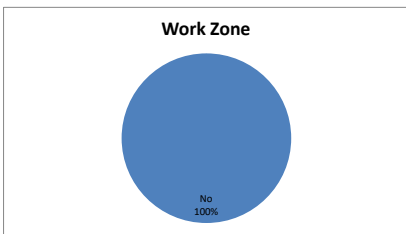
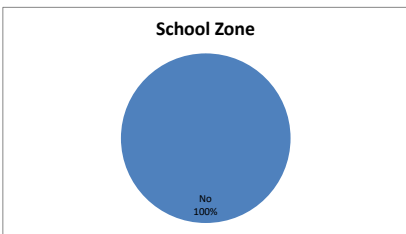
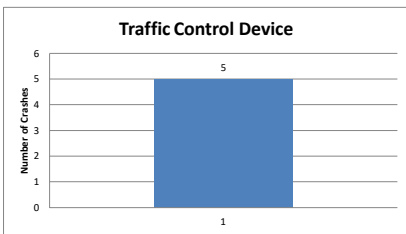
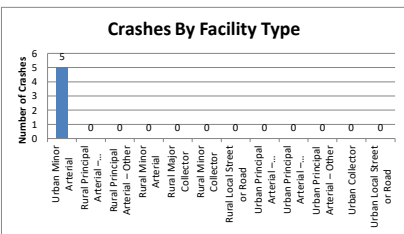
Crash Severity



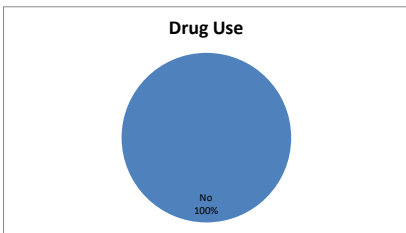
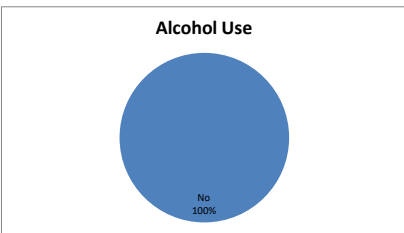
Crash Environment Characteristics



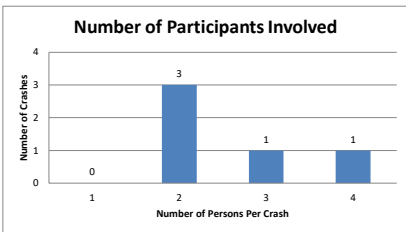
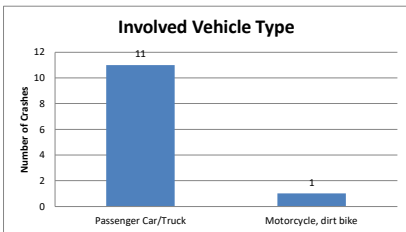
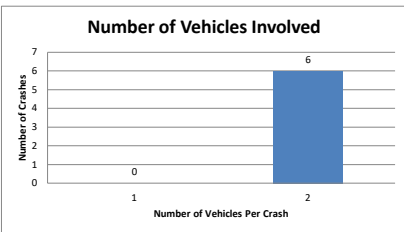
Crash Area Characteristics



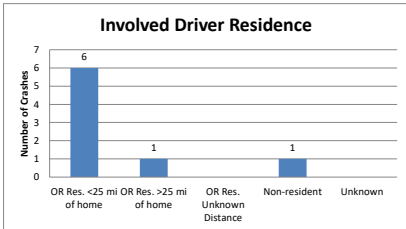
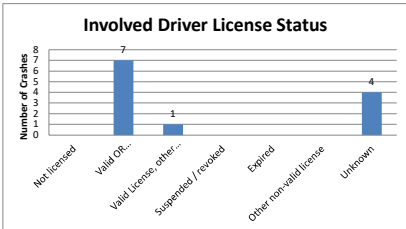
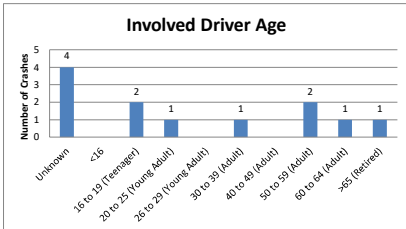
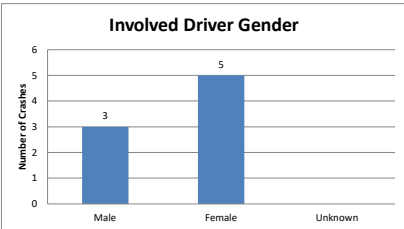
Driving Impairments



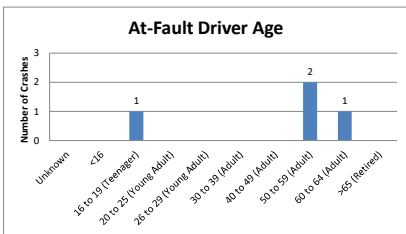
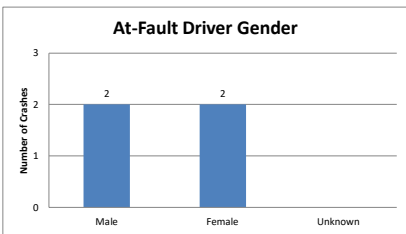
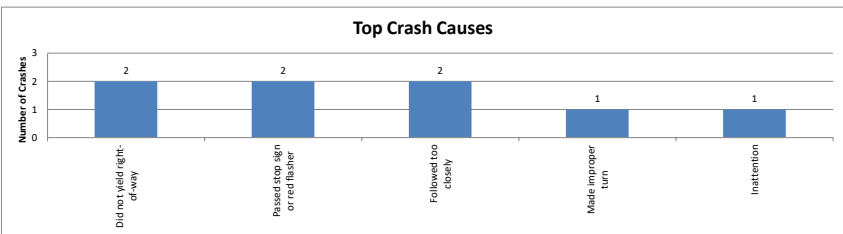
Vehicles and Occupants



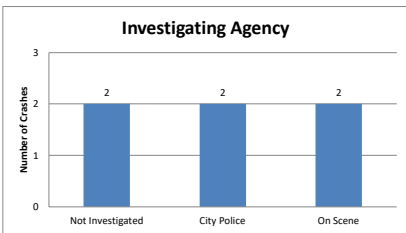
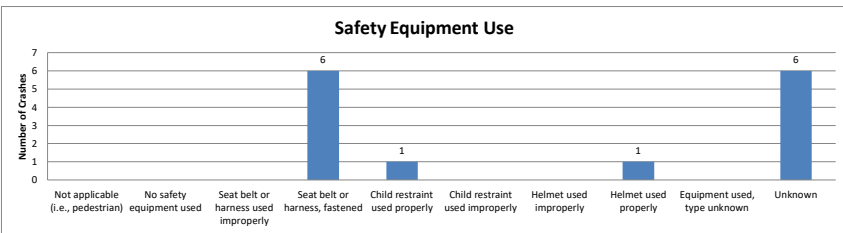
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

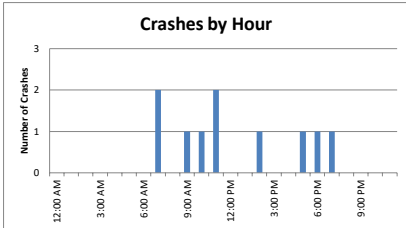
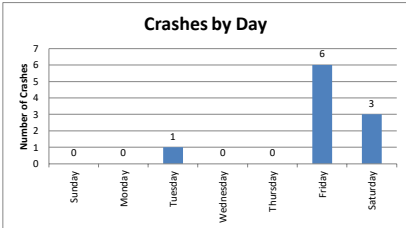
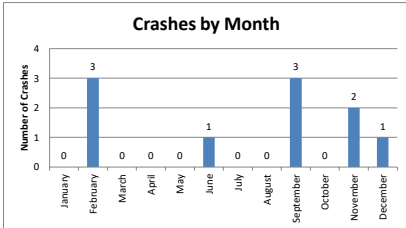
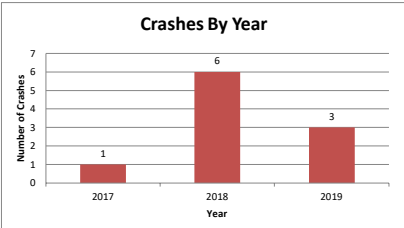


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 19th_Maple
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

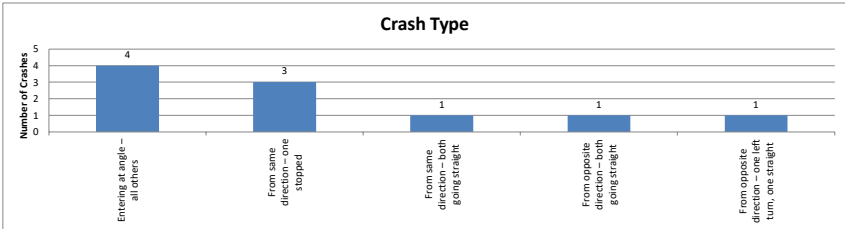
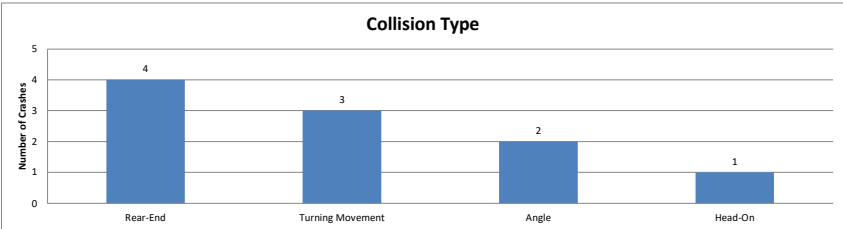
NW 19th Street/ NW Maple Avenue

(January 2016 through December 2020)

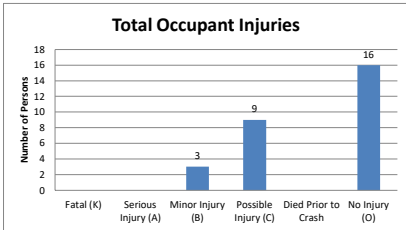
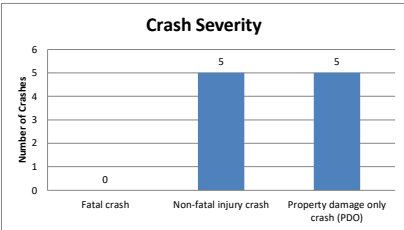
Crash Summary by Date and Time



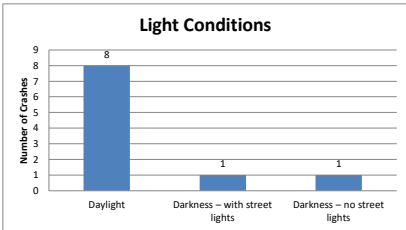
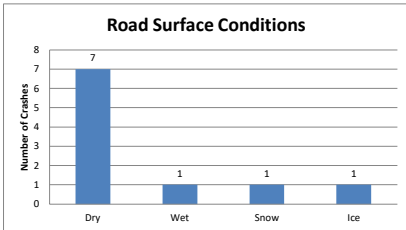
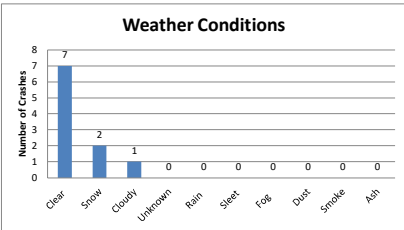
Crash Summary by Type



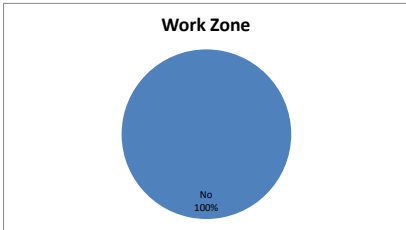
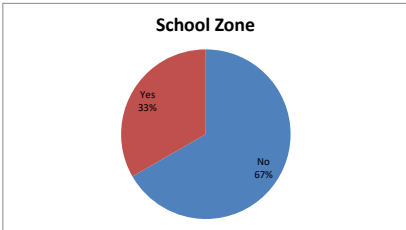
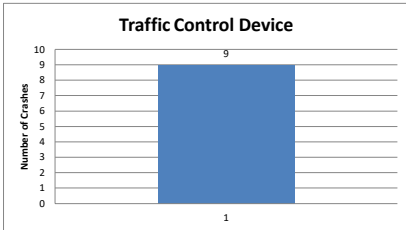
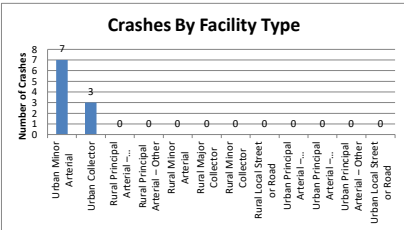
Crash Severity



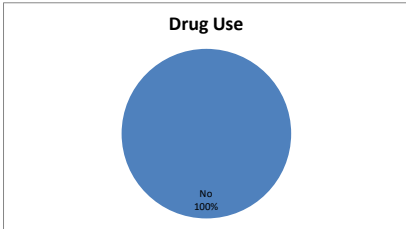
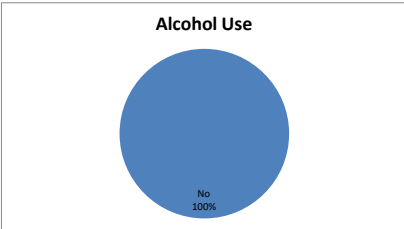
Crash Environment Characteristics



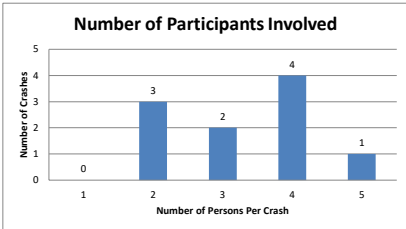
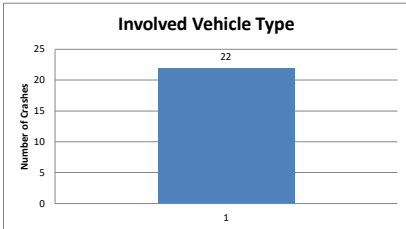
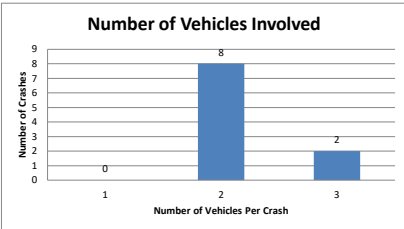
Crash Area Characteristics



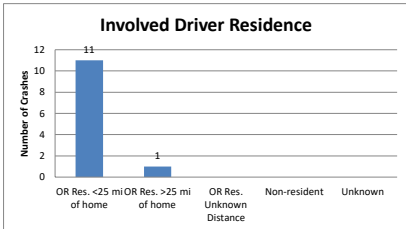
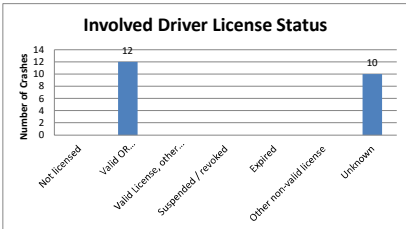
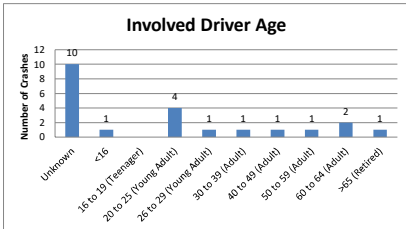
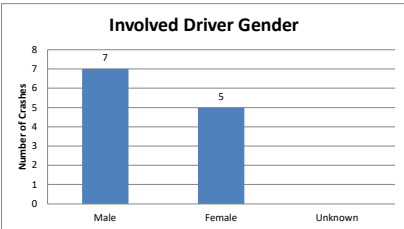
Driving Impairments



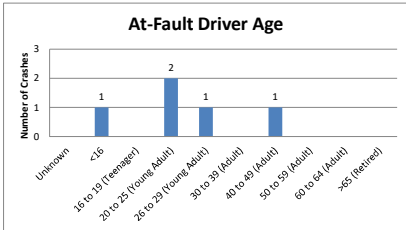
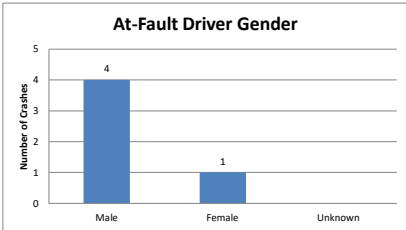
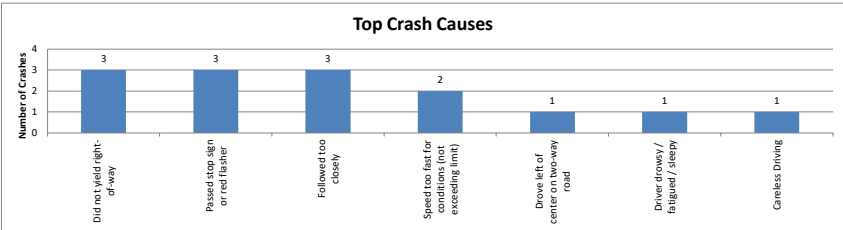
Vehicles and Occupants



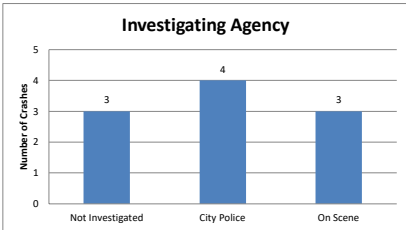
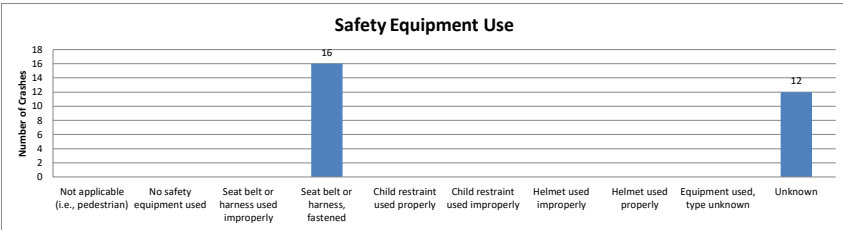
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

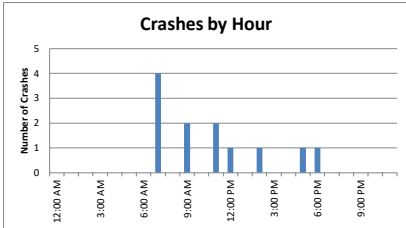
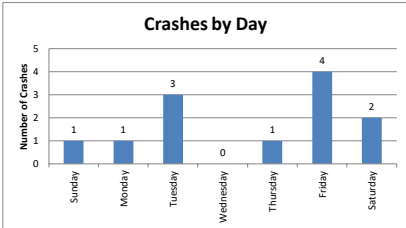
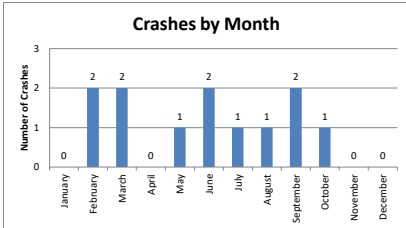
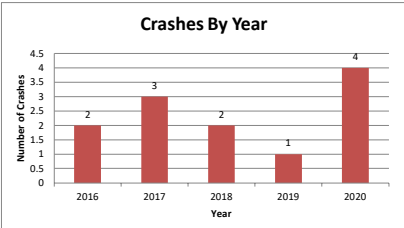


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 19th_Antler
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

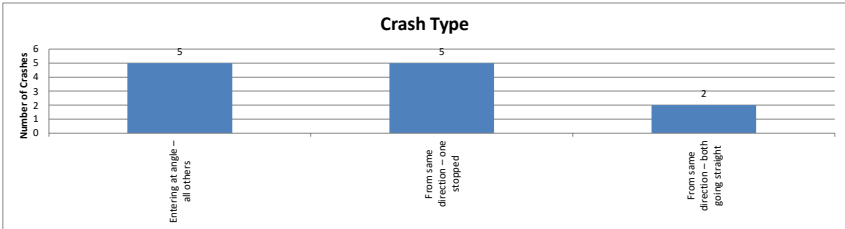
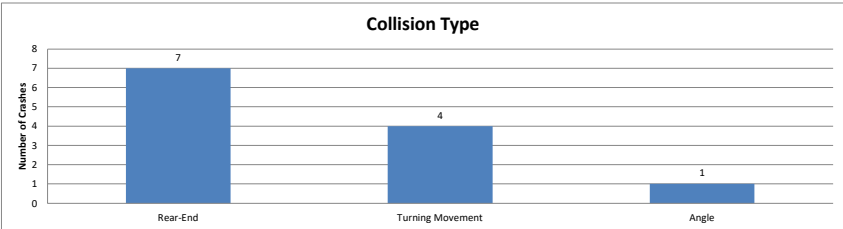
NW 19th Street - SW Rimrock Way/ W Antler Avenue

(January 2016 through December 2020)

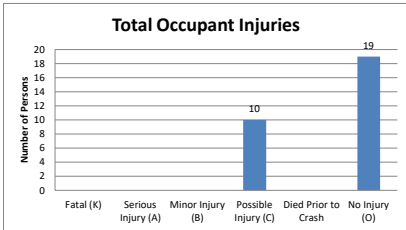
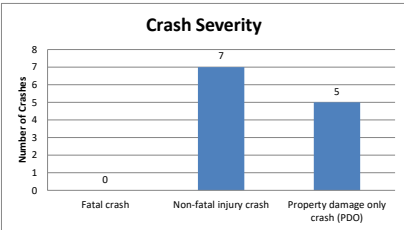
Crash Summary by Date and Time



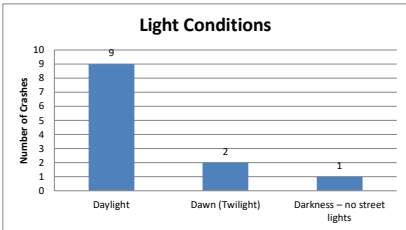
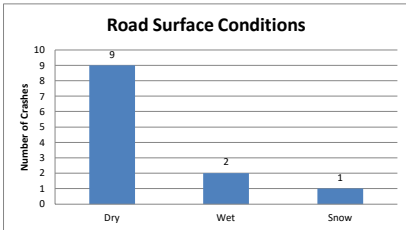
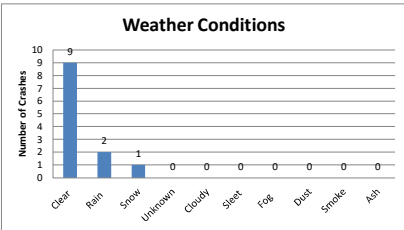
Crash Summary by Type



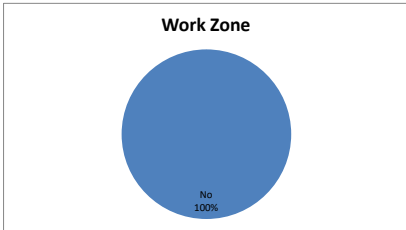
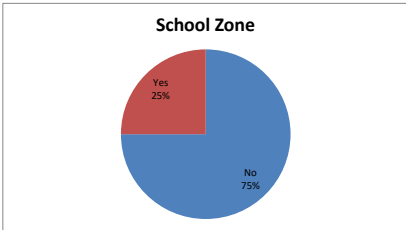
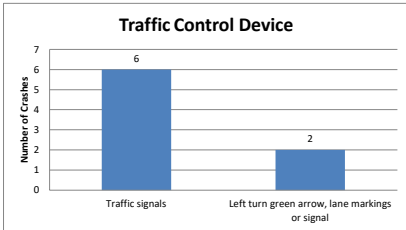
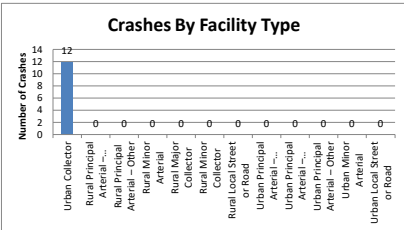
Crash Severity



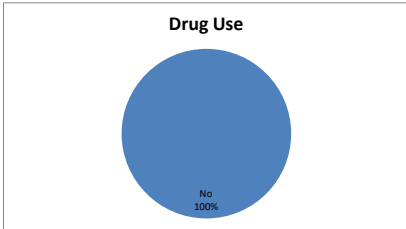
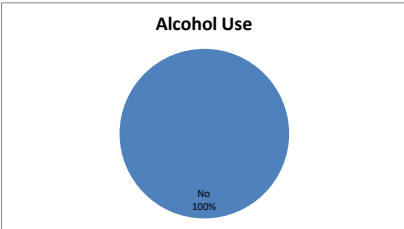
Crash Environment Characteristics



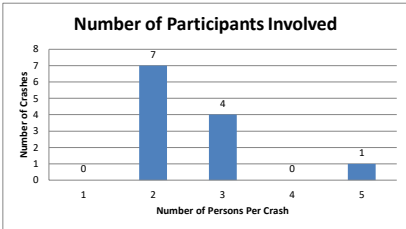
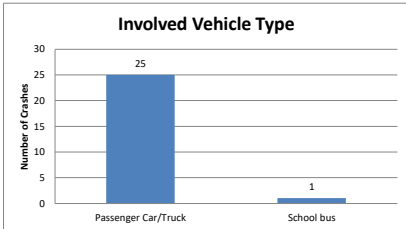
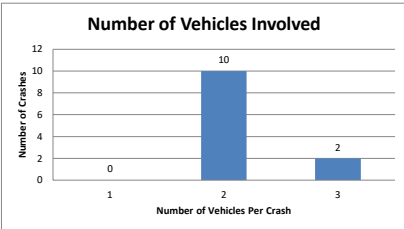
Crash Area Characteristics



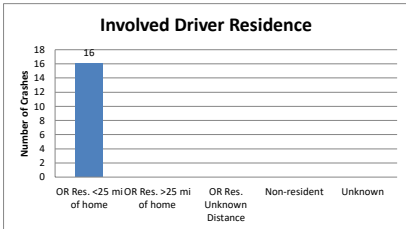
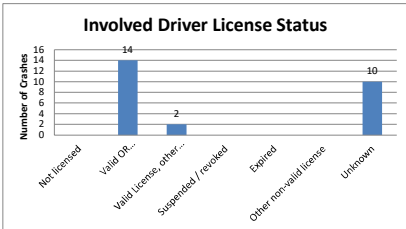
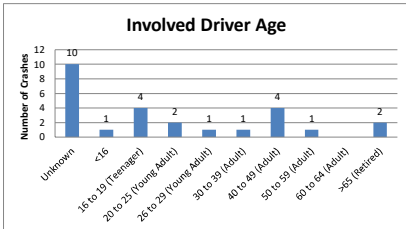
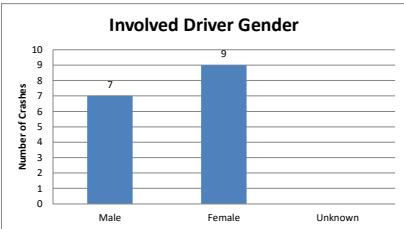
Driving Impairments



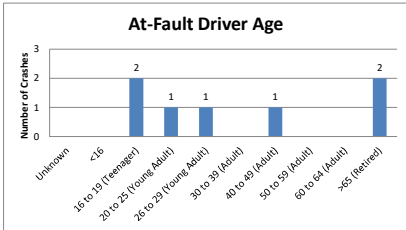
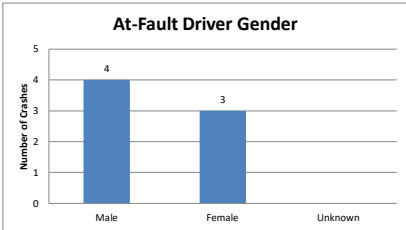
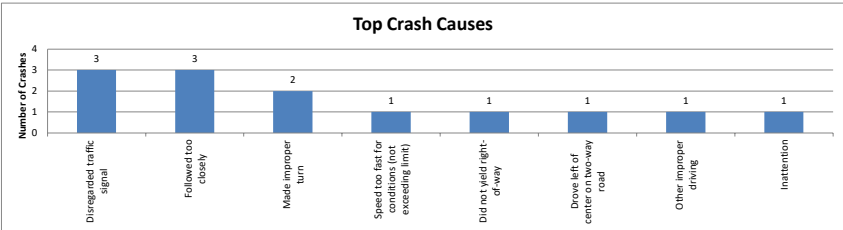
Vehicles and Occupants



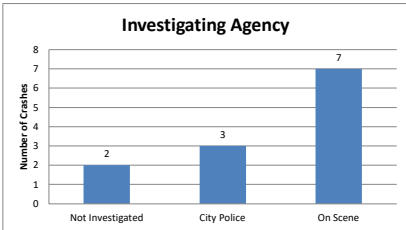
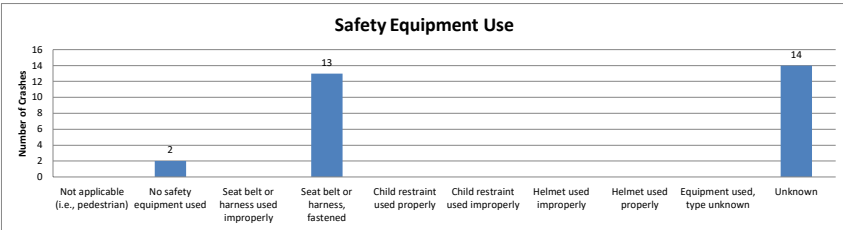
Involved Driver Characteristics



At-Fault Driver Characteristics



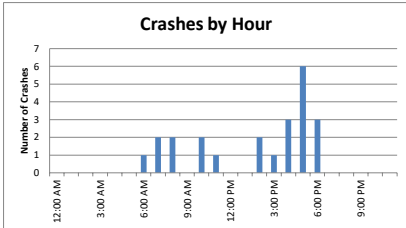
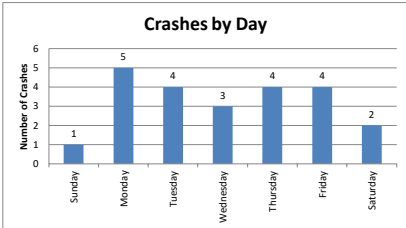
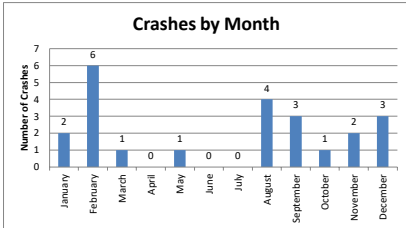
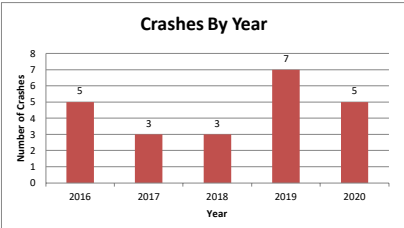
Other Crash Characteristics



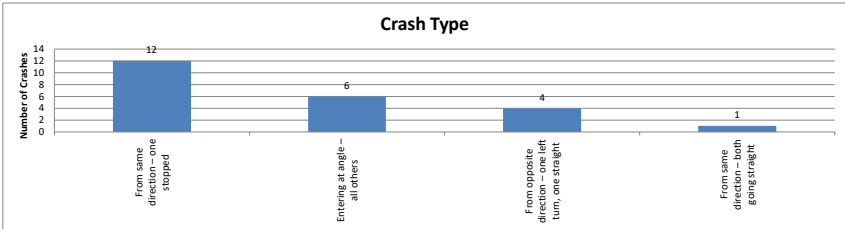
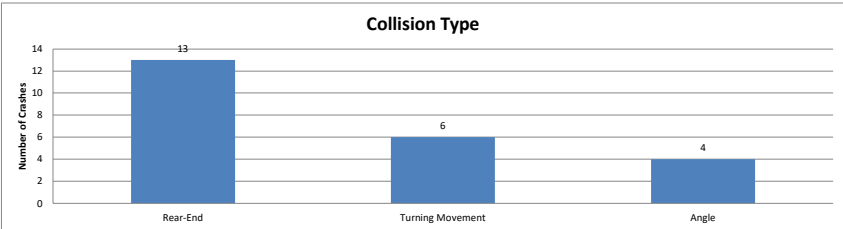
Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: 27th_Highland
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

SW 27th Street/ SW Highland Avenue (January 2016 through December 2020)

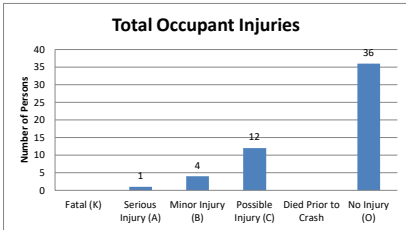
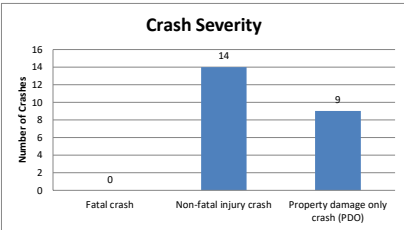
Crash Summary by Date and Time



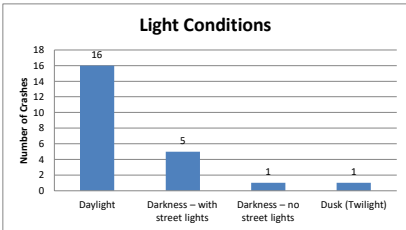
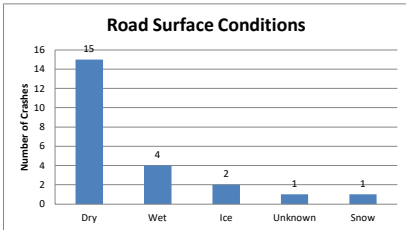
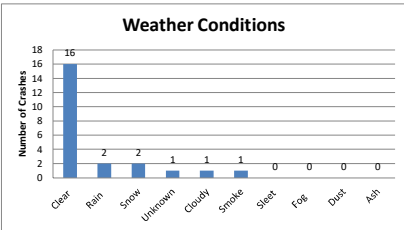
Crash Summary by Type



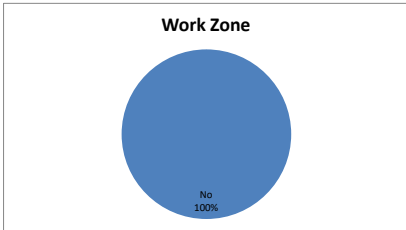
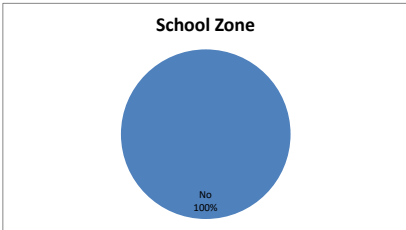
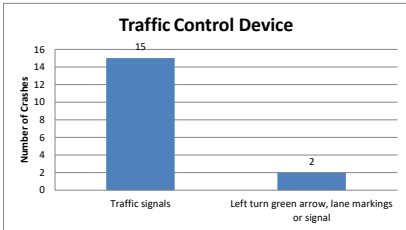
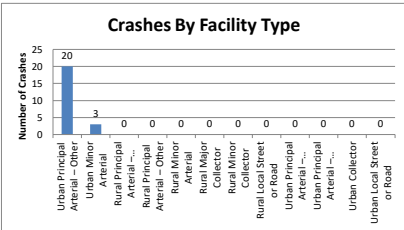
Crash Severity



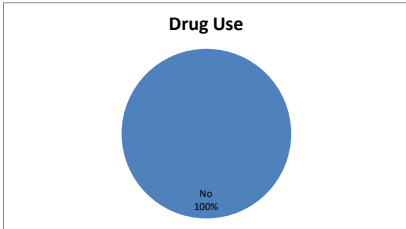
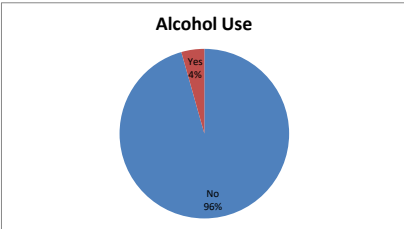
Crash Environment Characteristics



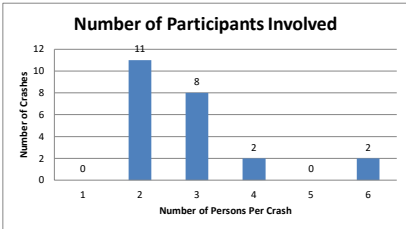
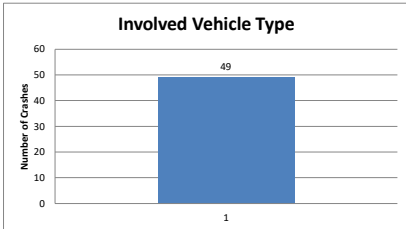
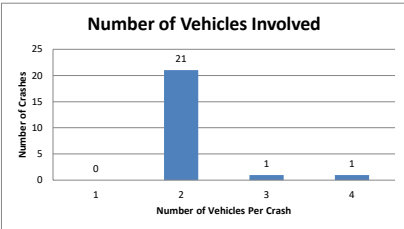
Crash Area Characteristics



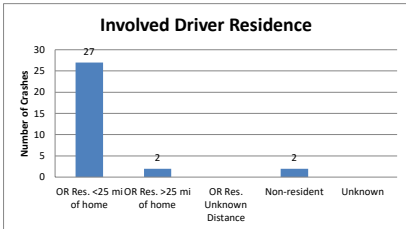
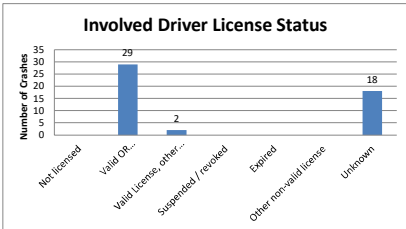
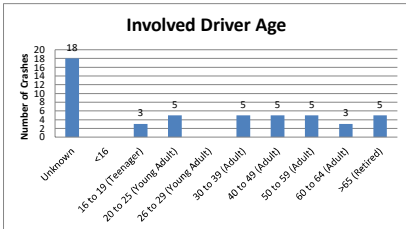
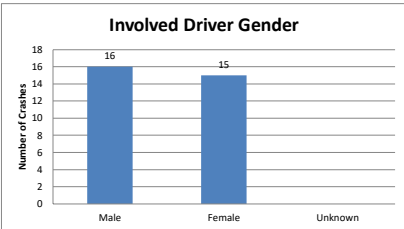
Driving Impairments



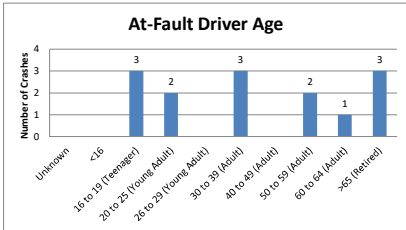
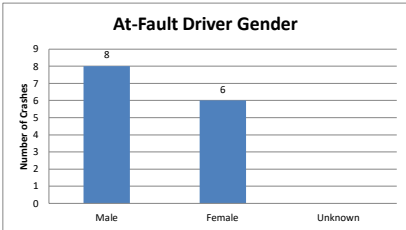
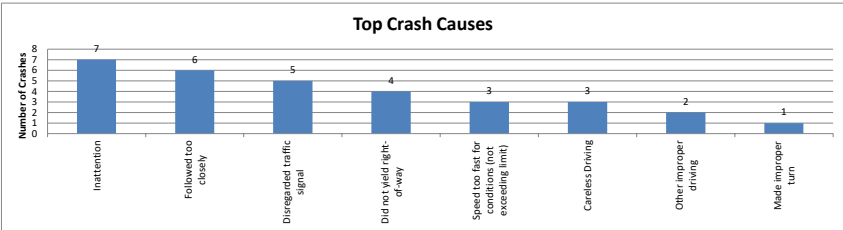
Vehicles and Occupants



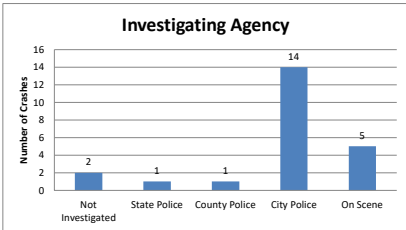
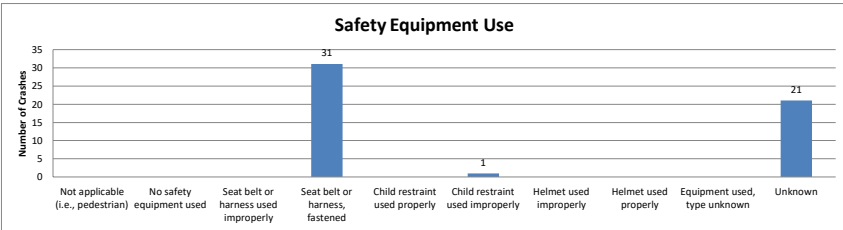
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

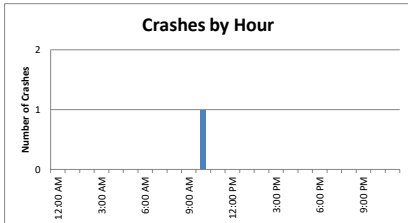
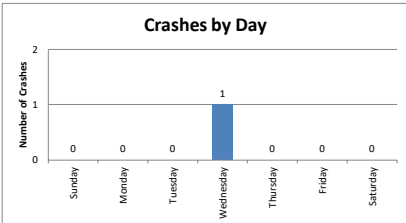
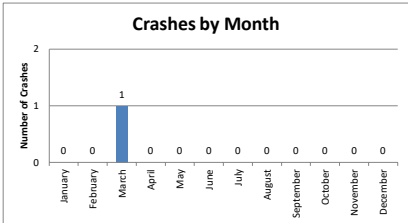
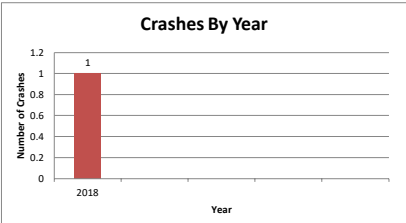


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: Canyon_BlackButte
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: DeschutesCrash Year: 2018Crash Month: MarchWeek Day Code: WednesdayCollision Type: AngleW

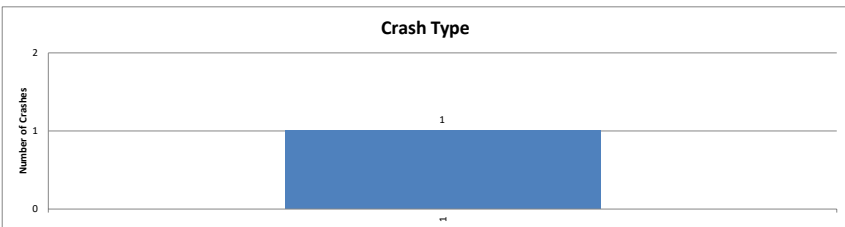
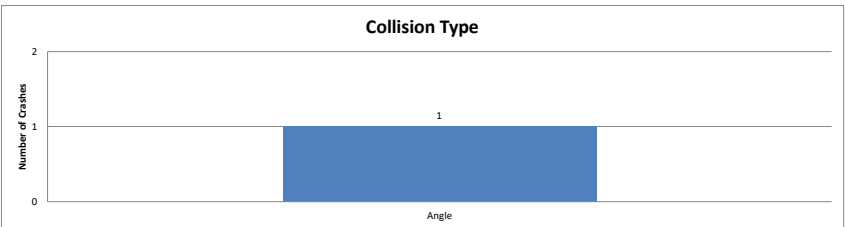
SW Canyon Drive/ SW Black Butte Boulevard

(January 2016 through December 2020)

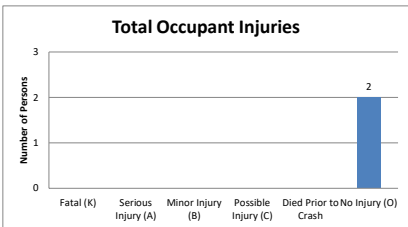
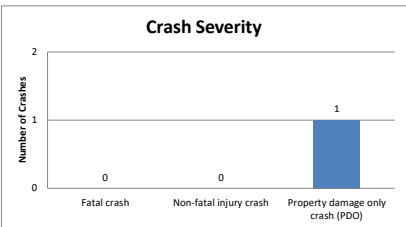
Crash Summary by Date and Time



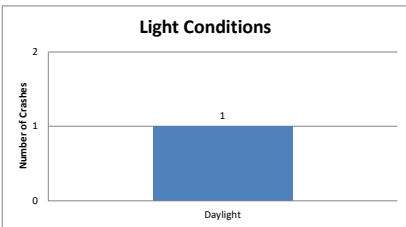
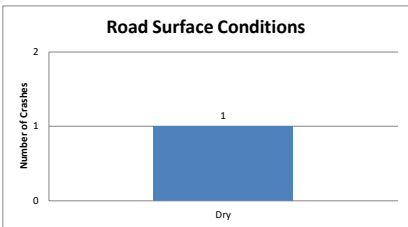
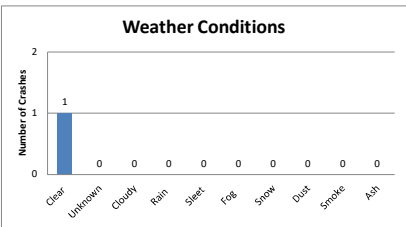
Crash Summary by Type



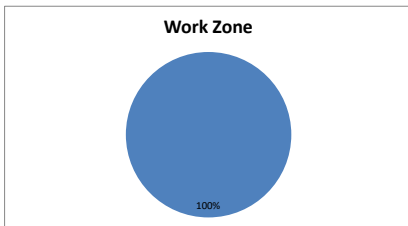
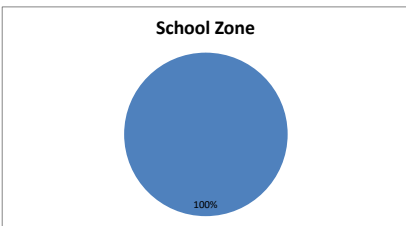
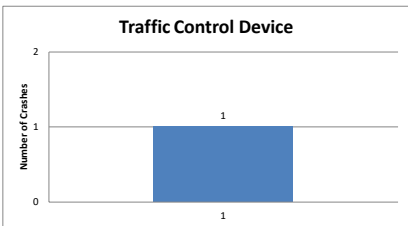
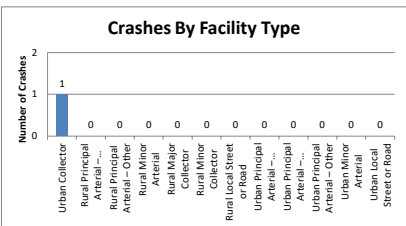
Crash Severity



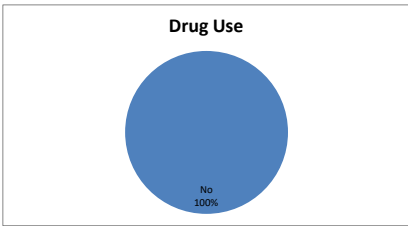
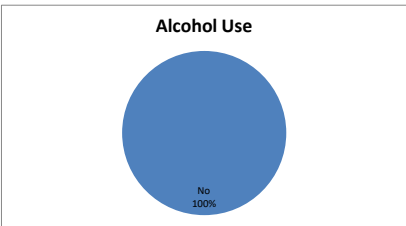
Crash Environment Characteristics



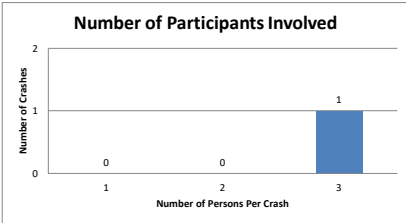
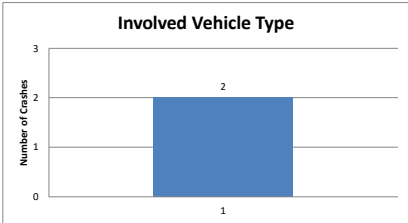
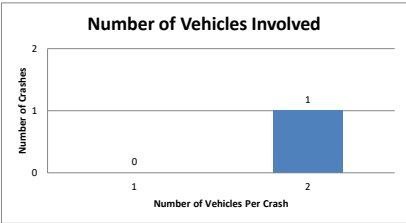
Crash Area Characteristics



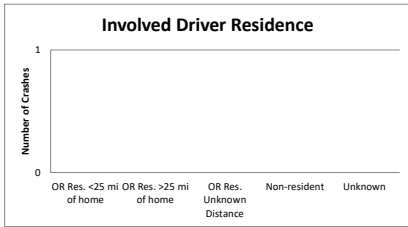
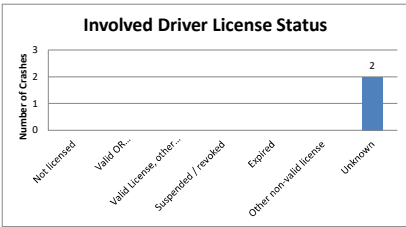
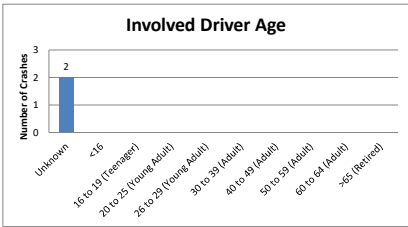
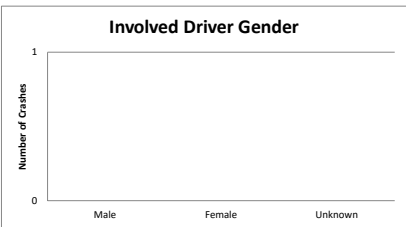
Driving Impairments



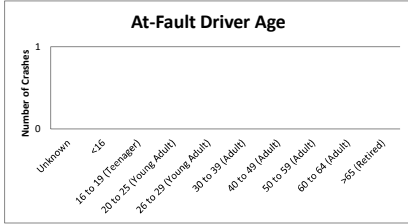
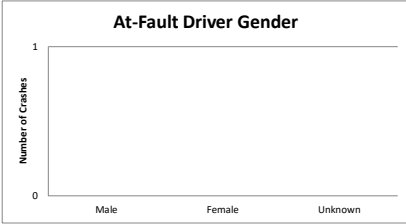
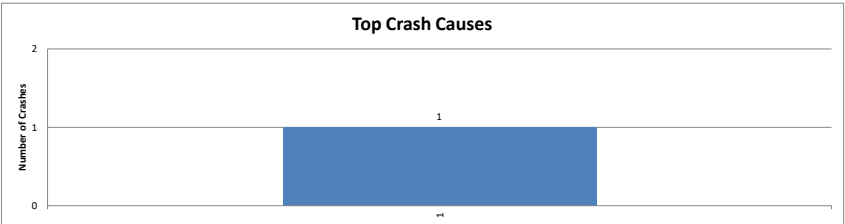
Vehicles and Occupants



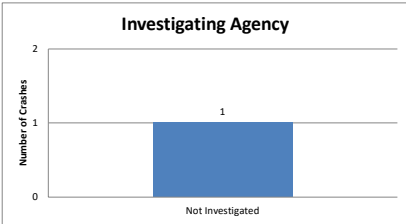
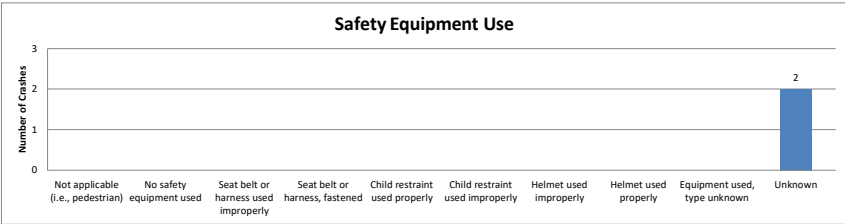
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

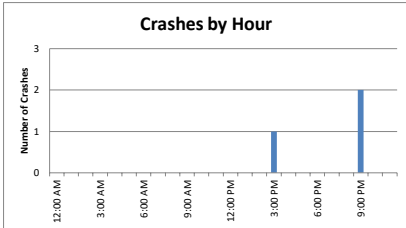
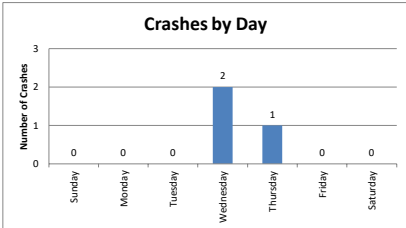
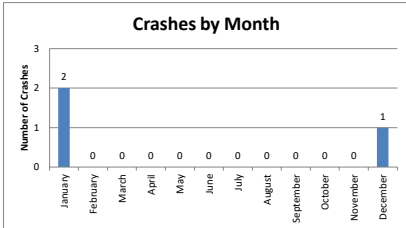
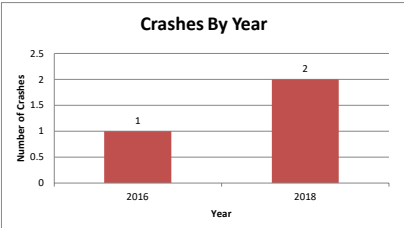


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: Northwest_Upas
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

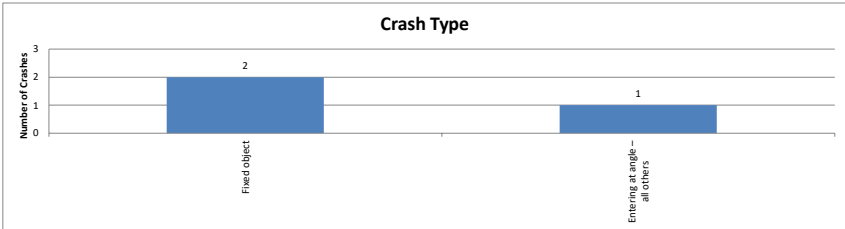
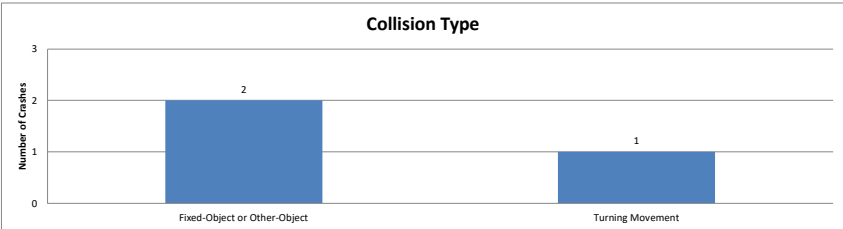
Northwest Way/ NW Upas Avenue

(January 2016 through December 2020)

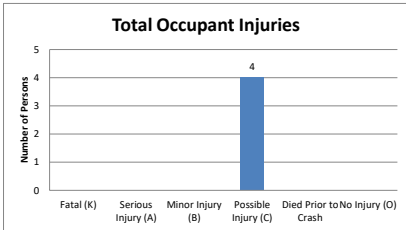
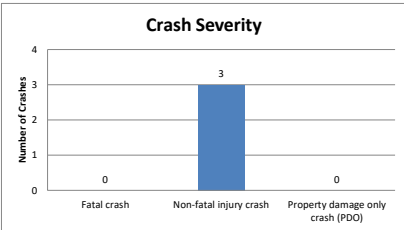
Crash Summary by Date and Time



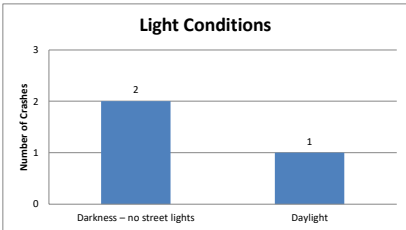
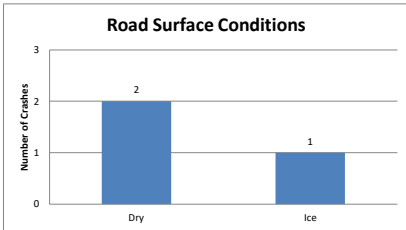
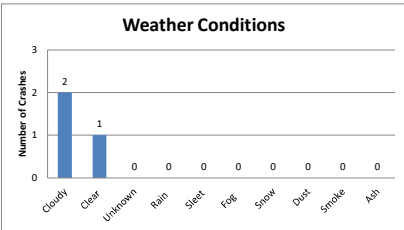
Crash Summary by Type



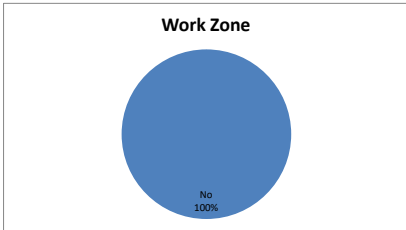
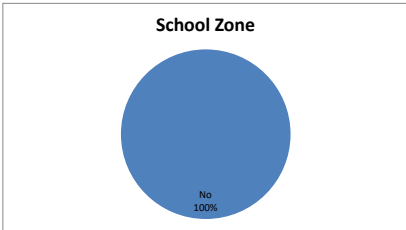
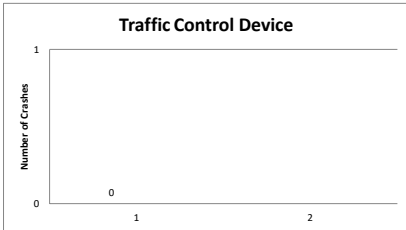
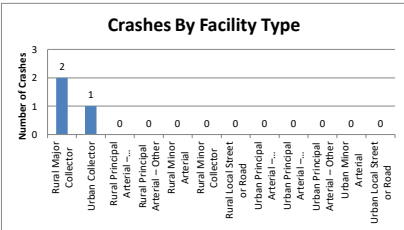
Crash Severity



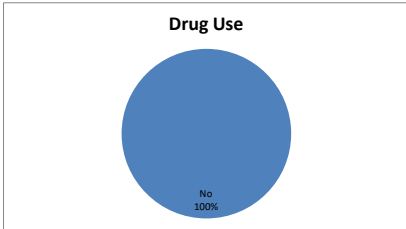
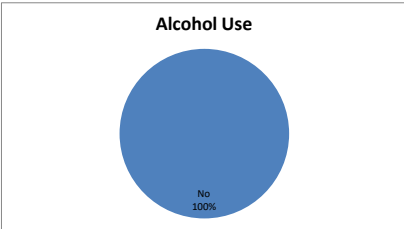
Crash Environment Characteristics



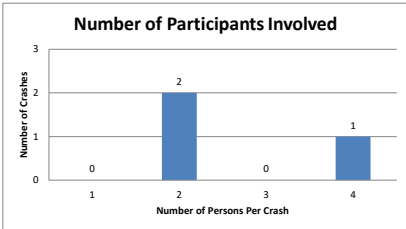
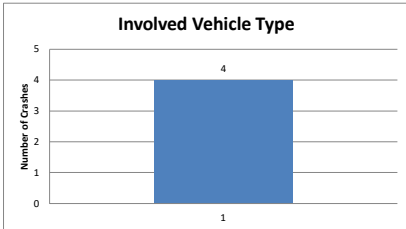
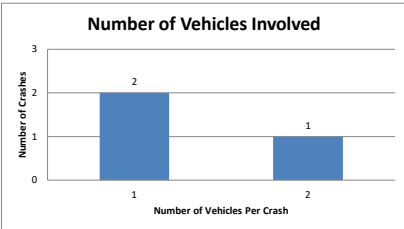
Crash Area Characteristics



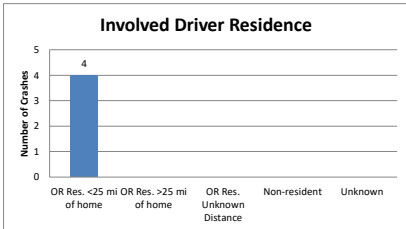
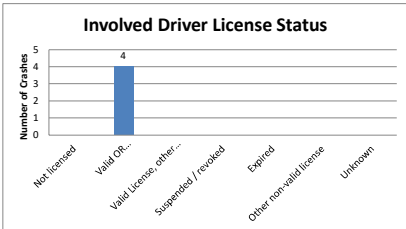
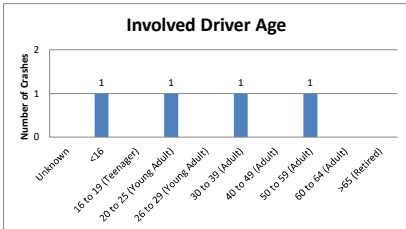
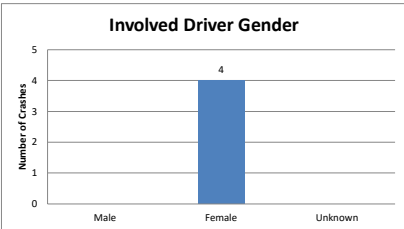
Driving Impairments



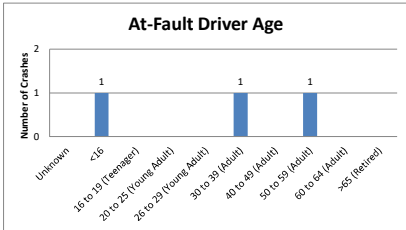
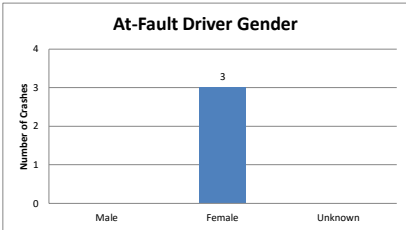
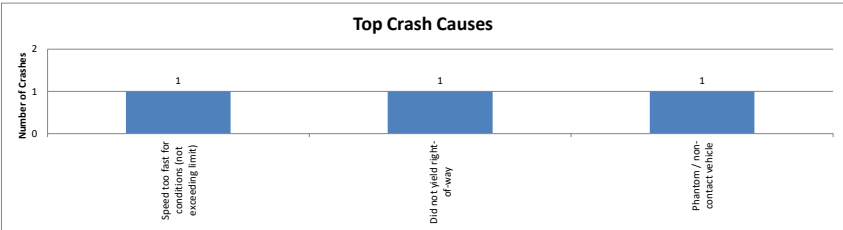
Vehicles and Occupants



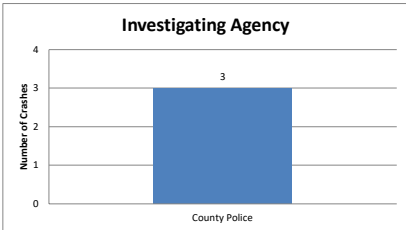
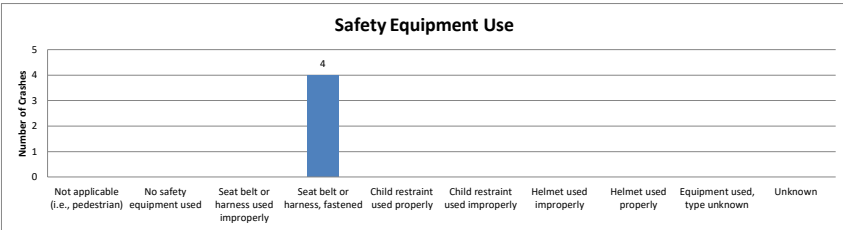
Involved Driver Characteristics



At-Fault Driver Characteristics



Other Crash Characteristics

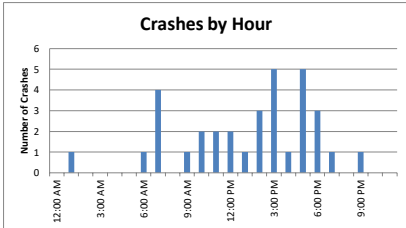
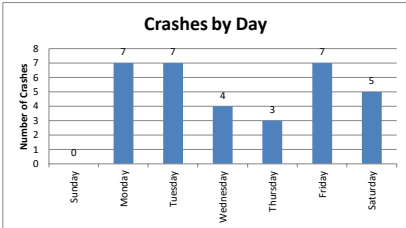
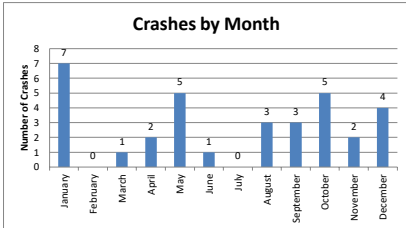
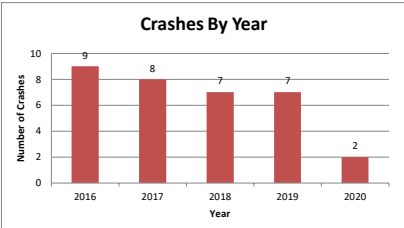


Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: US97_Glacier
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

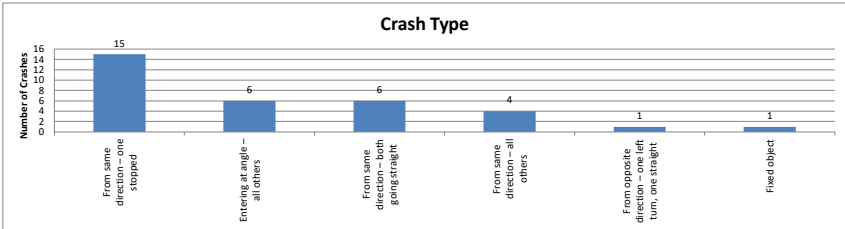
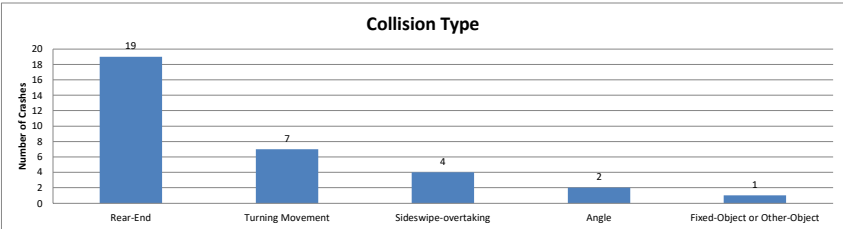
US 97/ SW Glacier Avenue - SW Highland Avenue

(January 2016 through December 2020)

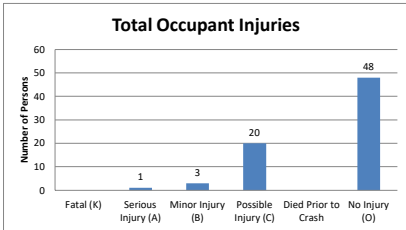
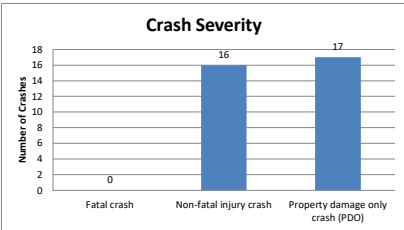
Crash Summary by Date and Time



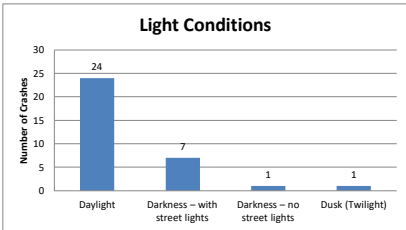
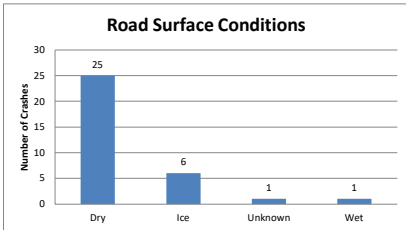
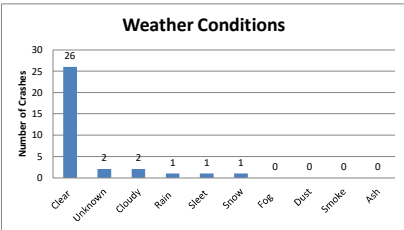
Crash Summary by Type



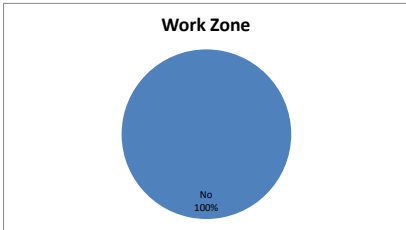
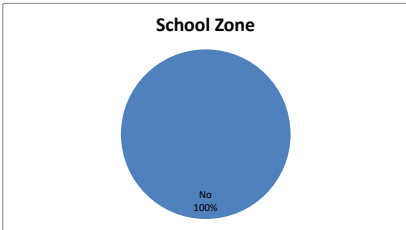
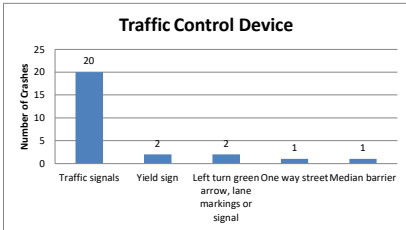
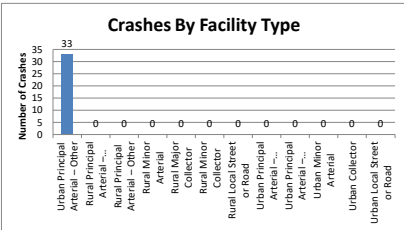
Crash Severity



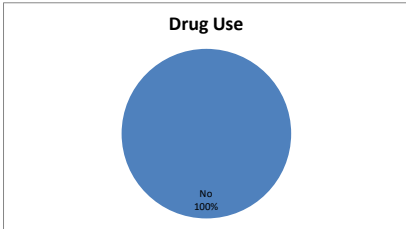
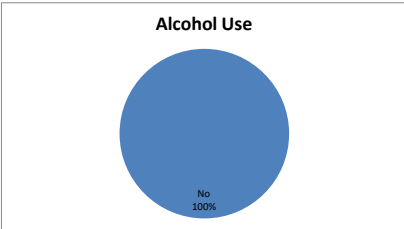
Crash Environment Characteristics



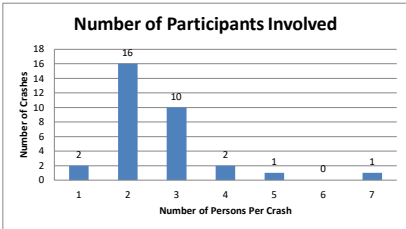
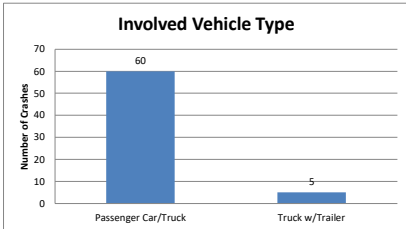
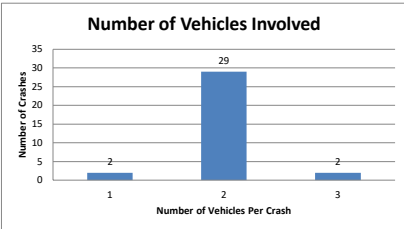
Crash Area Characteristics



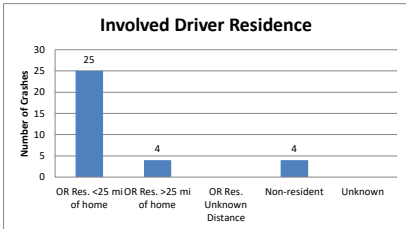
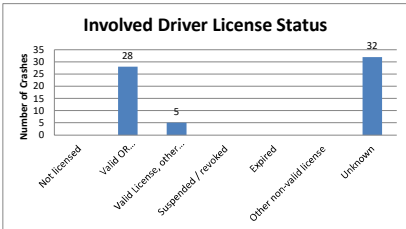
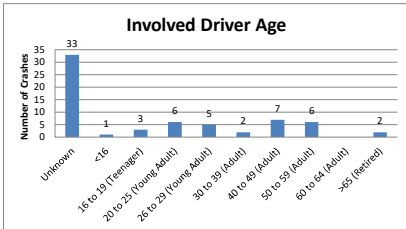
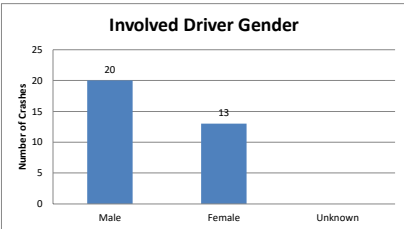
Driving Impairments



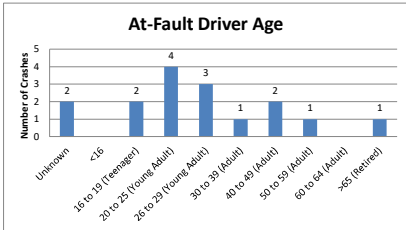
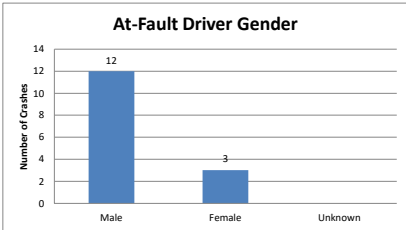
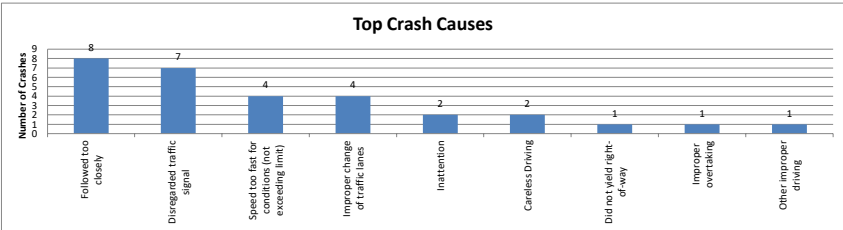
Vehicles and Occupants



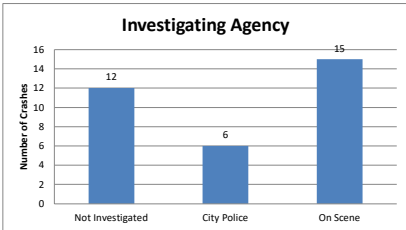
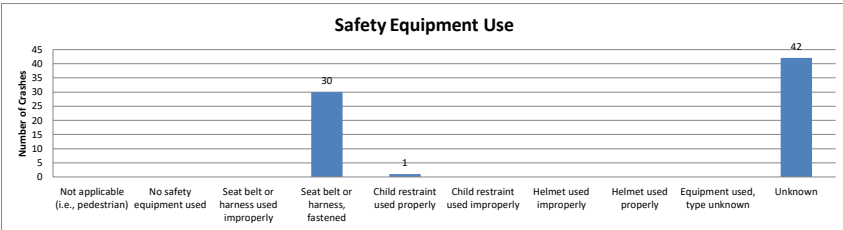
Involved Driver Characteristics



At-Fault Driver Characteristics



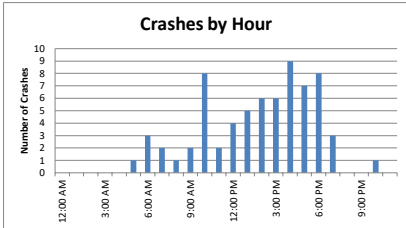
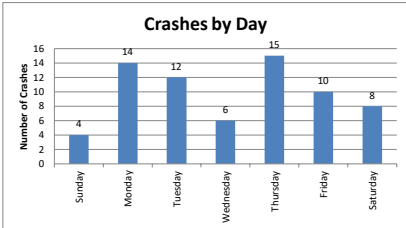
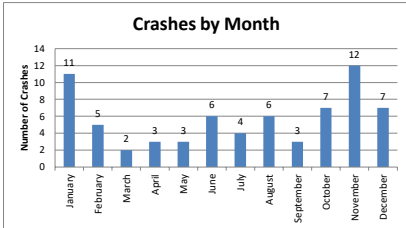
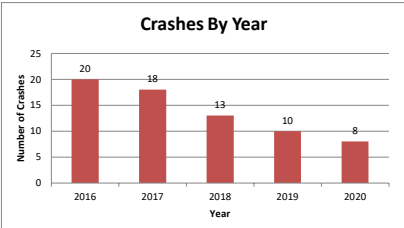
Other Crash Characteristics



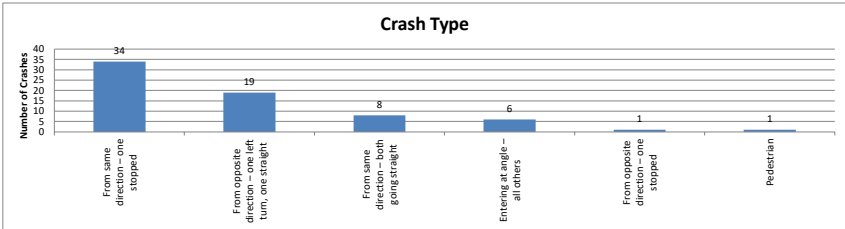
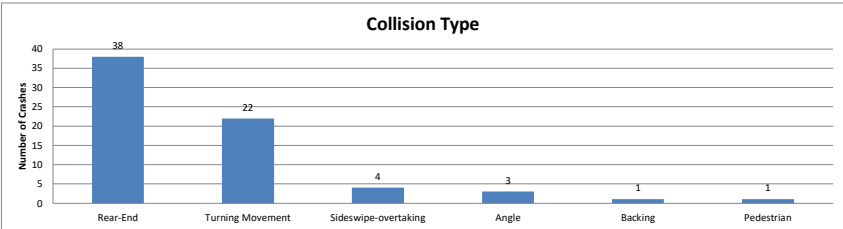
Project Name: Hayden Homes Northwest Redmond
Project Number: 1361
Query Information: US97 - Veterans
Data Queried: January 2016 - December 2020
Data Provider: ODOT Crash Analysis Reporting Unit
Analyst: JWW
Summary Date: 8/17/2022
Text File Name:
Filters Applied: :: County: Deschutes

US 97/
SW Veterans Way
(January 2016 through December 2020)

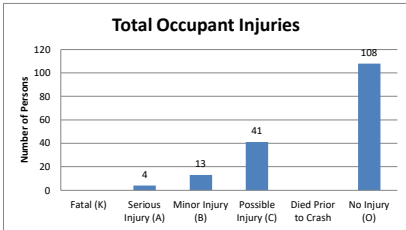
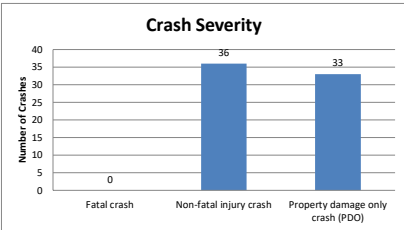
Crash Summary by Date and Time



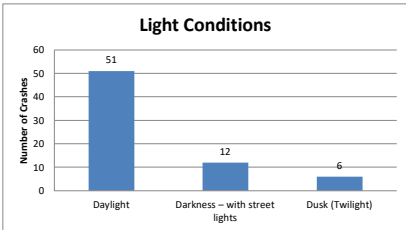
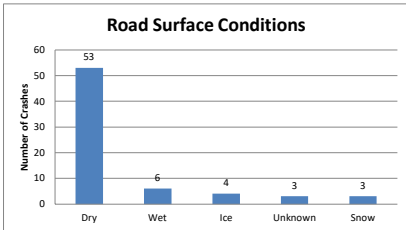
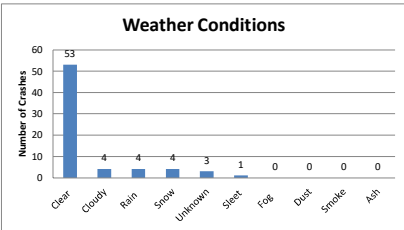
Crash Summary by Type



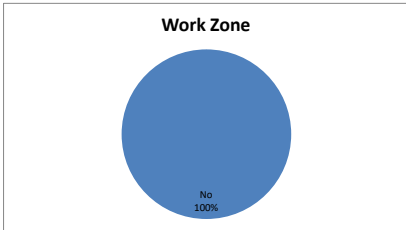
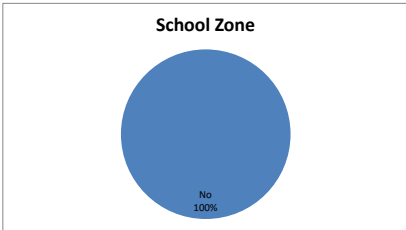
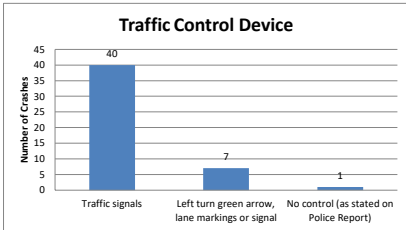
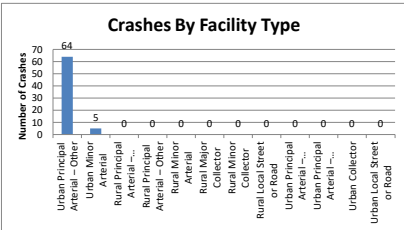
Crash Severity



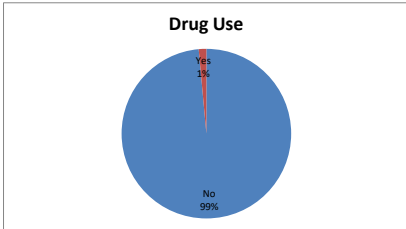
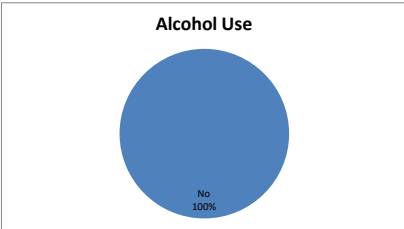
Crash Environment Characteristics



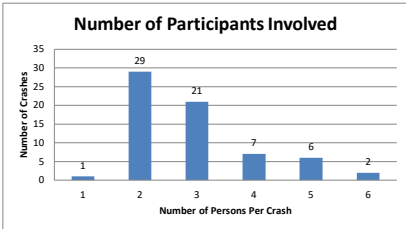
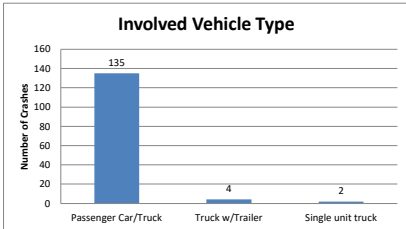
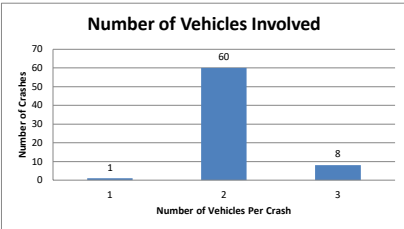
Crash Area Characteristics



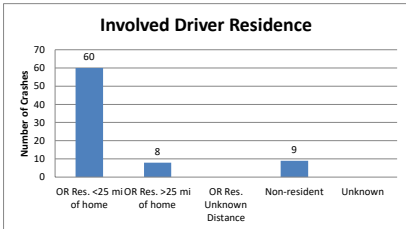
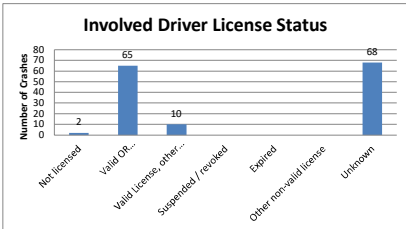
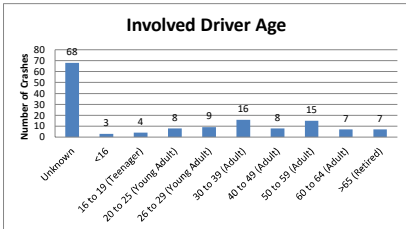
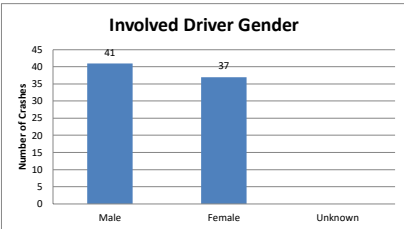
Driving Impairments



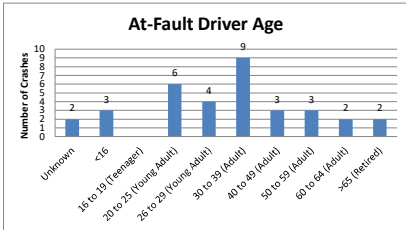
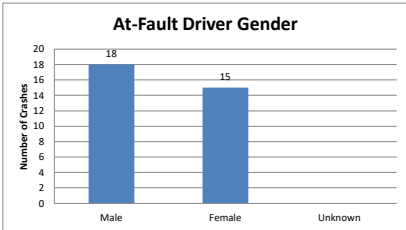
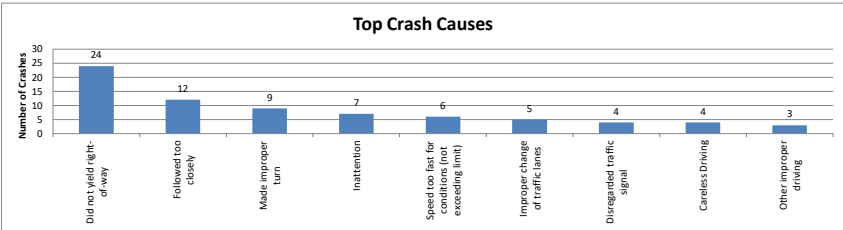
Vehicles and Occupants



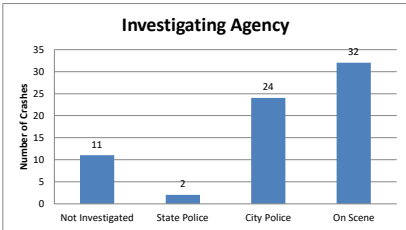
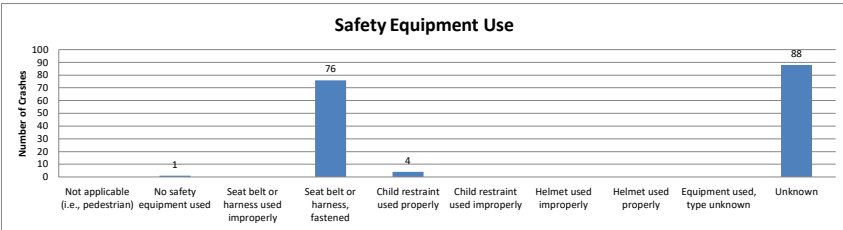
Involved Driver Characteristics



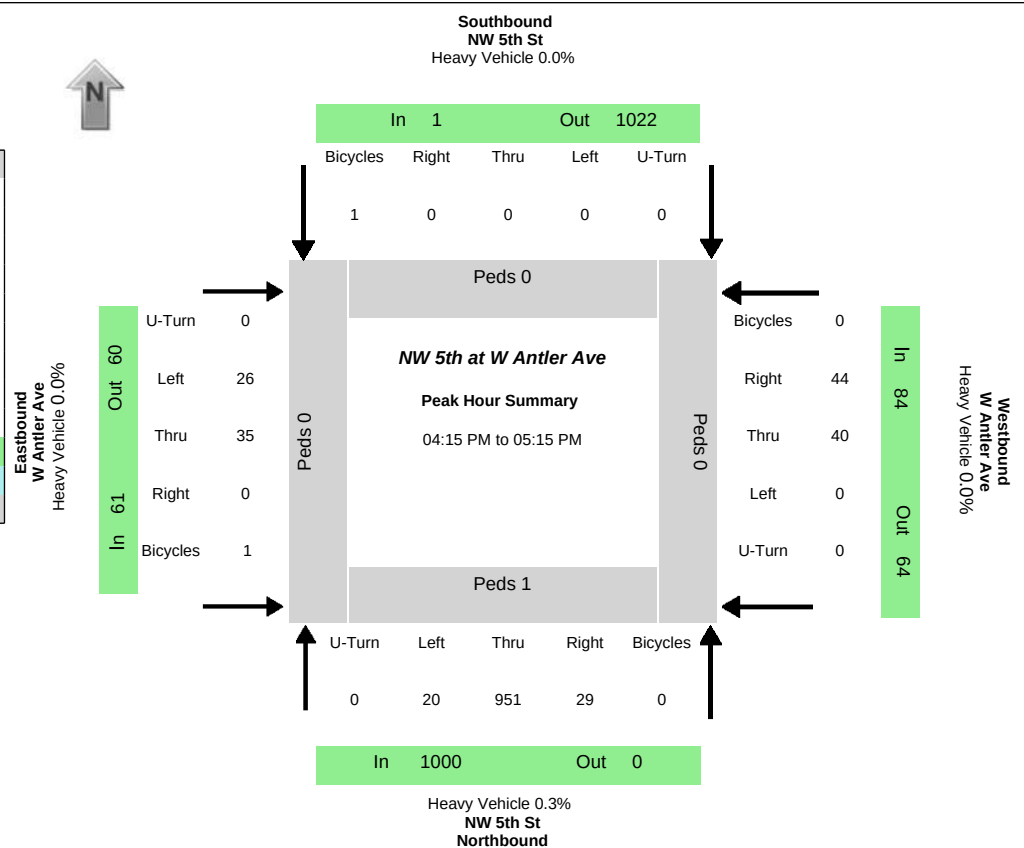
At-Fault Driver Characteristics



Other Crash Characteristics

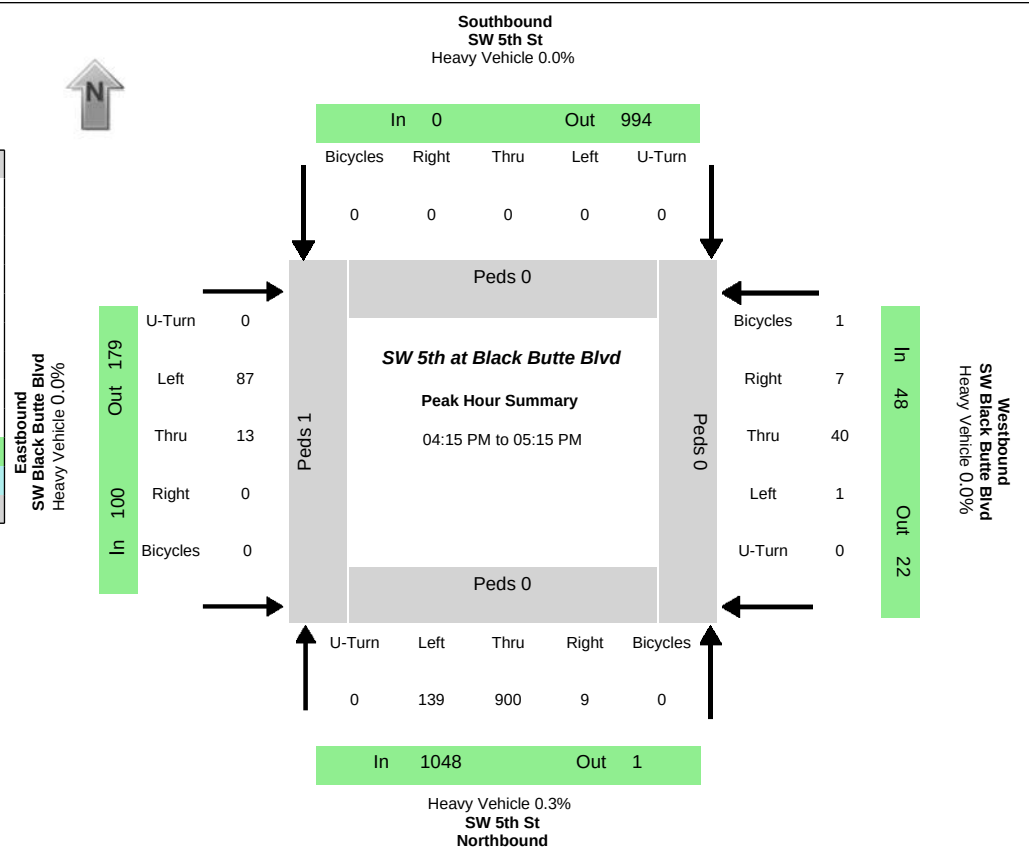


Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 5th St
E/W street	W Antler Ave
City, State	Redmond OR
Site Notes	
Location	44.27652 - -121.17322
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:15:00 PM
Peak 15 Min Start	04:55:00 PM
PHF (15-Min Int)	0.92



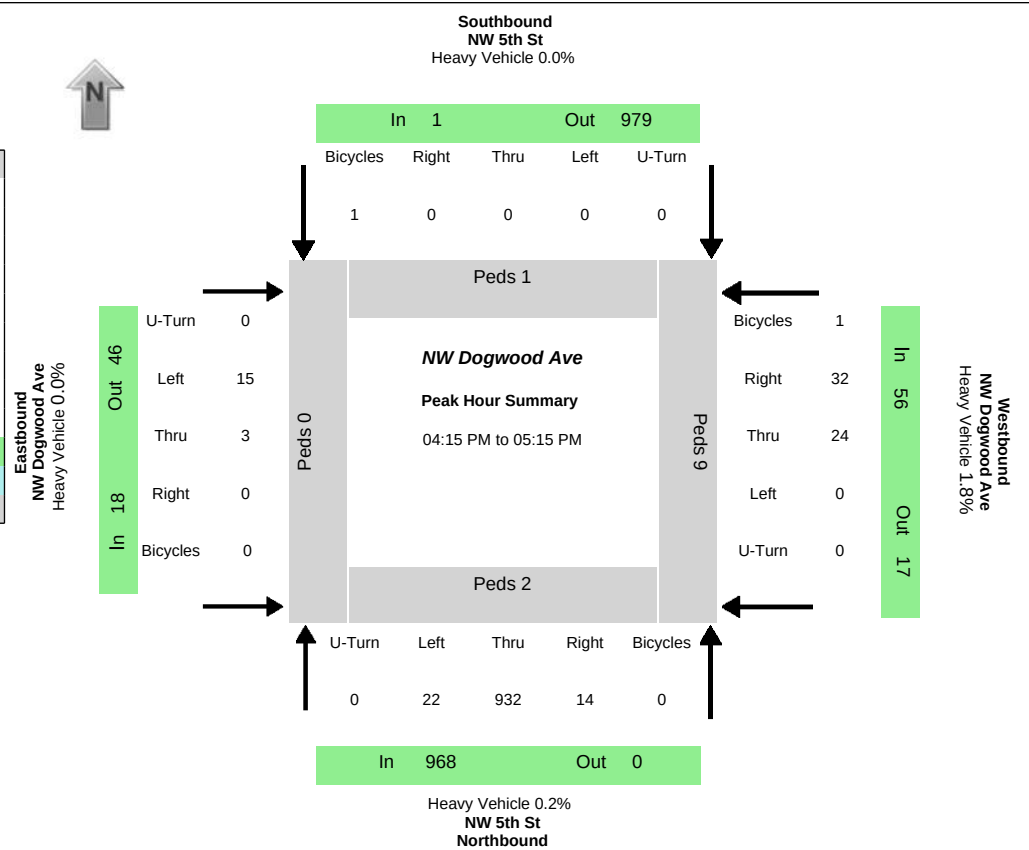
Peak-Hour Volumes (PHV)																									
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB		
20	951	29	0	0	0	0	0	26	35	0	0	0	40	44	0	1000	0	61	84	0	1021	60	64		
Percent Heavy Vehicles																									
0.0%	0.3%	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%	0.3%	0.0%	0.0%	0.0%	NaN	0.3%	0.0%	0.0%		
PHV- Bicycles																PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB					
0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	1	0	0	0	1				
All Vehicle Volumes																				15 Min Sum				1 HR Sum	
Time	Northbound NW 5th St				Southbound NW 5th St				Eastbound W Antler Ave				Westbound W Antler Ave												
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn									
04:00:00 PM	0	73	1	0	0	0	0	0	0	0	0	0	0	2	2	0	0								
04:05:00 PM	1	87	0	0	0	0	0	0	2	2	0	0	0	2	5	0									
04:10:00 PM	1	75	4	0	0	0	0	0	1	2	0	0	0	3	3	0	266								
04:15:00 PM	0	91	0	0	0	0	0	0	0	3	0	0	0	3	3	0	288								
04:20:00 PM	2	80	1	0	0	0	0	0	3	2	0	0	0	2	4	0	283								
04:25:00 PM	0	78	3	0	0	0	0	0	3	2	0	0	0	4	3	0	287								
04:30:00 PM	2	78	1	0	0	0	0	0	1	2	0	0	0	3	3	0	277								
04:35:00 PM	2	73	3	0	0	0	0	0	1	3	0	0	0	3	1	0	269								
04:40:00 PM	1	71	3	0	0	0	0	0	3	3	0	0	0	1	8	0	266								
04:45:00 PM	1	65	3	0	0	0	0	0	2	2	0	0	0	4	4	0	257								
04:50:00 PM	2	91	2	0	0	0	0	0	2	4	0	0	0	3	1	0	276								
04:55:00 PM	1	83	1	0	0	0	0	0	3	3	0	0	0	3	5	0	285	1104							
05:00:00 PM	4	78	4	0	0	0	0	0	3	4	0	0	0	5	1	0	303	1125							
05:05:00 PM	2	85	3	0	0	0	0	0	3	4	0	0	0	6	9	0	310	1138							
05:10:00 PM	3	78	5	0	0	0	0	0	2	3	0	0	0	3	2	0	307	1145							
05:15:00 PM	2	58	4	0	0	0	0	0	3	3	0	0	0	1	3	0	282	1119							
05:20:00 PM	3	74	7	0	0	0	0	0	1	3	0	0	0	4	3	0	265	1120							
05:25:00 PM	1	70	1	0	0	0	0	0	2	4	0	0	0	3	4	0	254	1112							
05:30:00 PM	3	67	4	0	0	0	0	0	2	2	0	0	0	2	3	0	263	1105							
05:35:00 PM	0	62	2	0	0	0	0	0	3	2	0	0	0	3	1	0	241	1092							
05:40:00 PM	1	66	2	0	0	0	0	0	1	6	0	0	0	2	4	0	238	1084							
05:45:00 PM	3	77	1	0	0	0	0	0	1	1	0	0	0	3	1	0	242	1090							
05:50:00 PM	0	54	2	0	0	0	0	0	1	2	0	0	0	4	1	0	233	1049							
05:55:00 PM	3	61	0	0	0	0	0	0	2	2	0	0	0	4	4	0	227	1026							

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW 5th St
E/W street	SW Black Butte Blvd
City, State	Redmond OR
Site Notes	
Location	44.27552 - -121.17322
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:15:00 PM
Peak 15 Min Start	04:50:00 PM
PHF (15-Min Int)	0.97



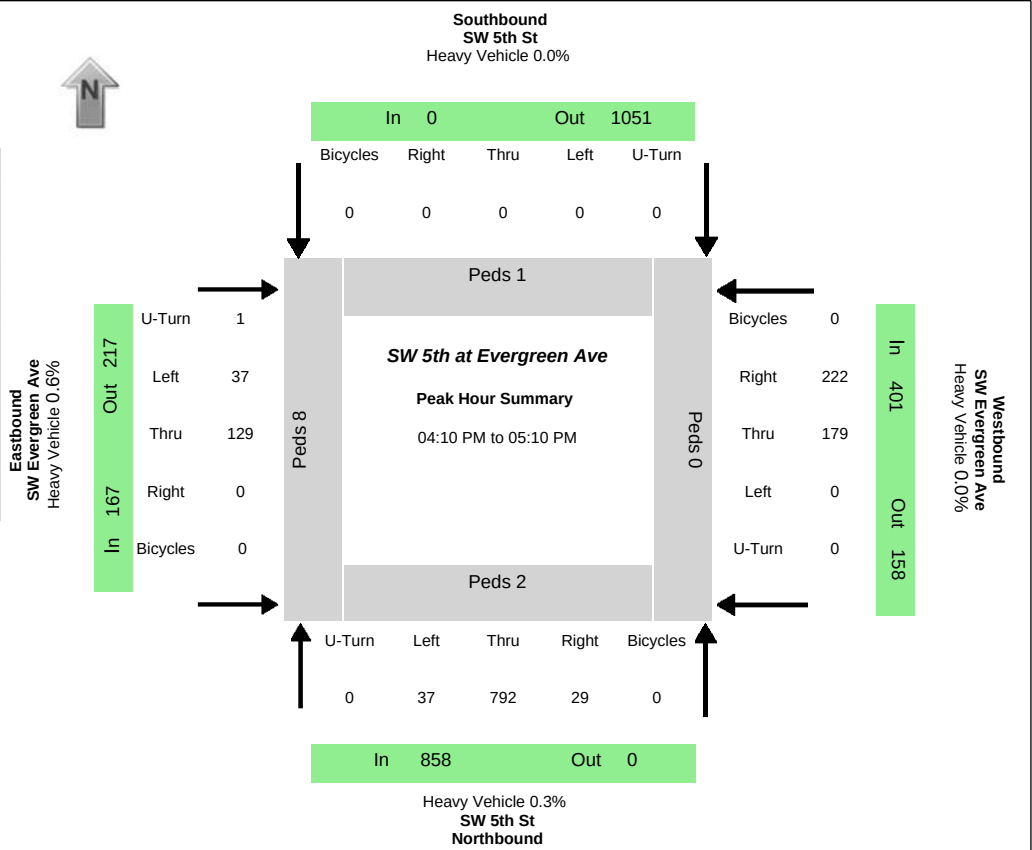
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
139	900	9	0	0	0	0	0	87	13	0	0	1	40	7	0	1048	0	100	48	1	994	179	22
Percent Heavy Vehicles																							
0.0%	0.3%	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%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
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	1	0	1		
All Vehicle Volumes																							
Time	Northbound SW 5th St				Southbound SW 5th St				Eastbound SW Black Butte Blvd				Westbound SW Black Butte Blvd				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	11	60	0	0	0	0	0	0	14	2	0	0	0	2	1	0							
04:05:00 PM	9	74	0	0	0	0	0	0	9	2	0	0	0	5	2	0							
04:10:00 PM	4	72	0	0	0	0	0	0	7	2	0	0	0	3	1	0	280						
04:15:00 PM	13	86	1	0	0	0	0	0	4	0	0	0	0	1	1	0	296						
04:20:00 PM	11	76	2	0	0	0	0	0	8	0	0	0	0	1	0	0	293						
04:25:00 PM	6	77	0	0	0	0	0	0	4	1	0	0	0	4	1	0	297						
04:30:00 PM	16	71	0	0	0	0	0	0	8	3	0	0	1	4	0	0	294						
04:35:00 PM	13	65	2	0	0	0	0	0	8	0	0	0	0	4	2	0	290						
04:40:00 PM	16	70	1	0	0	0	0	0	6	1	0	0	0	5	0	0	296						
04:45:00 PM	10	66	0	0	0	0	0	0	3	2	0	0	0	3	0	0	277						
04:50:00 PM	10	86	1	0	0	0	0	0	10	1	0	0	0	2	0	0	293						
04:55:00 PM	12	73	2	0	0	0	0	0	9	3	0	0	0	2	1	0	296	1169					
05:00:00 PM	6	78	0	0	0	0	0	0	6	0	0	0	0	5	0	0	307	1174					
05:05:00 PM	11	77	0	0	0	0	0	0	12	2	0	0	0	6	0	0	305	1181					
05:10:00 PM	15	75	0	0	0	0	0	0	9	0	0	0	0	3	2	0	307	1196					
05:15:00 PM	14	51	3	0	0	0	0	0	12	2	0	0	0	3	0	0	297	1175					
05:20:00 PM	9	73	0	0	0	0	0	0	7	2	0	0	0	3	1	0	284	1172					
05:25:00 PM	8	63	0	0	0	0	0	0	12	0	0	0	0	1	0	0	264	1163					
05:30:00 PM	12	67	0	0	0	0	0	0	5	1	0	0	0	1	0	0	265	1146					
05:35:00 PM	6	58	0	0	0	0	0	0	1	5	0	0	0	2	2	0	244	1126					
05:40:00 PM	8	62	0	0	0	0	0	0	6	2	0	0	0	2	0	0	240	1107					
05:45:00 PM	8	69	0	0	0	0	0	0	10	2	0	0	0	1	2	0	246	1115					
05:50:00 PM	3	49	1	0	0	0	0	0	4	2	0	0	0	3	0	0	234	1067					
05:55:00 PM	9	60	0	0	0	0	0	0	5	0	0	0	0	3	1	0	232	1043					

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 5th St
E/W street	NW Dogwood Ave
City, State	Redmond OR
Site Notes	
Location	44.27923 - -121.17323
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:15:00 PM
Peak 15 Min Start	04:55:00 PM
PHF (15-Min Int)	0.93



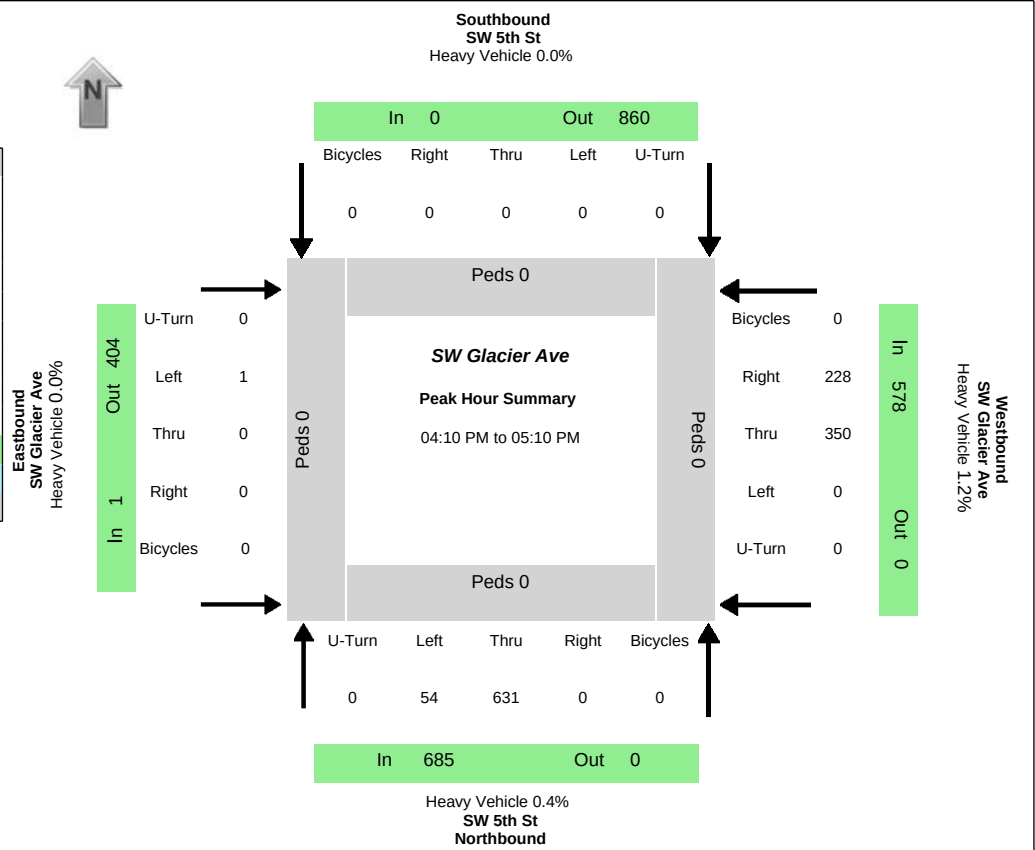
Peak-Hour Volumes (PHV)																									
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB		
22	932	14	0	0	0	0	0	15	3	0	0	0	24	32	0	968	0	18	56	0	979	46	17		
Percent Heavy Vehicles																									
0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.1%	0.0%	0.2%	0.0%	0.0%	1.8%	NaN	0.3%	0.0%	0.0%		
PHV- Bicycles																PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum				
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	1	0	0	0	0	0	0	0	0	1	0	0	2	2	1	0	9	12				
All Vehicle Volumes																					15 Min Sum			1 HR Sum	
Time	Northbound NW 5th St				Southbound NW 5th St				Eastbound NW Dogwood Ave				Westbound NW Dogwood Ave												
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn									
04:00:00 PM	1	75	1	0	0	0	0	0	1	2	0	0	0	2	1	0									
04:05:00 PM	0	81	1	0	0	0	0	0	2	0	0	0	0	2	0	0									
04:10:00 PM	1	69	2	0	0	0	0	0	1	0	0	0	0	2	1	0	245								
04:15:00 PM	4	78	3	0	0	0	0	0	3	0	0	0	0	3	1	0	254								
04:20:00 PM	6	77	0	0	0	0	0	0	1	1	0	0	0	1	3	0	257								
04:25:00 PM	1	73	3	0	0	0	0	0	1	0	0	0	0	0	3	0	262								
04:30:00 PM	1	75	0	0	0	0	0	0	2	0	0	0	0	1	5	0	254								
04:35:00 PM	3	70	2	0	0	0	0	0	1	0	0	0	0	2	2	0	245								
04:40:00 PM	0	77	1	0	0	0	0	0	1	0	0	0	0	1	2	0	246								
04:45:00 PM	1	74	1	0	0	0	0	0	0	0	0	0	0	3	3	0	244								
04:50:00 PM	2	80	3	0	0	0	0	0	2	0	0	0	0	3	3	0	257								
04:55:00 PM	2	88	0	0	0	0	0	0	2	0	0	0	0	3	3	0	273	1026							
05:00:00 PM	0	78	0	0	0	0	0	0	1	0	0	0	0	2	1	0	273	1025							
05:05:00 PM	1	90	0	0	0	0	0	0	0	1	0	0	0	4	3	0	279	1038							
05:10:00 PM	1	72	1	0	0	0	0	0	1	1	0	0	0	1	3	0	261	1042							
05:15:00 PM	2	69	0	0	0	0	0	0	4	1	0	0	0	2	1	0	258	1029							
05:20:00 PM	2	68	1	0	0	0	0	0	2	0	0	0	0	2	3	0	237	1018							
05:25:00 PM	3	71	1	0	0	0	0	0	3	1	0	0	0	1	1	0	238	1018							
05:30:00 PM	5	58	3	0	0	0	0	0	2	0	0	0	0	5	3	0	235	1010							
05:35:00 PM	0	63	2	0	0	0	0	0	1	0	0	0	0	3	0	0	226	999							
05:40:00 PM	1	67	1	0	0	0	0	0	2	1	0	0	0	1	0	0	218	990							
05:45:00 PM	2	64	0	0	0	0	0	0	2	0	0	0	0	2	1	0	213	979							
05:50:00 PM	1	57	1	0	0	0	0	0	1	1	0	0	0	2	0	0	207	949							
05:55:00 PM	0	60	1	0	0	0	0	0	0	0	0	0	0	5	1	0	201	918							

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW 5th St
E/W street	SW Evergreen Ave
City, State	Redmond OR
Site Notes	
Location	44.27256 - -121.1732
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:10:00 PM
Peak 15 Min Start	04:45:00 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
37	792	29	0	0	0	0	0	37	129	0	1	0	179	222	0	858	0	167	401	0	1051	217	158
Percent Heavy Vehicles																							
0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.6%	0.0%	NaN	0.3%	0.0%	0.6%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	8	0	11		
All Vehicle Volumes																							
Time	Northbound SW 5th St				Southbound SW 5th St				Eastbound SW Evergreen Ave				Westbound SW Evergreen Ave				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	7	59	1	0	0	0	0	0	2	5	0	0	0	19	14	0							
04:05:00 PM	4	70	3	0	0	0	0	0	1	6	0	0	0	16	16	0							
04:10:00 PM	2	69	2	0	0	0	0	0	3	11	0	0	0	15	10	0	335						
04:15:00 PM	4	71	1	0	0	0	0	0	2	7	0	0	0	20	25	0	358						
04:20:00 PM	4	67	2	0	0	0	0	0	0	10	0	0	0	9	15	0	349						
04:25:00 PM	1	60	1	0	0	0	0	0	2	6	0	0	0	17	20	0	344						
04:30:00 PM	0	59	1	0	0	0	0	0	3	16	0	0	0	11	20	0	324						
04:35:00 PM	0	70	4	0	0	0	0	0	2	17	0	0	0	14	17	0	341						
04:40:00 PM	9	61	4	0	0	0	0	0	2	7	0	0	0	16	13	0	346						
04:45:00 PM	4	57	2	0	0	0	0	0	6	12	0	1	0	19	21	0	358						
04:50:00 PM	2	83	2	0	0	0	0	0	5	10	0	0	0	19	17	0	372						
04:55:00 PM	3	66	2	0	0	0	0	0	2	12	0	0	0	16	21	0	382	1407					
05:00:00 PM	4	54	7	0	0	0	0	0	5	7	0	0	0	12	22	0	371	1411					
05:05:00 PM	4	75	1	0	0	0	0	0	5	14	0	0	0	11	21	0	364	1426					
05:10:00 PM	4	52	2	0	0	0	0	0	2	14	0	0	0	11	25	0	352	1424					
05:15:00 PM	4	54	1	0	0	0	0	0	4	6	0	0	0	14	13	0	337	1390					
05:20:00 PM	2	71	1	0	0	0	0	0	3	9	0	0	0	14	11	0	317	1394					
05:25:00 PM	1	61	3	0	0	0	0	0	0	10	0	0	0	7	12	0	301	1381					
05:30:00 PM	1	54	3	0	0	0	0	0	2	5	0	0	0	14	19	0	303	1369					
05:35:00 PM	2	62	0	0	0	0	0	0	5	7	0	0	0	5	15	0	288	1341					
05:40:00 PM	3	51	6	0	0	0	0	0	2	7	0	0	0	7	13	0	283	1318					
05:45:00 PM	6	63	4	0	0	0	0	0	3	7	0	0	0	9	10	0	287	1298					
05:50:00 PM	1	50	1	0	0	0	0	0	5	6	0	0	0	14	13	0	281	1250					
05:55:00 PM	2	60	3	0	0	0	0	0	9	6	0	0	0	5	16	0	293	1229					

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW 5th St
E/W street	SW Glacier Ave
City, State	Redmond OR
Site Notes	
Location	44.2706 - -121.17319
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:10:00 PM
Peak 15 Min Start	04:10:00 PM
PHF (15-Min Int)	0.97

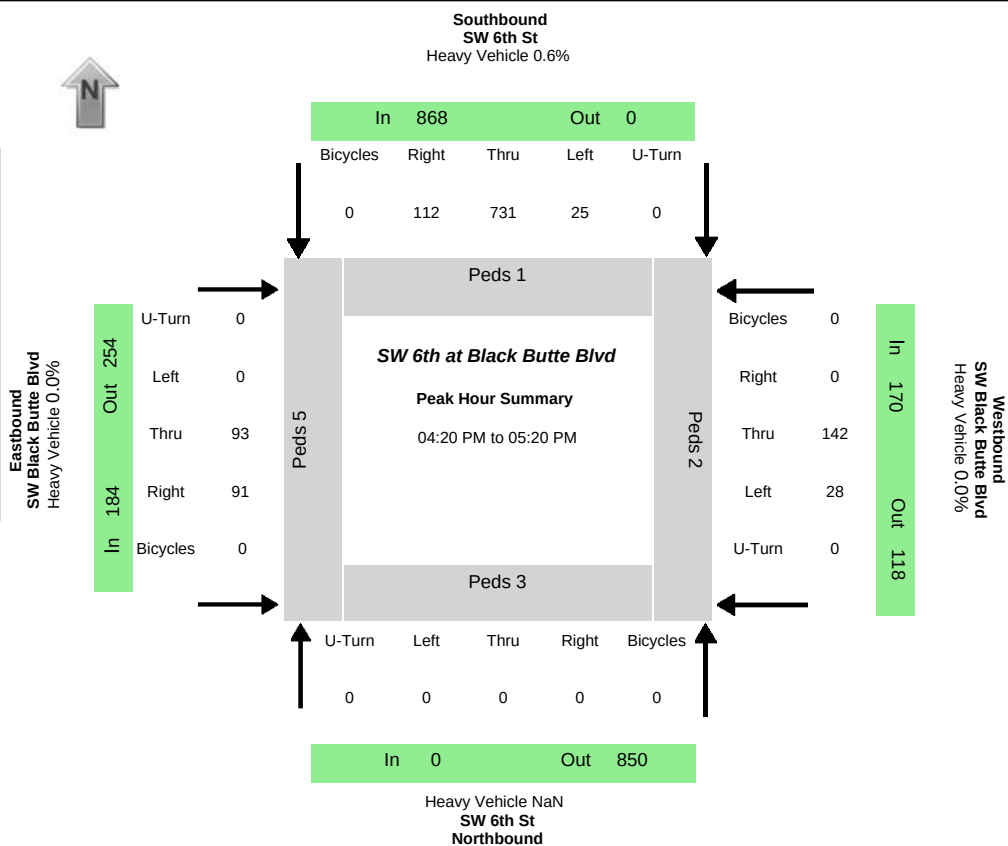


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
54	631	0	0	0	0	0	0	1	0	0	0	0	350	228	0	685	0	1	578	0	860	404	0
Percent Heavy Vehicles																							
0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.4%	0.0%	0.4%	0.0%	0.0%	1.2%	NaN	0.5%	1.5%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	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																				15 Min	1 HR		
Time	Northbound SW 5th St				Southbound SW 5th St				Eastbound SW Glacier Ave				Westbound SW Glacier Ave				Sum	Sum					
04:00:00 PM	3	61	0	0	0	0	0	0	0	0	0	0	0	20	12	0							
04:05:00 PM	3	45	0	0	0	0	0	0	0	0	0	0	0	37	15	0							
04:10:00 PM	7	57	0	0	0	0	0	0	0	0	0	0	28	27	0	315							
04:15:00 PM	3	58	0	0	0	0	0	0	0	0	0	0	30	20	0	330							
04:20:00 PM	3	57	0	0	0	0	0	0	0	0	0	0	19	18	0	327							
04:25:00 PM	5	43	0	0	0	0	0	0	0	0	0	0	41	16	0	313							
04:30:00 PM	1	45	0	0	0	0	0	0	0	0	0	0	26	20	0	294							
04:35:00 PM	6	61	0	0	0	0	0	0	0	0	0	0	35	18	0	317							
04:40:00 PM	3	50	0	0	0	0	0	0	0	0	0	0	41	14	0	320							
04:45:00 PM	4	47	0	0	0	0	0	0	0	0	0	0	24	18	0	321							
04:50:00 PM	8	63	0	0	0	0	0	0	0	0	0	0	34	20	0	326							
04:55:00 PM	5	46	0	0	0	0	0	0	0	0	0	0	14	23	0	306	1254						
05:00:00 PM	4	48	0	0	0	0	0	0	1	0	0	0	32	15	0	313	1258						
05:05:00 PM	5	56	0	0	0	0	0	0	0	0	0	0	26	19	0	294	1264						
05:10:00 PM	3	38	0	0	0	0	0	0	0	0	0	0	36	18	0	301	1240						
05:15:00 PM	6	43	0	0	0	0	0	0	0	0	0	0	33	20	0	303	1231						
05:20:00 PM	2	55	0	0	0	0	0	0	0	0	0	0	28	19	0	301	1238						
05:25:00 PM	7	49	0	0	0	0	0	0	0	0	0	0	20	7	0	289	1216						
05:30:00 PM	6	49	0	0	0	0	0	0	0	0	0	0	33	16	0	291	1228						
05:35:00 PM	5	53	0	0	0	0	0	0	0	0	0	0	30	18	0	293	1214						
05:40:00 PM	6	47	0	0	0	0	0	0	0	0	0	0	25	20	0	308	1204						
05:45:00 PM	3	51	0	0	0	0	0	0	0	0	0	0	33	13	0	304	1211						
05:50:00 PM	3	35	0	0	0	0	0	0	0	0	0	0	17	12	0	265	1153						
05:55:00 PM	6	42	0	0	0	0	0	0	0	0	0	0	19	18	0	252	1150						

Data Provided by K-D-N.com 503-594-4224

N/S street	SW 6th St		
E/W street	SW Black Butte Blvd		
City, State	Redmond OR		
Site Notes			
Location	44.2755	-	-121.17428
Start Date	Thursday, May 05, 2022		
Start Time	04:00:00 PM		
Weather			
Study ID #			

Peak Hour Start	04:20:00 PM
Peak 15 Min Start	05:00:00 PM
PHF (15-Min Int)	0.95

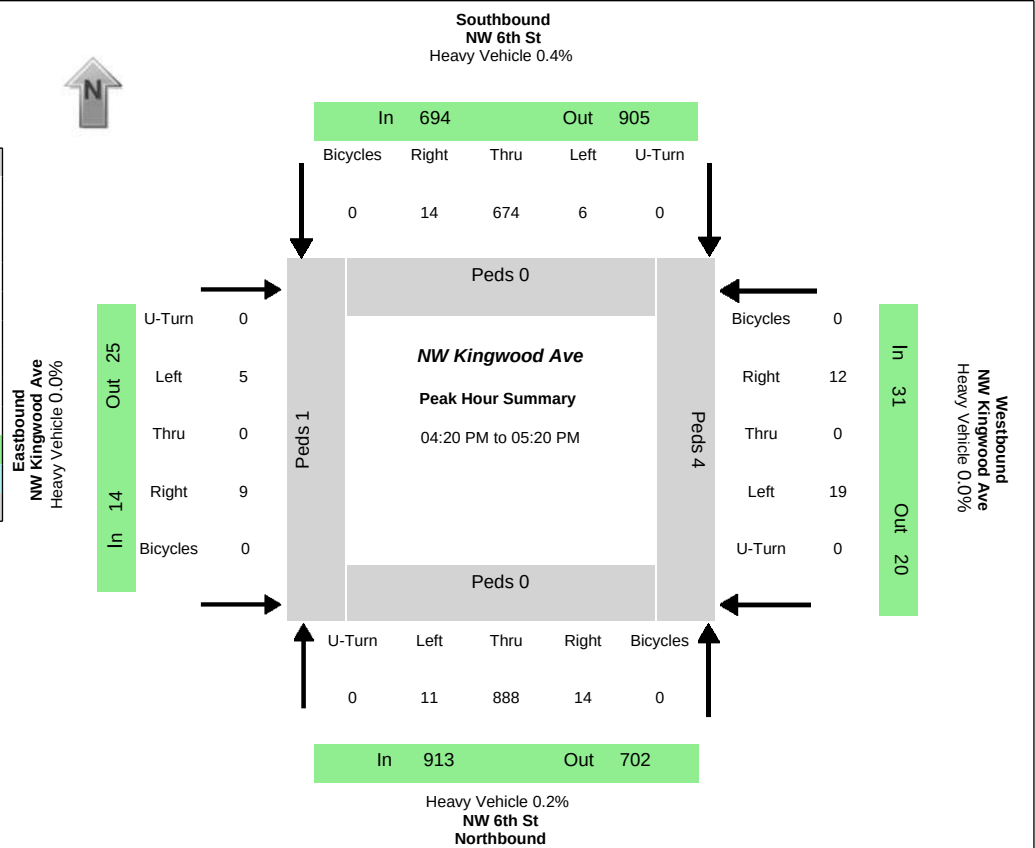


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	25	731	112	0	0	93	91	0	28	142	0	0	0	868	184	170	850	0	254	118
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NaN	0.6%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%

PHV- Bicycles																PHV - Pedestrians					
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	5	2	
																11					

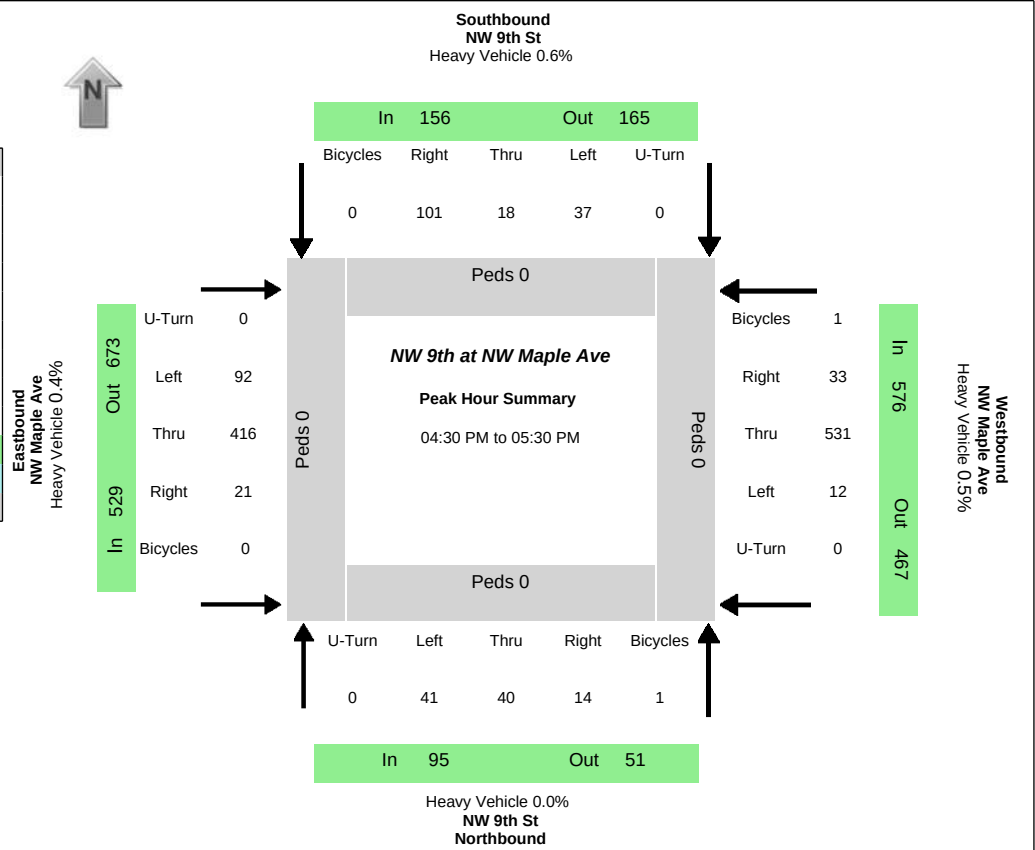
All Vehicle Volumes																		
Time	Northbound SW 6th St				Southbound SW 6th St				Eastbound SW Black Butte Blvd				Westbound SW Black Butte Blvd				15 Min	1 HR
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	0	0	0	4	58	10	0	0	11	8	0	2	10	0	0		
04:05:00 PM	0	0	0	0	3	48	7	0	0	9	9	0	0	12	0	0		
04:10:00 PM	0	0	0	0	1	63	11	0	0	9	11	0	0	9	0	0	295	
04:15:00 PM	0	0	0	0	1	56	5	0	0	5	10	0	6	7	0	0	282	
04:20:00 PM	0	0	0	0	3	66	10	0	0	8	11	0	3	8	0	0	303	
04:25:00 PM	0	0	0	0	1	52	8	0	0	4	4	0	2	8	0	0	278	
04:30:00 PM	0	0	0	0	2	56	6	0	0	10	9	0	3	11	0	0	285	
04:35:00 PM	0	0	0	0	2	73	12	0	0	5	9	0	3	12	0	0	292	
04:40:00 PM	0	0	0	0	2	51	11	0	0	7	6	0	3	19	0	0	312	
04:45:00 PM	0	0	0	0	4	68	10	0	0	4	5	0	1	11	0	0	318	
04:50:00 PM	0	0	0	0	2	63	8	0	0	10	9	0	4	11	0	0	309	
04:55:00 PM	0	0	0	0	1	55	6	0	0	9	10	0	0	12	0	0	303	1188
05:00:00 PM	0	0	0	0	1	64	6	0	0	5	11	0	2	8	0	0	297	1182
05:05:00 PM	0	0	0	0	3	69	14	0	0	13	3	0	6	11	0	0	309	1213
05:10:00 PM	0	0	0	0	2	58	10	0	0	8	11	0	0	18	0	0	323	1216
05:15:00 PM	0	0	0	0	2	56	11	0	0	10	3	0	1	13	0	0	322	1222
05:20:00 PM	0	0	0	0	1	53	9	0	0	10	5	0	4	11	0	0	296	1206
05:25:00 PM	0	0	0	0	3	54	8	0	0	8	7	0	1	9	0	0	279	1217
05:30:00 PM	0	0	0	0	2	61	12	0	0	4	8	0	1	12	0	0	283	1220
05:35:00 PM	0	0	0	0	2	62	6	0	0	3	4	0	0	8	0	0	275	1189
05:40:00 PM	0	0	0	0	0	56	5	0	0	8	8	0	1	10	0	0	273	1178
05:45:00 PM	0	0	0	0	2	51	2	0	0	11	8	0	4	7	0	0	258	1160
05:50:00 PM	0	0	0	0	2	51	5	0	0	4	6	0	1	2	0	0	244	1124
05:55:00 PM	0	0	0	0	0	34	13	0	0	5	8	0	4	11	0	0	231	1106

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 6th St
E/W street	NW Kingwood Ave
City, State	Redmond OR
Site Notes	
Location	44.28736 - -121.17396
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:20:00 PM
Peak 15 Min Start	04:55:00 PM
PHF (15-Min Int)	0.93



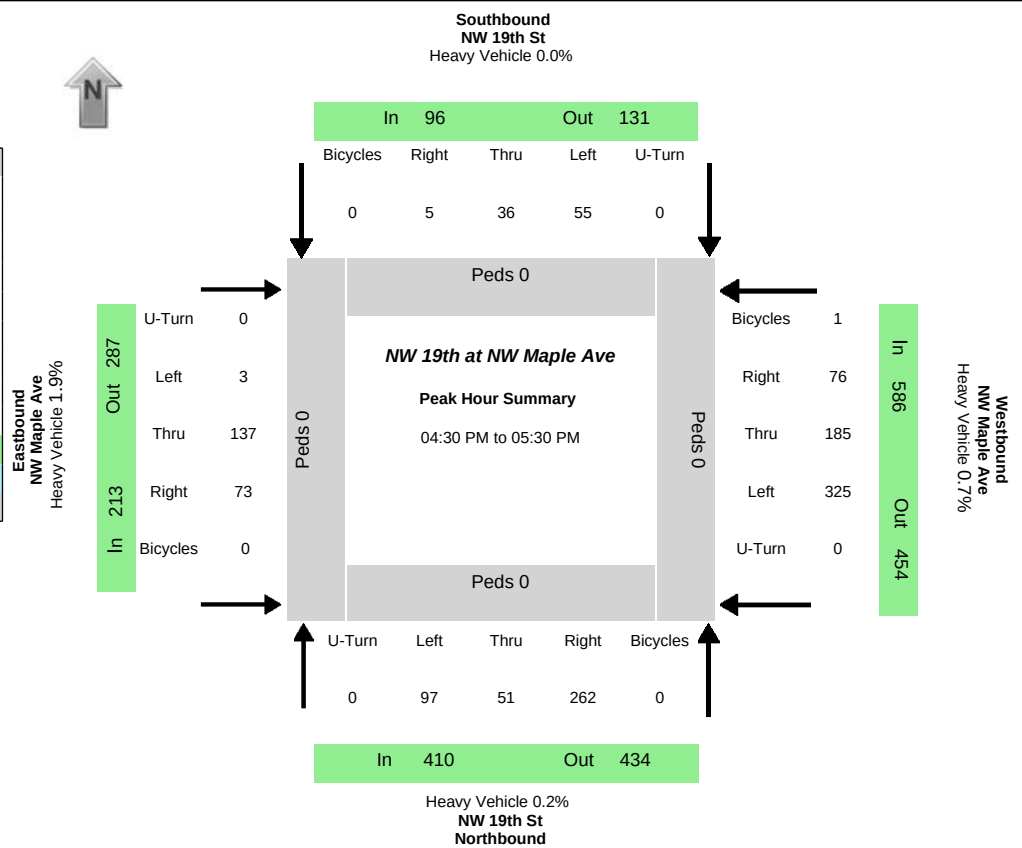
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
11	888	14	0	6	674	14	0	5	0	9	0	19	0	12	0	913	694	14	31	702	905	25	20
Percent Heavy Vehicles																							
0.0%	0.2%	0.0%	0.0%	0.0%	0.3%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.0%	0.0%	0.3%	0.2%	4.0%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk				Sum			
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	1	4	5		
All Vehicle Volumes																							
Time	Northbound NW 6th St				Southbound NW 6th St				Eastbound NW Kingwood Ave				Westbound NW Kingwood Ave				15 Min		1 HR				
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum		Sum				
04:00:00 PM	3	75	1	0	2	63	0	0	0	0	2	0	0	0	4	0							
04:05:00 PM	2	83	1	0	0	55	1	0	1	0	0	0	3	0	1	0							
04:10:00 PM	0	62	0	0	1	65	1	0	0	0	0	0	0	0	2	0	428						
04:15:00 PM	0	66	0	0	0	51	1	0	0	0	0	0	0	0	2	0	398						
04:20:00 PM	1	72	0	0	0	48	1	0	1	0	1	0	4	0	3	0	382						
04:25:00 PM	1	67	1	0	0	52	1	0	0	0	0	0	3	0	1	0	377						
04:30:00 PM	1	71	1	0	1	43	0	0	0	0	0	0	0	0	0	0	374						
04:35:00 PM	1	68	3	0	0	57	1	0	0	0	0	0	0	0	0	0	373						
04:40:00 PM	0	80	0	0	1	66	3	0	0	0	1	0	2	0	1	0	401						
04:45:00 PM	0	62	3	0	0	58	0	0	0	0	3	0	1	0	3	0	414						
04:50:00 PM	2	76	0	0	1	55	0	0	0	0	1	0	2	0	0	0	421						
04:55:00 PM	0	88	2	0	0	51	2	0	0	0	1	0	1	0	1	0	413	1619					
05:00:00 PM	0	81	1	0	1	70	0	0	1	0	1	0	2	0	0	0	440	1626					
05:05:00 PM	2	81	1	0	1	50	2	0	1	0	0	0	2	0	0	0	443	1619					
05:10:00 PM	1	70	1	0	0	63	1	0	1	0	1	0	2	0	1	0	438	1629					
05:15:00 PM	2	72	1	0	1	61	3	0	1	0	0	0	0	0	2	0	424	1652					
05:20:00 PM	1	61	0	0	0	63	0	0	0	0	2	0	1	0	2	0	414	1651					
05:25:00 PM	0	67	1	0	0	49	1	0	0	0	0	0	2	0	1	0	394	1646					
05:30:00 PM	2	60	0	0	0	47	0	0	1	0	2	0	3	0	2	0	368	1646					
05:35:00 PM	0	52	0	0	0	62	0	0	1	0	0	0	2	0	0	0	355	1633					
05:40:00 PM	1	63	0	0	0	49	2	0	0	0	0	0	0	0	1	0	350	1595					
05:45:00 PM	2	56	1	0	0	37	0	0	2	0	0	0	2	0	1	0	334	1566					
05:50:00 PM	1	55	0	0	0	45	0	0	1	0	0	0	2	0	0	0	321	1533					
05:55:00 PM	1	59	1	0	0	48	0	0	0	0	0	0	1	0	1	0	316	1498					

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 9th St
E/W street	NW Maple Ave
City, State	Redmond OR
Site Notes	
Location	44.291 - -121.17771
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:30:00 PM
Peak 15 Min Start	05:10:00 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		
41	40	14	0	37	18	101	0	92	416	21	0	12	531	33	0	95	156	529	576	51	165	673	467		
Percent Heavy Vehicles																									
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	1.1%	0.0%	4.8%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.6%	0.4%	0.5%	2.0%	0.6%	0.6%	0.0%		
PHV- Bicycles																PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB					
1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0			
All Vehicle Volumes																				15 Min Sum				1 HR Sum	
Time	Northbound NW 9th St				Southbound NW 9th St				Eastbound NW Maple Ave				Westbound NW Maple Ave												
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn									
04:00:00 PM	3	3	1	0	3	4	10	0	10	38	3	0	2	39	2	0									
04:05:00 PM	4	7	1	0	7	0	10	0	7	34	1	0	2	40	1	0									
04:10:00 PM	1	3	1	0	1	0	7	0	8	37	1	0	3	52	2	0	348								
04:15:00 PM	2	5	2	0	1	1	6	0	8	40	1	0	4	36	4	0	340								
04:20:00 PM	1	4	3	0	2	6	7	0	3	30	1	0	0	34	4	0	321								
04:25:00 PM	3	3	2	0	3	3	3	0	6	34	1	0	2	24	5	0	294								
04:30:00 PM	4	4	1	0	1	2	5	0	2	38	2	0	2	40	3	0	288								
04:35:00 PM	7	3	1	0	4	2	5	0	11	30	2	0	1	44	5	0	308								
04:40:00 PM	2	5	1	0	3	2	8	0	5	40	1	0	2	47	2	0	337								
04:45:00 PM	6	6	1	0	1	2	7	0	11	29	4	0	2	40	0	0	342								
04:50:00 PM	1	2	1	0	2	2	10	0	10	31	2	0	1	51	4	0	344								
04:55:00 PM	3	2	0	0	3	5	9	0	12	31	1	0	0	48	1	0	341	1320							
05:00:00 PM	6	4	1	0	3	0	6	0	4	39	1	0	0	40	1	0	337	1307							
05:05:00 PM	1	0	4	0	3	0	11	0	9	30	3	0	2	46	4	0	333	1306							
05:10:00 PM	2	5	1	0	2	0	11	0	4	36	2	0	0	44	4	0	329	1301							
05:15:00 PM	3	4	1	0	4	0	12	0	9	47	0	0	2	48	4	0	358	1325							
05:20:00 PM	2	2	1	0	5	3	12	0	8	32	2	0	0	46	1	0	359	1344							
05:25:00 PM	4	3	1	0	6	0	5	0	7	33	1	0	0	37	4	0	349	1356							
05:30:00 PM	2	4	4	0	5	1	4	0	12	33	0	0	4	34	1	0	319	1356							
05:35:00 PM	0	5	4	0	2	0	5	0	8	22	3	0	1	44	5	0	304	1340							
05:40:00 PM	1	6	0	0	1	3	4	0	5	24	2	0	0	46	1	0	296	1315							
05:45:00 PM	5	3	3	0	1	2	8	0	11	20	0	0	2	33	0	0	280	1294							
05:50:00 PM	1	0	5	0	2	1	12	0	3	23	1	0	1	37	2	0	269	1265							
05:55:00 PM	4	7	3	0	3	1	5	0	7	31	2	0	3	30	1	0	273	1247							

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 19th St
E/W street	NW Maple Ave
City, State	Redmond OR
Site Notes	
Location	44.29095 - -121.18914
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:30:00 PM
Peak 15 Min Start	05:10:00 PM
PHF (15-Min Int)	0.94

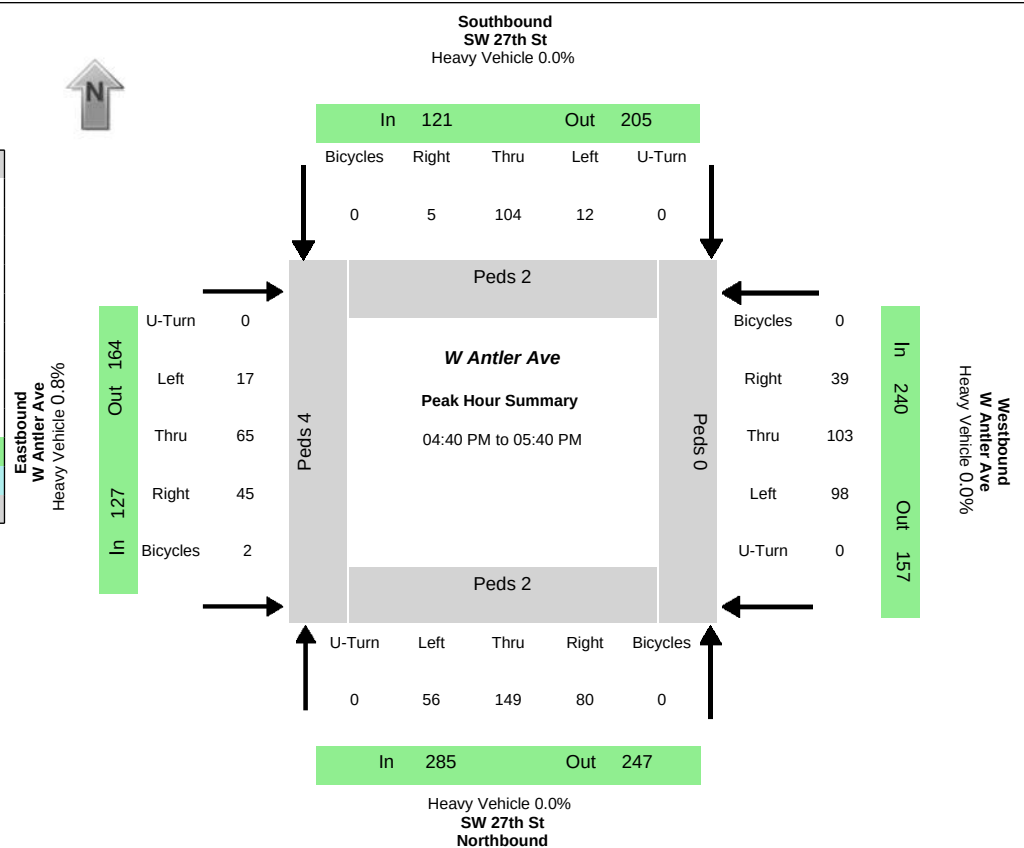


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
97	51	262	0	55	36	5	0	3	137	73	0	325	185	76	0	410	96	213	586	434	130	287	454
Percent Heavy Vehicles																							
0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	4.1%	0.0%	1.2%	0.0%	0.0%	0.0%	0.2%	0.0%	1.9%	0.7%	1.6%	0.0%	0.0%	0.4%

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

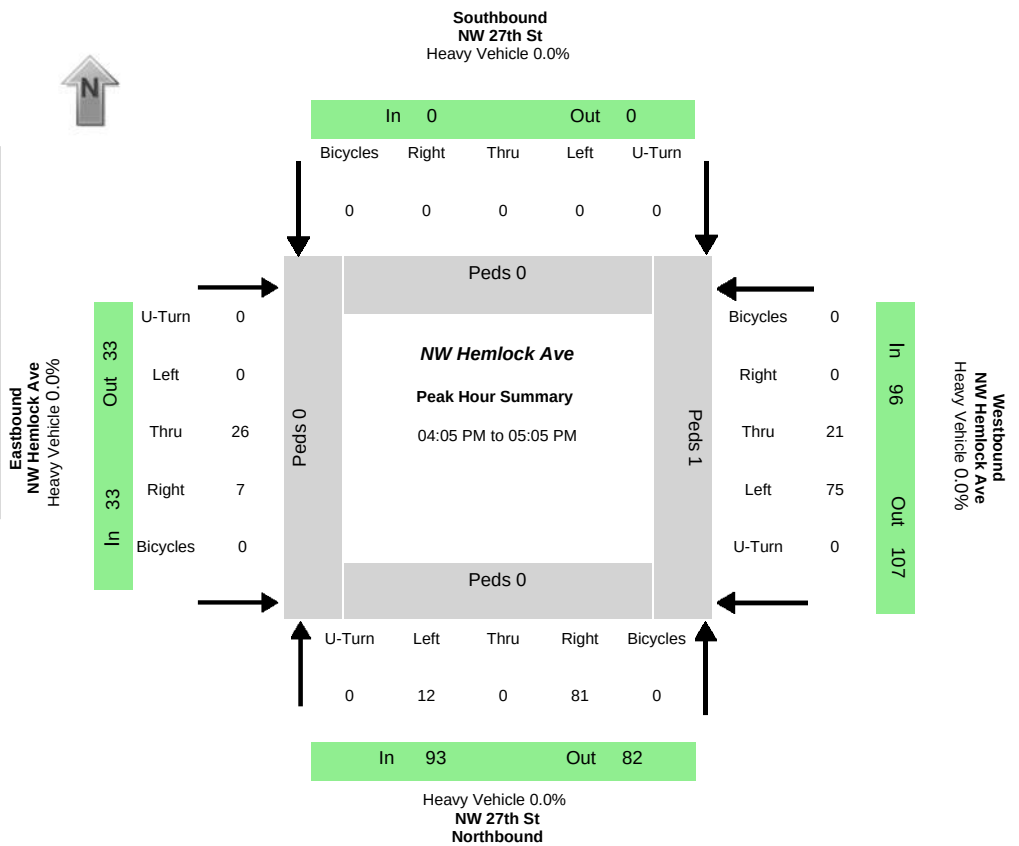
All Vehicle Volumes																	
Time	Northbound NW 19th St				Southbound NW 19th St				Eastbound NW Maple Ave				Westbound NW Maple Ave				15 Min Sum
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	
04:00:00 PM	9	3	27	0	6	4	0	0	0	14	6	0	25	9	6	0	
04:05:00 PM	12	7	18	0	3	3	0	0	0	11	7	0	29	17	5	0	
04:10:00 PM	6	2	20	0	6	0	1	0	1	18	6	0	25	18	7	0	331
04:15:00 PM	9	2	22	0	2	1	0	0	0	11	5	0	25	9	3	0	311
04:20:00 PM	7	3	24	0	4	2	0	0	0	5	2	0	19	15	5	0	285
04:25:00 PM	6	5	18	0	3	2	0	0	1	9	7	0	11	9	2	0	248
04:30:00 PM	10	5	24	0	7	0	1	0	0	8	3	0	28	18	5	0	268
04:35:00 PM	11	1	23	0	5	6	1	0	1	11	4	0	25	20	8	0	298
04:40:00 PM	12	4	31	0	3	4	1	0	0	9	5	0	26	14	6	0	340
04:45:00 PM	12	2	25	0	2	4	1	0	0	10	10	0	24	14	9	0	344
04:50:00 PM	4	5	17	0	4	0	0	0	1	9	11	0	32	19	5	0	335
04:55:00 PM	7	3	25	0	5	3	0	0	0	12	8	0	31	12	5	0	331 1250
05:00:00 PM	5	4	25	0	3	1	0	0	0	6	5	0	22	16	6	0	311 1234
05:05:00 PM	1	4	11	0	8	4	1	0	0	12	9	0	26	16	6	0	302 1220
05:10:00 PM	10	7	25	0	4	2	0	0	0	19	3	0	24	16	9	0	310 1229
05:15:00 PM	10	4	22	0	5	2	0	0	1	16	6	0	28	18	3	0	332 1255
05:20:00 PM	7	7	18	0	4	6	0	0	0	11	6	0	31	16	7	0	347 1282
05:25:00 PM	8	5	16	0	5	4	0	0	0	14	3	0	28	6	7	0	324 1305
05:30:00 PM	6	5	23	0	8	1	1	0	0	9	3	0	14	14	6	0	299 1286
05:35:00 PM	11	4	20	0	4	2	0	0	0	6	2	0	20	12	7	0	274 1258
05:40:00 PM	13	5	14	0	3	4	1	0	0	11	6	0	27	15	2	0	279 1244
05:45:00 PM	11	3	13	0	1	4	0	0	1	9	5	0	14	12	11	0	273 1215
05:50:00 PM	4	4	22	0	2	1	0	0	1	12	4	0	28	13	3	0	279 1202
05:55:00 PM	9	5	17	0	4	5	1	0	0	5	2	0	14	16	6	0	262 1175

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW 27th St
E/W street	W Antler Ave
City, State	Redmond OR
Site Notes	
Location	44.27641 - -121.19928
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:40:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.93



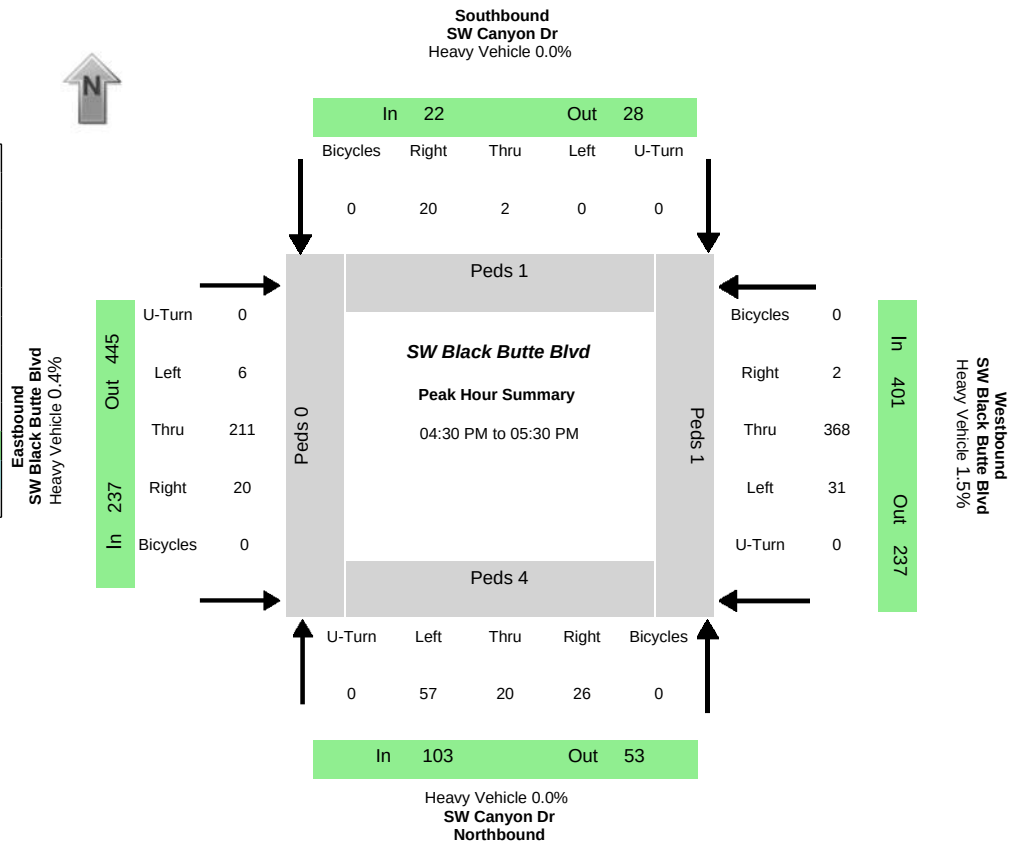
Peak-Hour Volumes (PHV)																									
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB		
56	149	80	0	12	104	5	0	17	65	45	0	98	103	39	0	285	121	127	240	247	205	164	157		
Percent Heavy Vehicles																									
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.5%	0.0%	0.0%		
PHV- Bicycles																PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB					
0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	2	4	0	8				
All Vehicle Volumes																				15 Min Sum				1 HR Sum	
Time	Northbound SW 27th St				Southbound SW 27th St				Eastbound W Antler Ave				Westbound W Antler Ave												
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn									
04:00:00 PM	5	8	11	0	4	8	0	0	1	4	4	0	3	4	2	0									
04:05:00 PM	4	13	9	0	3	10	1	0	1	6	4	0	7	6	5	0									
04:10:00 PM	1	17	10	0	2	6	1	0	0	3	4	0	10	1	2	0	180								
04:15:00 PM	3	14	7	0	1	7	0	0	2	3	4	0	9	4	4	0	184								
04:20:00 PM	0	9	9	0	0	13	2	0	1	3	1	0	1	8	1	0	163								
04:25:00 PM	1	15	3	0	2	8	1	0	1	6	1	0	8	10	1	0	163								
04:30:00 PM	0	11	7	0	0	13	0	0	1	4	7	0	6	5	1	0	160								
04:35:00 PM	2	10	6	0	1	5	1	0	0	5	2	0	9	7	1	0	161								
04:40:00 PM	3	13	5	0	0	10	1	0	4	4	2	0	9	10	4	0	169								
04:45:00 PM	8	9	6	0	1	4	1	0	4	6	4	0	6	11	2	0	176								
04:50:00 PM	2	16	10	0	3	7	1	0	1	8	6	0	6	12	0	0	199								
04:55:00 PM	5	18	3	0	0	13	0	0	0	9	8	0	12	5	1	0	208	720							
05:00:00 PM	4	14	7	0	0	8	1	0	1	6	5	0	7	6	3	0	208	728							
05:05:00 PM	3	11	7	0	1	6	0	0	0	6	3	0	8	10	4	0	195	718							
05:10:00 PM	2	13	8	0	3	15	0	0	1	3	3	0	7	12	0	0	188	728							
05:15:00 PM	7	6	2	0	0	6	0	0	2	3	3	0	12	6	6	0	179	723							
05:20:00 PM	7	9	7	0	1	11	0	0	2	3	1	0	13	13	6	0	193	748							
05:25:00 PM	6	10	7	0	1	8	0	0	1	7	2	0	6	8	4	0	186	751							
05:30:00 PM	5	17	13	0	2	10	0	0	0	5	2	0	4	6	5	0	202	765							
05:35:00 PM	4	13	5	0	0	6	1	0	1	5	6	0	8	4	4	0	186	773							
05:40:00 PM	2	11	6	0	2	6	1	0	1	4	7	0	7	11	2	0	186	768							
05:45:00 PM	5	12	5	0	0	3	0	0	2	6	1	0	5	7	2	0	165	754							
05:50:00 PM	1	17	4	0	2	7	0	0	0	8	4	0	3	6	1	0	161	735							
05:55:00 PM	3	18	5	0	1	7	1	0	0	5	2	0	3	3	2	0	151	711							

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 27th St
E/W street	NW Hemlock Ave
City, State	Redmond OR
Site Notes	
Location	44.28372 - -121.19928
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:05:00 PM
Peak 15 Min Start	04:20:00 PM
PHF (15-Min Int)	0.83



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
12	0	81	0	0	0	0	0	0	26	7	0	75	21	0	0	93	0	33	96	82	0	33	107
Percent Heavy Vehicles																							
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%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
All Vehicle Volumes																							
Time	Northbound NW 27th St				Southbound NW 27th St				Eastbound NW Hemlock Ave				Westbound NW Hemlock Ave				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	0	0	2	0	0	0	0	0	0	2	1	0	3	1	0	0							
04:05:00 PM	1	0	9	0	0	0	0	0	0	3	0	0	10	5	0	0							
04:10:00 PM	1	0	10	0	0	0	0	0	0	1	0	0	5	1	0	0	55						
04:15:00 PM	1	0	7	0	0	0	0	0	0	3	0	0	8	1	0	0	66						
04:20:00 PM	1	0	8	0	0	0	0	0	0	3	1	0	9	1	0	0	61						
04:25:00 PM	2	0	10	0	0	0	0	0	0	1	0	0	9	1	0	0	66						
04:30:00 PM	1	0	7	0	0	0	0	0	0	4	1	0	5	3	0	0	67						
04:35:00 PM	0	0	2	0	0	0	0	0	0	2	1	0	3	1	0	0	53						
04:40:00 PM	1	0	7	0	0	0	0	0	0	4	0	0	7	2	0	0	51						
04:45:00 PM	0	0	6	0	0	0	0	0	0	0	1	0	2	2	0	0	41						
04:50:00 PM	2	0	4	0	0	0	0	0	0	2	0	0	4	2	0	0	46						
04:55:00 PM	2	0	7	0	0	0	0	0	0	0	2	0	8	2	0	0	46	218					
05:00:00 PM	0	0	4	0	0	0	0	0	0	3	1	0	5	0	0	0	48	222					
05:05:00 PM	1	0	6	0	0	0	0	0	0	1	0	0	7	4	0	0	53	213					
05:10:00 PM	0	0	8	0	0	0	0	0	0	4	0	0	5	1	0	0	50	213					
05:15:00 PM	0	0	5	0	0	0	0	0	0	3	0	0	2	2	0	0	49	205					
05:20:00 PM	0	0	3	0	0	0	0	0	0	3	1	0	9	3	0	0	49	201					
05:25:00 PM	1	0	2	0	0	0	0	0	0	3	0	0	8	2	0	0	47	194					
05:30:00 PM	1	0	4	0	0	0	0	0	0	3	0	0	3	0	0	0	46	184					
05:35:00 PM	2	0	4	0	0	0	0	0	0	1	1	0	5	0	0	0	40	188					
05:40:00 PM	2	0	5	0	0	0	0	0	0	3	0	0	2	1	0	0	37	180					
05:45:00 PM	3	0	1	1	0	0	0	0	0	4	0	0	2	1	0	0	38	181					
05:50:00 PM	1	0	6	0	0	0	0	0	0	1	0	0	3	4	0	0	40	182					
05:55:00 PM	1	0	8	0	0	0	0	0	0	2	0	0	4	2	0	0	44	178					

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW Canyon Dr
E/W street	SW Black Butte Blvd
City, State	Redmond OR
Site Notes	
Location	44.27551 - -121.1818
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:30:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.90

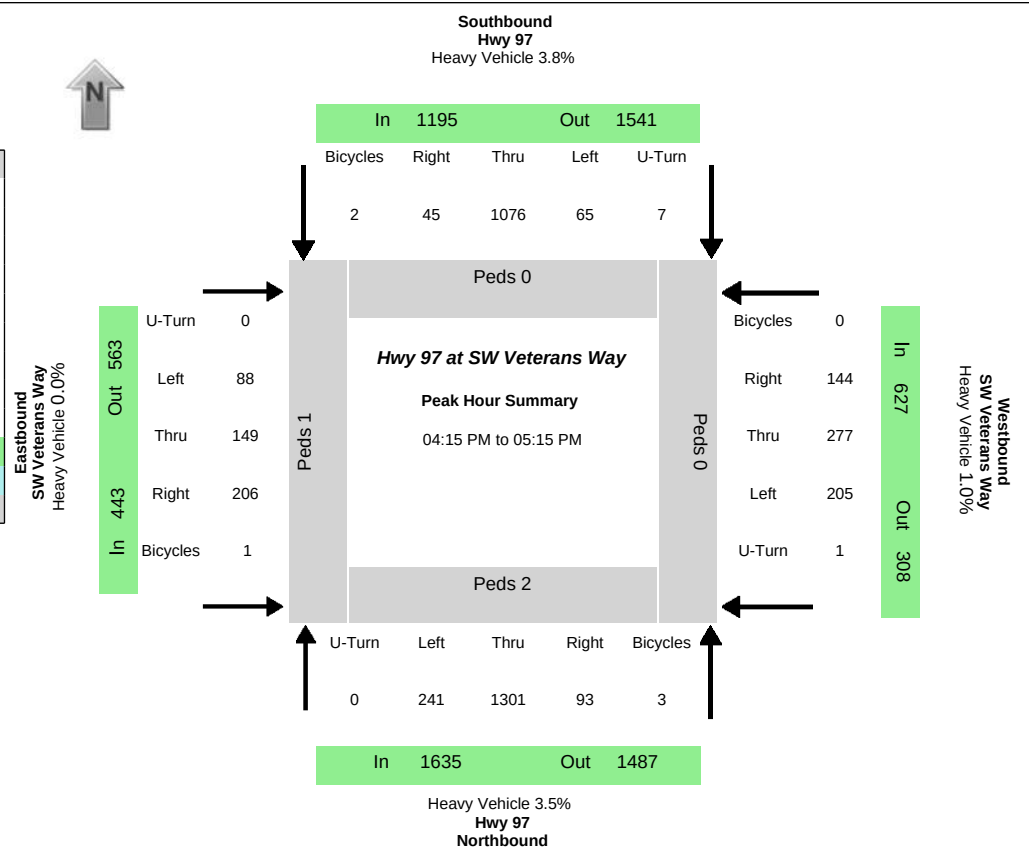


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
57	20	26	0	0	2	20	0	6	211	20	0	31	368	2	0	103	22	237	401	53	28	445	237
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.4%	1.5%	0.0%	0.0%	1.3%	0.4%

PHV- Bicycles												PHV - Pedestrians				
Northbound				Southbound				Eastbound				Westbound				Sum
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	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

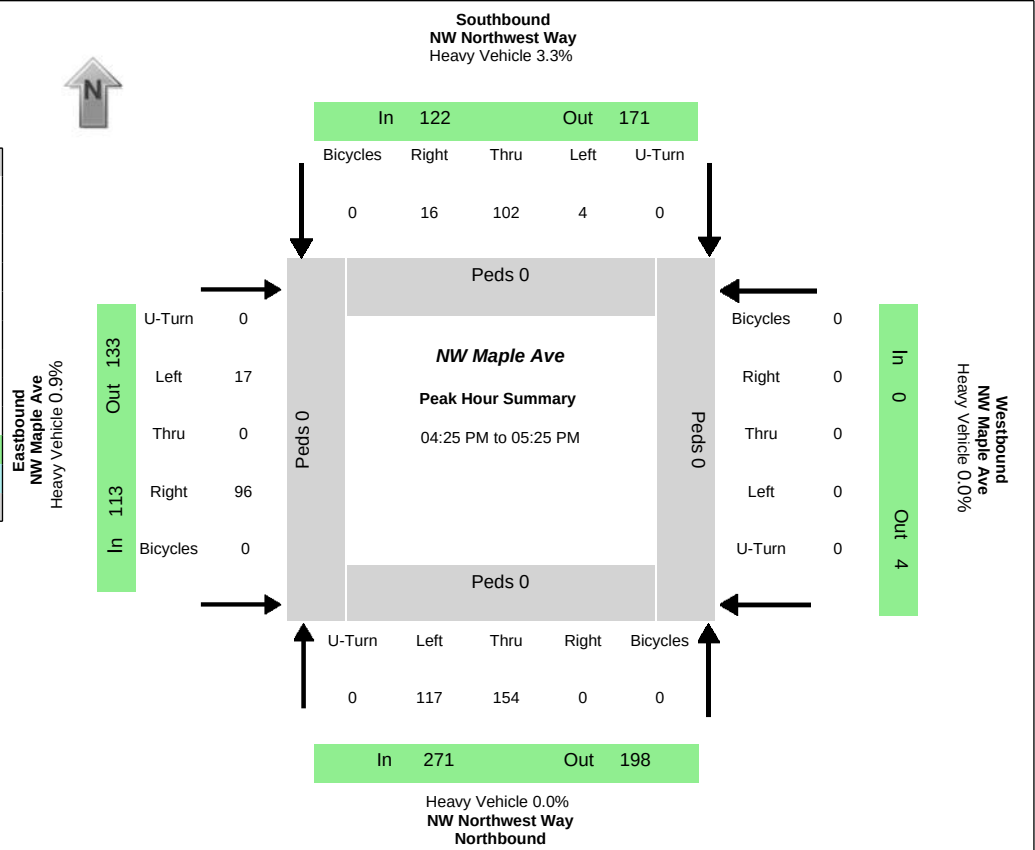
All Vehicle Volumes																	
Time	Northbound SW Canyon Dr				Southbound SW Canyon Dr				Eastbound SW Black Butte Blvd				Westbound SW Black Butte Blvd				15 Min Sum
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	
04:00:00 PM	5	1	0	0	0	0	3	0	0	30	0	0	2	22	0	0	
04:05:00 PM	3	0	1	0	0	0	1	0	0	19	0	0	6	32	0	0	
04:10:00 PM	0	3	0	0	0	0	2	0	0	29	3	0	1	31	1	0	195
04:15:00 PM	4	0	3	0	0	0	2	0	2	18	1	0	5	18	0	0	185
04:20:00 PM	4	2	0	0	0	0	1	0	1	21	1	0	6	24	0	0	183
04:25:00 PM	4	1	0	0	0	0	2	0	0	11	3	0	2	21	0	0	157
04:30:00 PM	4	1	3	0	0	0	2	0	0	24	2	0	4	25	0	0	169
04:35:00 PM	5	2	3	0	0	0	2	0	1	18	0	0	0	40	0	0	180
04:40:00 PM	7	4	1	0	0	0	1	0	2	15	2	0	2	34	0	0	204
04:45:00 PM	3	2	2	0	0	1	1	0	0	13	4	0	2	36	0	0	203
04:50:00 PM	3	2	4	0	0	1	0	0	1	17	1	0	2	25	0	0	188
04:55:00 PM	3	1	3	0	0	0	2	0	0	23	2	0	2	25	1	0	182
05:00:00 PM	3	1	2	0	0	0	5	0	0	25	1	0	6	18	0	0	179
05:05:00 PM	5	2	1	0	0	0	4	0	0	15	1	0	3	41	0	0	195
05:10:00 PM	7	0	1	0	0	0	1	0	0	16	1	0	2	35	0	0	196
05:15:00 PM	7	1	1	0	0	0	0	0	0	20	2	0	3	41	1	0	211
05:20:00 PM	5	1	1	0	0	0	1	0	0	15	4	0	1	27	0	0	194
05:25:00 PM	5	3	4	0	0	0	1	0	2	10	0	0	4	21	0	0	181
05:30:00 PM	5	0	1	0	0	0	0	0	0	18	2	0	3	28	0	0	162
05:35:00 PM	5	0	0	0	0	0	2	0	1	10	3	0	0	30	1	0	159
05:40:00 PM	3	3	2	0	0	0	1	0	1	20	2	0	2	22	0	0	165
05:45:00 PM	5	0	3	0	0	0	1	0	0	22	2	0	2	22	0	0	165
05:50:00 PM	5	2	0	0	0	0	1	0	1	11	2	0	1	13	2	0	151
05:55:00 PM	3	4	5	0	0	0	0	0	0	16	0	0	1	17	0	0	141

Data Provided by K-D-N.com 503-594-4224	
N/S street	Hwy 97
E/W street	SW Veterans Way
City, State	Redmond OR
Site Notes	
Location	44.26311 - -121.17694
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:15:00 PM
Peak 15 Min Start	05:00:00 PM
PHF (15-Min Int)	0.94

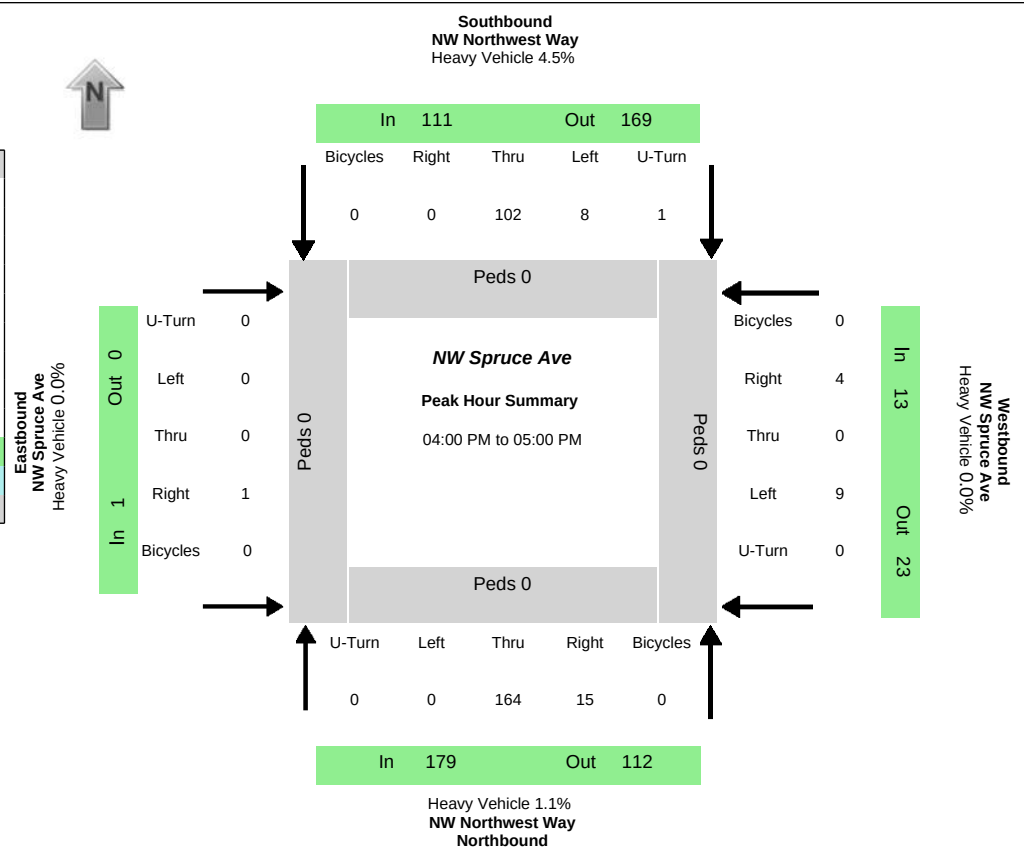


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
241	1301	93	0	65	1076	45	7	88	149	206	0	205	277	144	1	1635	1193	443	627	1487	1540	563	308
Percent Heavy Vehicles																							
0.0%	4.2%	2.2%	0.0%	7.7%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	2.8%	0.0%	3.5%	3.9%	0.0%	1.0%	2.8%	3.8%	0.4%	2.3%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
1	0	2	0	1	0	1	0	1	0	0	0	0	0	0	0	6	2	0	1	0	3		
All Vehicle Volumes																							
Time	Northbound Hwy 97				Southbound Hwy 97				Eastbound SW Veterans Way				Westbound SW Veterans Way				15 Min						
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	16	128	11	0	5	105	5	0	4	5	13	0	8	14	6	0							
04:05:00 PM	19	74	10	0	3	75	3	0	9	18	25	0	26	35	19	0							
04:10:00 PM	27	111	6	0	11	78	4	0	7	8	10	0	18	21	23	0	960						
04:15:00 PM	16	108	14	0	5	113	4	0	8	11	9	0	11	18	6	0	963						
04:20:00 PM	22	102	7	0	5	84	3	2	9	11	16	0	13	18	7	0	946						
04:25:00 PM	17	101	6	0	12	73	1	1	11	17	17	0	20	29	12	0	939						
04:30:00 PM	22	122	4	0	7	118	4	2	9	13	17	0	14	25	12	0	985						
04:35:00 PM	24	95	5	0	1	55	4	0	4	18	16	0	25	21	11	0	965						
04:40:00 PM	19	132	7	0	4	96	4	0	6	11	13	0	15	22	14	0	991						
04:45:00 PM	24	112	12	0	5	90	2	0	5	11	19	0	13	23	12	0	950						
04:50:00 PM	16	107	8	0	3	93	5	0	10	10	18	0	16	15	15	0	987						
04:55:00 PM	15	96	4	0	1	74	3	1	7	15	21	0	17	25	8	1	932	3822					
05:00:00 PM	24	120	11	0	6	95	4	1	6	6	27	0	16	26	12	0	958	3856					
05:05:00 PM	21	109	7	0	6	112	5	0	4	11	10	0	18	24	17	0	986	3884					
05:10:00 PM	21	97	8	0	10	73	6	0	9	15	23	0	27	31	18	0	1036	3898					
05:15:00 PM	24	119	4	0	5	77	3	0	7	5	23	0	16	16	10	0	991	3884					
05:20:00 PM	17	86	9	0	4	81	2	0	6	3	21	0	15	20	11	0	922	3860					
05:25:00 PM	7	73	4	0	8	65	3	0	9	14	13	0	8	19	12	0	819	3778					
05:30:00 PM	23	112	9	0	13	92	4	3	9	4	18	0	12	17	11	0	837	3736					
05:35:00 PM	21	125	6	0	5	98	4	1	8	7	16	0	14	12	12	0	891	3786					
05:40:00 PM	19	120	11	0	4	86	1	1	8	8	12	0	17	22	8	0	973	3760					
05:45:00 PM	23	85	9	0	3	61	1	0	6	13	18	0	8	12	9	0	894	3680					
05:50:00 PM	19	106	8	0	10	77	2	0	3	7	10	0	4	7	4	0	822	3621					
05:55:00 PM	17	98	5	0	1	68	7	0	12	9	11	0	14	9	5	0	761	3589					

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW Northwest Way
E/W street	NW Maple Ave
City, State	Redmond OR
Site Notes	
Location	44.29098 - -121.19841
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:25:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.90

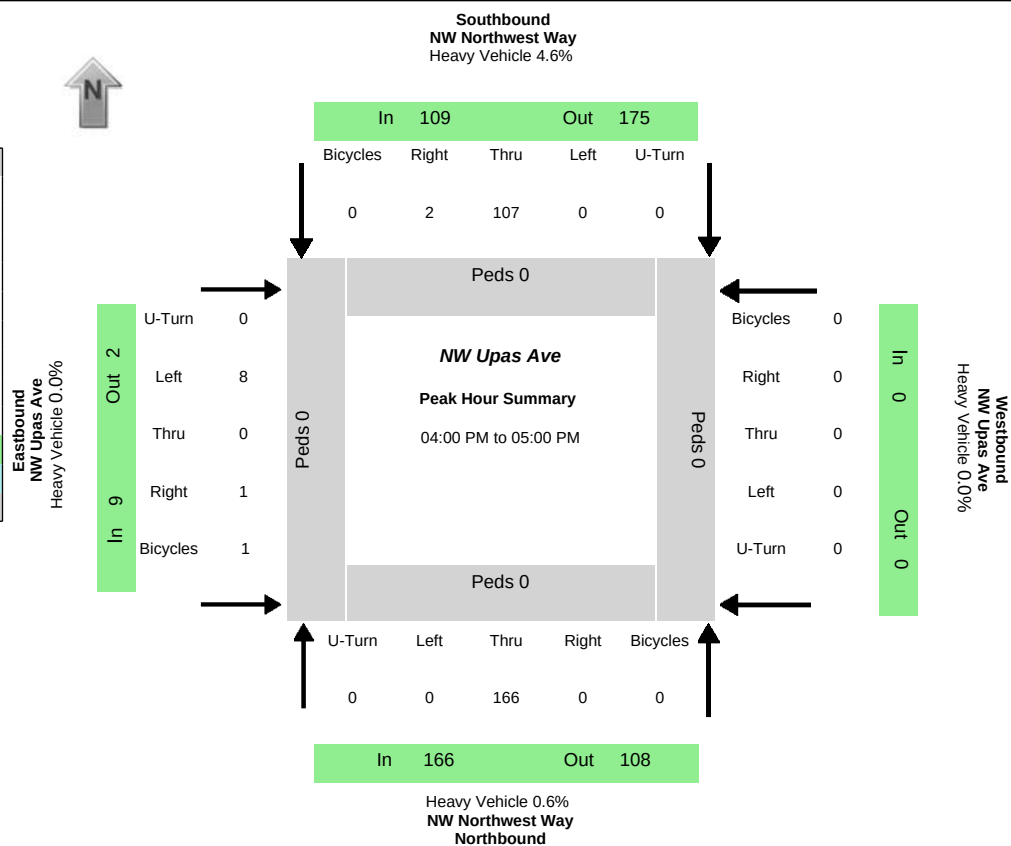


Data Provided by K-D-N.com 503-594-4224	
N/S street	NW Northwest Way
E/W street	NW Spruce Ave
City, State	Redmond OR
Site Notes	
Location	44.30192 - -121.19901
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.84



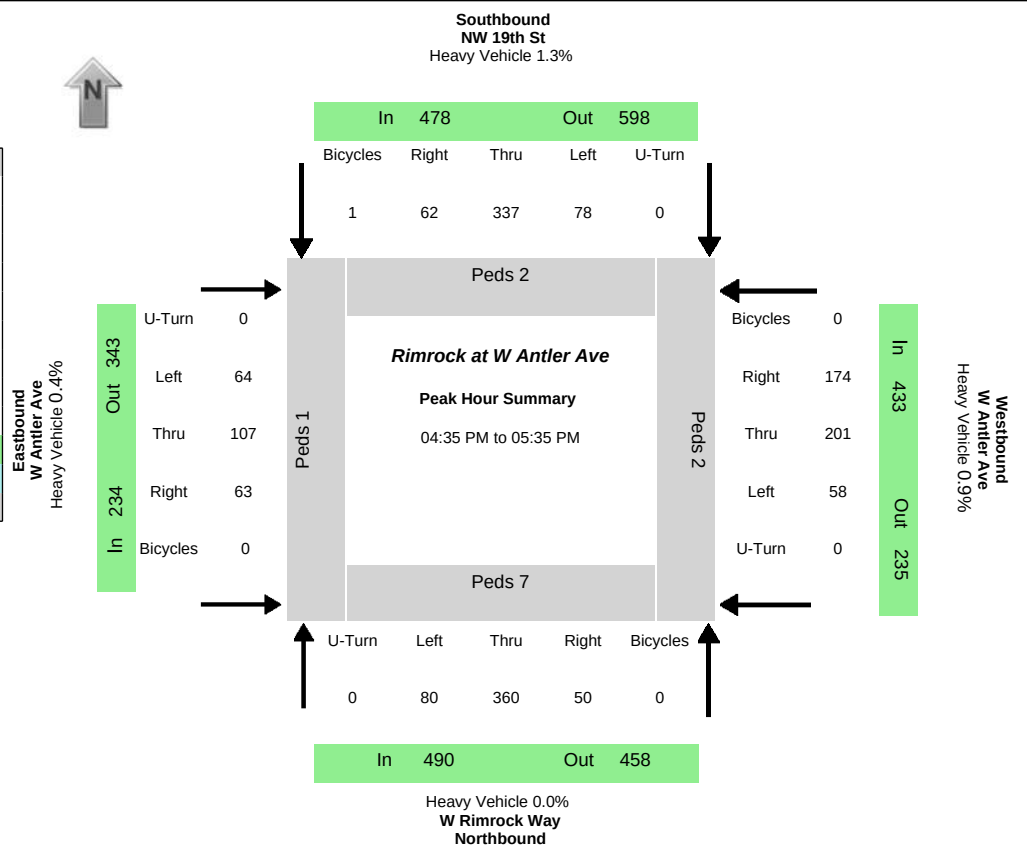
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	164	15	0	8	102	0	1	0	0	1	0	9	0	4	0	179	111	1	13	112	169	0	23
Percent Heavy Vehicles																							
0.0%	0.6%	6.7%	0.0%	0.0%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	4.5%	0.0%	0.0%	4.5%	0.6%	NaN	4.3%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	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																							
Time	Northbound NW Northwest Way				Southbound NW Northwest Way				Eastbound NW Spruce Ave				Westbound NW Spruce Ave				15 Min						
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	0	8	2	0	2	7	0	0	0	0	0	0	2	0	0	0							
04:05:00 PM	0	13	1	0	0	10	0	0	0	0	0	0	0	0	1	0							
04:10:00 PM	0	13	2	0	0	13	0	0	0	0	0	1	0	0	0	0	75						
04:15:00 PM	0	13	1	0	2	7	0	0	0	0	0	0	1	0	0	0	78						
04:20:00 PM	0	12	2	0	0	2	0	0	0	0	0	0	0	0	0	0	69						
04:25:00 PM	0	10	1	0	0	7	0	1	0	0	0	0	1	0	0	0	60						
04:30:00 PM	0	10	0	0	2	5	0	0	0	0	0	0	0	0	1	0	54						
04:35:00 PM	0	18	1	0	0	9	0	0	0	0	0	0	1	0	1	0	68						
04:40:00 PM	0	20	2	0	1	7	0	0	0	0	0	0	0	0	0	0	78						
04:45:00 PM	0	14	0	0	0	10	0	0	0	0	0	0	2	0	0	0	86						
04:50:00 PM	0	18	3	0	0	10	0	0	0	0	0	0	1	0	0	0	88						
04:55:00 PM	0	15	0	0	1	15	0	0	0	0	0	0	1	0	1	0	91	304					
05:00:00 PM	0	6	2	0	0	4	0	0	0	0	0	0	3	0	0	0	80	298					
05:05:00 PM	0	9	2	0	1	11	0	0	0	0	0	0	2	0	0	0	73	298					
05:10:00 PM	0	8	0	0	0	8	0	0	0	0	0	0	2	0	0	0	58	287					
05:15:00 PM	0	13	4	0	0	7	0	0	0	0	0	1	0	0	0	0	68	288					
05:20:00 PM	0	15	0	0	0	10	0	0	0	0	0	0	0	0	0	0	68	297					
05:25:00 PM	0	8	1	0	0	4	0	0	0	0	0	0	1	0	0	0	64	291					
05:30:00 PM	0	10	1	0	0	5	0	0	0	0	0	0	0	0	0	0	55	289					
05:35:00 PM	0	10	2	0	0	5	0	0	0	0	0	0	0	0	0	0	47	276					
05:40:00 PM	0	16	1	0	1	9	0	0	0	0	0	0	2	0	0	0	62	275					
05:45:00 PM	0	27	3	0	1	6	0	0	0	0	0	0	2	0	0	0	85	288					
05:50:00 PM	1	7	4	0	0	9	0	0	0	0	0	0	0	0	0	0	89	277					
05:55:00 PM	1	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	65	249					

N/S street	NW Northwest Way
E/W street	NW Upas Ave
City, State	Redmond OR
Site Notes	
Location	44.30549 - -121.19897
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.86



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
0	166	0	0	0	107	2	0	8	0	1	0	0	0	0	0	166	109	9	0	108	174	2	0
Percent Heavy Vehicles																							
0.0%	0.6%	0.0%	0.0%	0.0%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	4.6%	0.0%	0.0%	4.6%	0.6%	0.0%	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	1	0	0	0	0	0	0	0	1	0	0	0	0	0		
All Vehicle Volumes																							
Time	Northbound NW Northwest Way				Southbound NW Northwest Way				Eastbound NW Upas Ave				Westbound NW Upas Ave				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	0	6	0	0	0	11	1	0	0	0	0	0	0	0	0	0							
04:05:00 PM	0	15	0	0	0	7	0	0	0	0	0	0	0	0	0	0							
04:10:00 PM	0	14	0	0	0	11	1	0	3	0	1	0	0	0	0	0	70						
04:15:00 PM	0	13	0	0	0	10	0	0	1	0	0	0	0	0	0	0	76						
04:20:00 PM	0	12	0	0	0	1	0	0	0	0	0	0	0	0	0	0	67						
04:25:00 PM	0	8	0	0	0	8	0	0	1	0	0	0	0	0	0	0	54						
04:30:00 PM	0	14	0	0	0	7	0	0	2	0	0	0	0	0	0	0	53						
04:35:00 PM	0	18	0	0	0	9	0	0	0	0	0	0	0	0	0	0	67						
04:40:00 PM	0	20	0	0	0	7	0	0	0	0	0	0	0	0	0	0	77						
04:45:00 PM	0	13	0	0	0	10	0	0	0	0	0	0	0	0	0	0	77						
04:50:00 PM	0	17	0	0	0	11	0	0	0	0	0	0	0	0	0	0	78						
04:55:00 PM	0	16	0	0	0	15	0	0	1	0	0	0	0	0	0	0	83	284					
05:00:00 PM	0	6	0	0	0	4	1	0	0	0	0	0	0	0	0	0	71	277					
05:05:00 PM	0	10	0	0	0	12	1	0	0	0	1	0	0	0	0	0	67	279					
05:10:00 PM	0	7	0	0	0	7	1	0	0	0	2	0	0	0	0	0	52	266					
05:15:00 PM	0	14	0	0	0	7	0	0	1	0	0	0	0	0	0	0	63	264					
05:20:00 PM	0	15	0	0	0	9	0	0	1	0	0	0	0	0	0	0	64	276					
05:25:00 PM	0	6	0	0	0	4	0	0	3	0	0	0	0	0	0	0	60	272					
05:30:00 PM	0	12	0	0	0	5	0	0	2	0	0	0	0	0	0	0	57	268					
05:35:00 PM	0	10	0	0	0	6	1	0	2	0	0	0	0	0	0	0	51	260					
05:40:00 PM	0	16	0	0	0	11	0	0	1	0	0	0	0	0	0	0	66	261					
05:45:00 PM	0	26	0	0	0	7	1	0	0	0	0	0	0	0	0	0	81	272					
05:50:00 PM	0	8	0	0	0	10	0	0	0	0	0	0	0	0	0	0	80	262					
05:55:00 PM	0	10	0	0	0	3	1	0	2	0	0	0	0	0	0	0	68	246					

Data Provided by K-D-N.com 503-594-4224	
N/S street	W Rimrock Way
E/W street	W Antler Ave
City, State	Redmond OR
Site Notes	
Location	44.27645 - -121.18923
Start Date	Thursday, May 05, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:35:00 PM
Peak 15 Min Start	05:10:00 PM
PHF (15-Min Int)	0.93

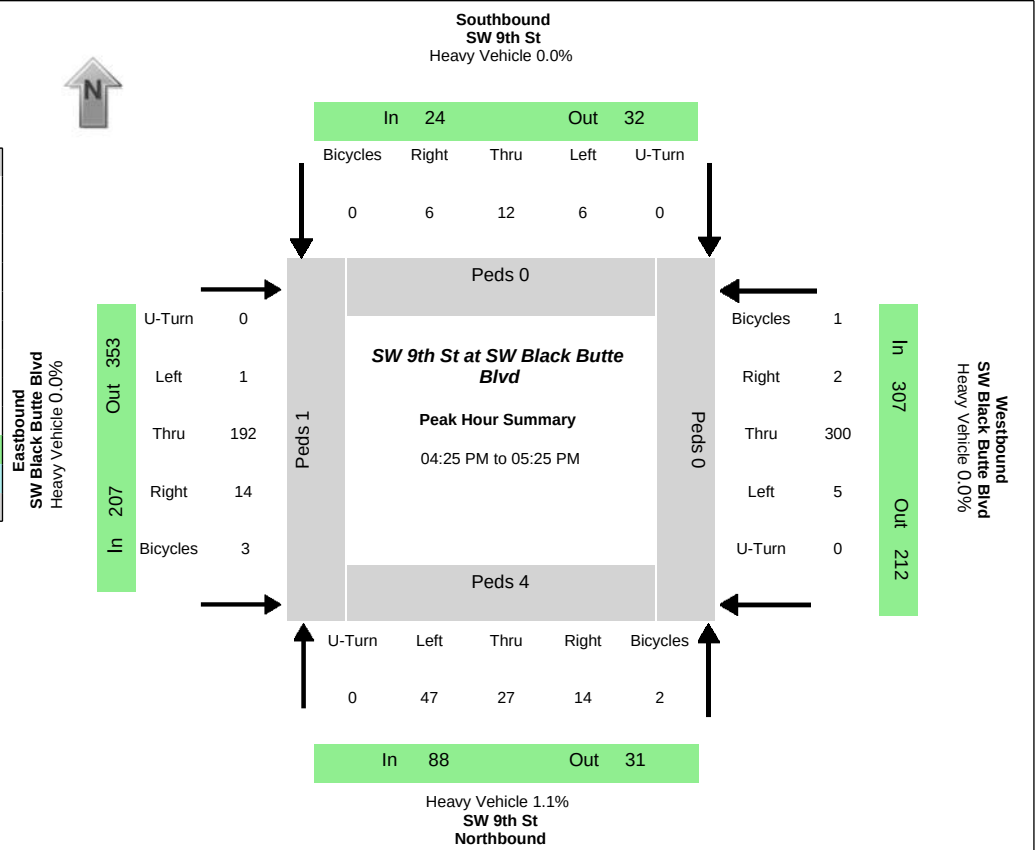


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
80	360	50	0	78	337	62	0	64	107	63	0	58	201	174	0	490	477	234	433	458	598	343	235
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	1.3%	1.5%	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	6.9%	0.0%	0.0%	0.0%	0.0%	1.3%	0.4%	0.9%	2.2%	0.0%	0.0%	0.4%

PHV- Bicycles																PHV - Pedestrians					
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB	
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0		1	7	2	1	

All Vehicle Volumes																		
Time	Northbound W Rimrock Way				Southbound NW 19th St				Eastbound W Antler Ave				Westbound W Antler Ave				15 Min	1 HR
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	11	35	4	0	5	22	1	0	5	12	5	0	7	11	15	0		
04:05:00 PM	4	32	7	0	6	28	8	0	9	15	4	0	2	15	12	0		
04:10:00 PM	6	25	5	0	14	18	6	0	6	11	2	0	1	15	13	0	397	
04:15:00 PM	4	37	5	0	10	23	1	0	6	4	7	0	7	6	10	0	384	
04:20:00 PM	7	25	1	0	6	15	3	0	5	10	4	0	2	12	14	0	346	
04:25:00 PM	4	24	2	0	8	22	1	0	6	7	7	0	6	13	12	0	336	
04:30:00 PM	6	34	5	0	8	16	3	0	6	4	4	0	7	14	11	0	334	
04:35:00 PM	4	30	1	0	12	32	6	0	7	11	4	0	6	14	21	0	378	
04:40:00 PM	2	31	1	0	5	24	8	0	5	5	4	0	4	23	14	0	392	
04:45:00 PM	7	29	2	0	6	33	6	0	6	8	3	0	3	19	17	0	413	
04:50:00 PM	6	24	6	0	9	28	9	0	6	14	4	0	8	12	13	0	404	
04:55:00 PM	11	21	4	0	12	35	5	0	7	7	8	0	2	15	8	0	413	1538
05:00:00 PM	8	28	8	0	5	25	6	0	9	8	11	0	2	15	13	0	412	1543
05:05:00 PM	3	25	4	0	2	35	4	0	4	11	5	0	7	15	16	0	404	1532
05:10:00 PM	7	36	7	0	9	22	3	0	8	8	3	0	5	22	18	0	417	1558
05:15:00 PM	13	32	8	0	5	29	2	0	2	6	7	0	7	21	17	0	428	1587
05:20:00 PM	8	37	2	0	6	30	7	0	1	10	5	0	8	15	12	0	438	1624
05:25:00 PM	6	29	4	0	5	25	2	0	5	6	6	0	2	12	14	0	406	1628
05:30:00 PM	5	38	3	0	2	19	4	0	4	13	3	0	4	18	11	0	381	1634
05:35:00 PM	3	36	2	0	6	23	4	0	4	7	3	0	1	13	15	0	357	1603
05:40:00 PM	7	39	3	0	7	32	10	0	3	9	2	0	7	9	13	0	382	1618
05:45:00 PM	4	27	4	0	4	24	3	0	2	7	2	0	1	7	16	0	359	1580
05:50:00 PM	3	40	3	0	3	18	6	0	6	10	0	0	2	5	11	0	349	1548
05:55:00 PM	0	28	4	0	3	19	2	0	1	9	2	0	3	15	14	0	308	1513

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW 9th St
E/W street	SW Black Butte Blvd
City, State	Redmond OR
Site Notes	
Location	44.275546 - -121.177527
Start Date	Thursday, March 03, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:25:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.87

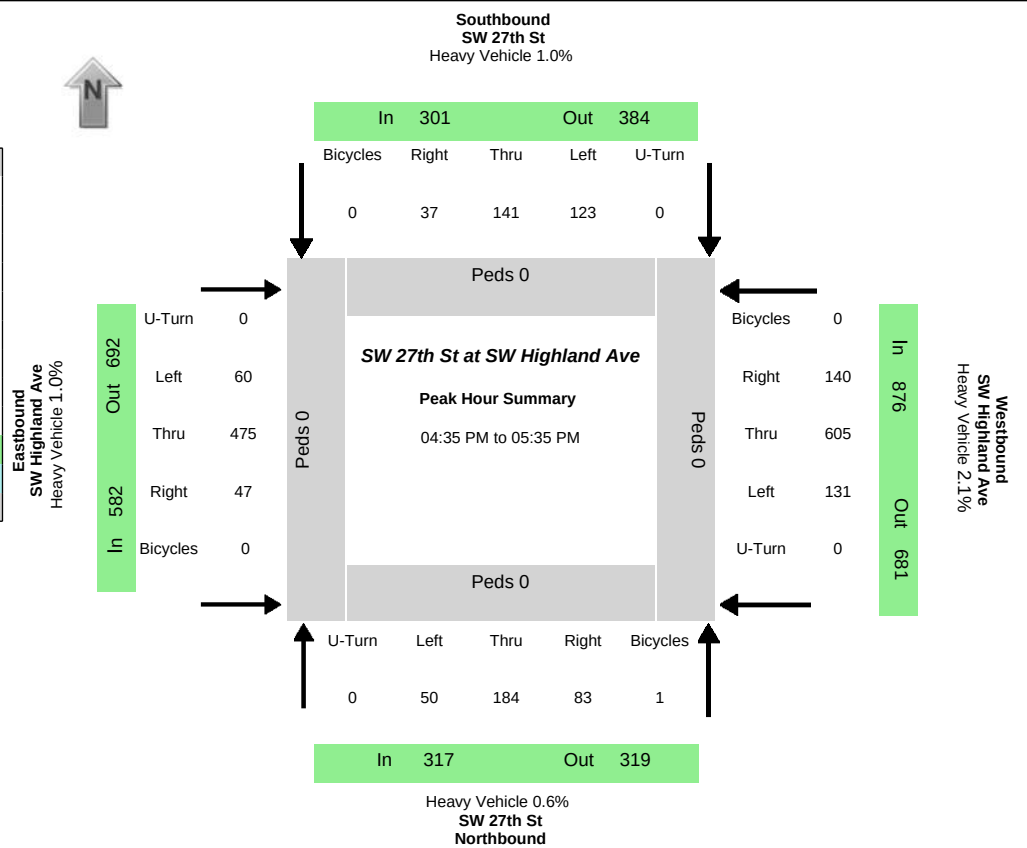


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
47	27	14	0	6	12	6	0	1	192	14	0	5	300	2	0	88	24	207	307	31	30	353	212
Percent Heavy Vehicles																							
2.1%	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%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%

PHV- Bicycles																PHV - Pedestrians						
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk					Sum
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB		
0	2	0	0	0	0	0	0	0	2	1	0	0	1	0	0		6	4	0	1	0	

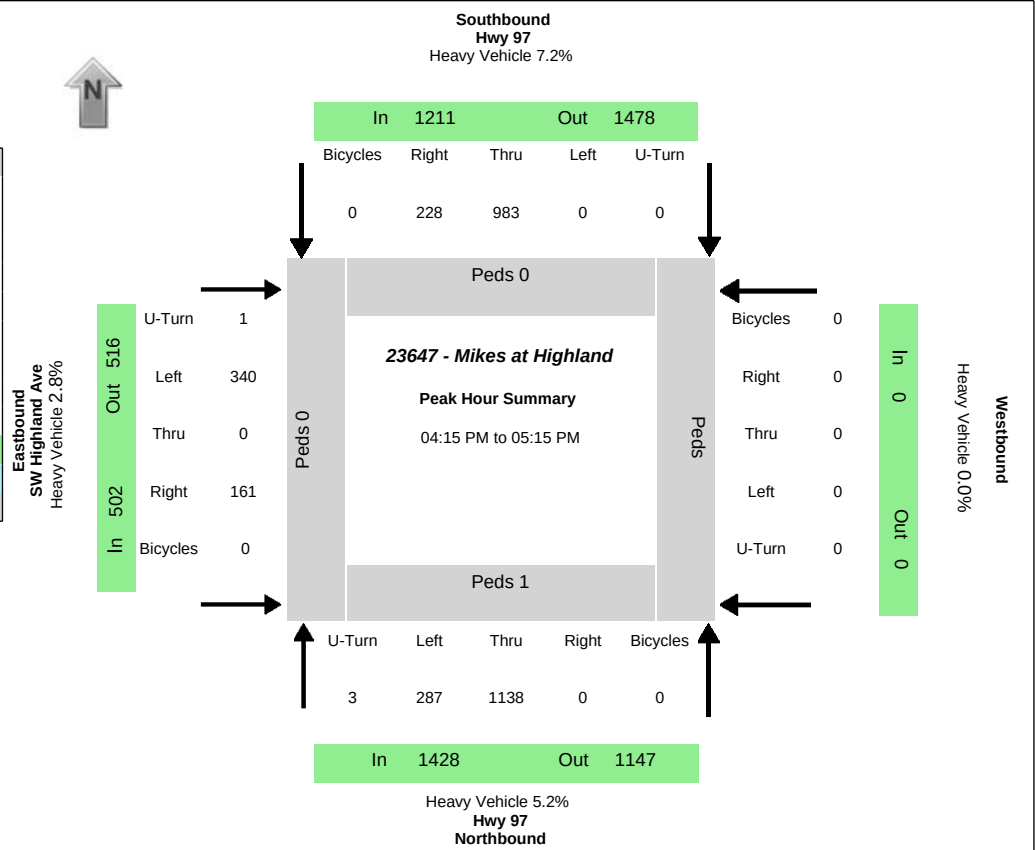
All Vehicle Volumes																	
Time	Northbound SW 9th St				Southbound SW 9th St				Eastbound SW Black Butte Blvd				Westbound SW Black Butte Blvd				15 Min Sum
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	
04:00:00 PM	1	2	0	0	0	2	2	0	0	18	0	0	0	17	0	0	
04:05:00 PM	4	3	2	0	0	0	2	0	0	20	1	0	1	23	0	0	
04:10:00 PM	2	2	2	0	1	1	2	0	0	12	0	0	1	23	0	0	144
04:15:00 PM	1	3	1	0	0	1	0	0	1	8	0	0	0	23	0	0	140
04:20:00 PM	3	3	0	0	0	2	0	0	0	20	0	0	1	22	0	0	135
04:25:00 PM	5	4	0	0	0	1	1	0	0	13	0	0	0	22	0	0	135
04:30:00 PM	3	1	3	0	0	1	0	0	0	17	1	0	2	16	1	0	142
04:35:00 PM	3	1	2	0	0	1	0	0	0	19	1	0	0	25	0	0	143
04:40:00 PM	2	2	3	0	1	1	0	0	1	17	1	0	0	18	0	0	143
04:45:00 PM	3	2	2	0	1	3	1	0	0	22	1	0	0	21	0	0	154
04:50:00 PM	5	1	1	0	0	0	0	0	0	15	1	0	1	23	0	0	149
04:55:00 PM	2	5	0	0	0	0	0	0	0	17	3	0	0	26	0	0	156 578
05:00:00 PM	3	1	0	0	1	2	1	0	0	10	3	0	1	28	0	0	150 586
05:05:00 PM	6	2	2	0	1	2	1	0	0	15	0	0	0	28	1	0	161 588
05:10:00 PM	5	4	1	0	0	1	1	0	0	13	0	0	0	35	0	0	168 602
05:15:00 PM	6	1	0	0	1	0	0	0	0	18	1	0	0	34	0	0	179 625
05:20:00 PM	4	3	0	0	1	0	1	0	0	16	2	0	1	24	0	0	173 626
05:25:00 PM	2	2	1	0	0	0	0	0	0	15	0	0	0	16	0	0	149 616
05:30:00 PM	0	1	3	0	0	0	1	0	1	19	1	0	0	17	0	0	131 614
05:35:00 PM	5	3	3	0	0	0	2	0	0	8	1	0	0	23	0	0	124 607
05:40:00 PM	1	2	0	0	0	0	0	0	0	15	1	0	0	23	0	0	130 603
05:45:00 PM	2	2	1	0	0	0	0	0	1	16	0	0	0	14	0	0	123 583
05:50:00 PM	3	0	0	0	0	0	0	0	0	26	0	0	0	13	0	0	120 578
05:55:00 PM	3	3	0	0	1	1	0	0	2	21	0	0	0	14	0	0	123 570

Data Provided by K-D-N.com 503-594-4224	
N/S street	SW 27th St
E/W street	SW Highland Ave
City, State	Redmond OR
Site Notes	
Location	44.269245 - -121.199353
Start Date	Wednesday, June 02, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:35:00 PM
Peak 15 Min Start	04:45:00 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		
50	184	83	0	123	141	37	0	60	475	47	0	131	605	140	0	317	301	582	876	319	384	692	681		
Percent Heavy Vehicles																									
2.0%	0.0%	1.2%	0.0%	0.0%	1.4%	2.7%	0.0%	0.0%	1.1%	2.1%	0.0%	0.0%	3.0%	0.0%	0.0%	0.6%	1.0%	1.0%	2.1%	0.9%	0.0%	2.9%	0.9%		
PHV- Bicycles																PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB					
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0			
All Vehicle Volumes																				15 Min Sum				1 HR Sum	
Time	Northbound SW 27th St				Southbound SW 27th St				Eastbound SW Highland Ave				Westbound SW Highland Ave												
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn									
04:00:00 PM	2	12	8	0	5	11	2	0	7	47	2	0	11	42	13	0									
04:05:00 PM	5	8	9	0	10	15	4	0	3	35	3	0	11	38	11	0									
04:10:00 PM	4	26	6	0	4	12	4	0	7	42	7	0	9	44	5	0	484								
04:15:00 PM	8	10	4	0	8	12	3	0	2	41	7	0	14	43	13	0	487								
04:20:00 PM	4	20	12	0	6	6	2	0	5	32	1	0	16	51	10	0	500								
04:25:00 PM	7	16	10	0	8	6	8	0	1	48	2	0	11	48	13	0	508								
04:30:00 PM	1	17	10	0	7	10	2	0	2	36	2	0	8	43	8	0	489								
04:35:00 PM	7	7	4	0	8	16	2	0	4	31	4	0	18	48	17	0	490								
04:40:00 PM	4	23	6	0	8	13	2	0	4	49	3	0	8	37	9	0	478								
04:45:00 PM	6	14	5	0	12	12	5	0	6	54	1	0	11	42	10	0	510								
04:50:00 PM	4	20	12	0	13	10	3	0	10	44	3	0	9	46	5	0	523								
04:55:00 PM	3	14	5	0	16	10	4	0	3	52	9	0	7	59	16	0	555	2025							
05:00:00 PM	0	9	7	0	7	12	3	0	1	47	4	0	14	47	16	0	544	2030							
05:05:00 PM	9	10	9	0	14	9	5	0	4	27	2	0	13	46	19	0	532	2045							
05:10:00 PM	3	16	5	0	10	13	2	0	2	48	7	0	11	53	9	0	513	2054							
05:15:00 PM	5	16	4	0	14	12	4	0	6	27	3	0	9	57	7	0	510	2053							
05:20:00 PM	4	15	10	0	7	15	5	0	10	39	5	0	7	52	9	0	521	2066							
05:25:00 PM	2	12	7	0	7	12	2	0	4	31	5	0	16	59	12	0	511	2057							
05:30:00 PM	3	28	9	0	7	7	0	0	6	26	1	0	8	59	11	0	512	2076							
05:35:00 PM	6	10	12	0	17	14	3	0	9	10	1	0	9	47	10	0	482	2058							
05:40:00 PM	0	21	9	0	11	20	0	0	9	14	0	0	12	46	11	0	466	2045							
05:45:00 PM	7	15	11	0	14	14	6	0	1	6	0	0	11	24	10	0	420	1986							
05:50:00 PM	7	22	17	0	12	18	2	0	6	14	1	0	3	38	16	0	428	1963							
05:55:00 PM	6	14	11	0	14	6	4	0	1	7	0	0	15	47	14	0	414	1904							

Data Provided by K-D-N.com 503-594-4224	
N/S street	Hwy 97
E/W street	SW Highland Ave
City, State	Redmond OR
Site Notes	
Location	44.26967 - -121.17171
Start Date	Wednesday, June 09, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:15:00 PM
Peak 15 Min Start	05:00:00 PM
PHF (15-Min Int)	0.91

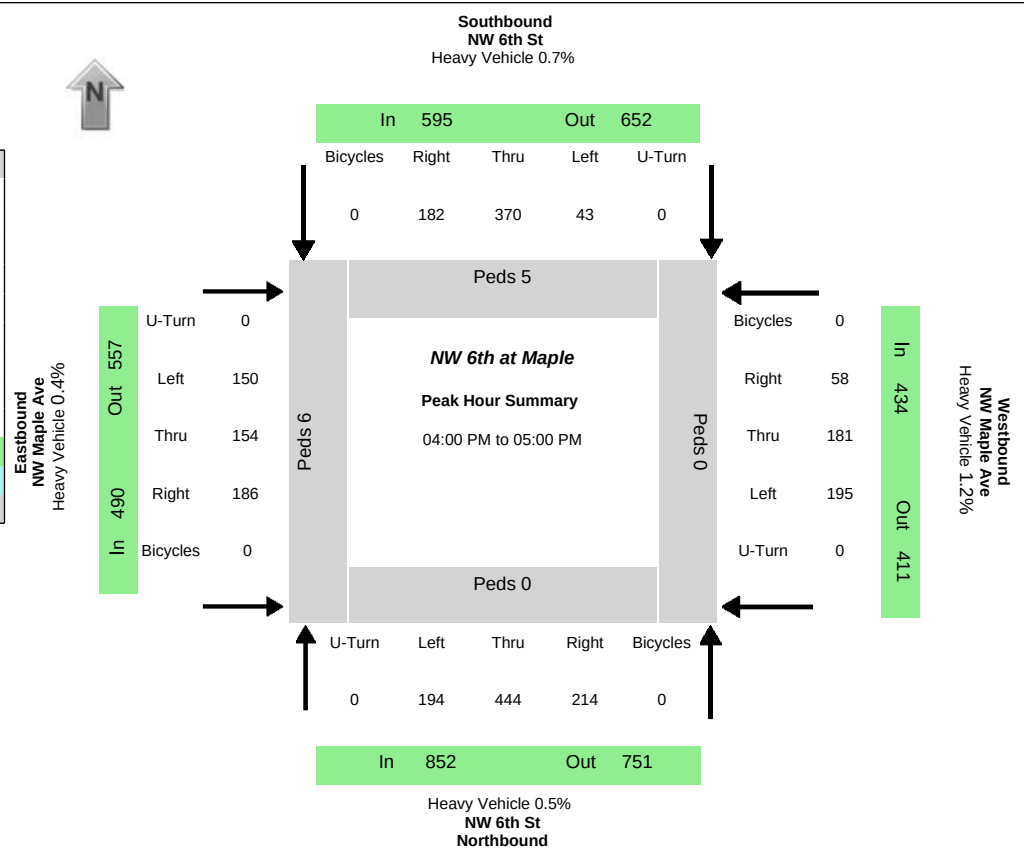


Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
287	1138	0	3	0	983	228	0	340	0	161	1	0	0	0	0	1428	1211	502	0	1147	1478	516	0
Percent Heavy Vehicles																							
2.1%	6.0%	0.0%	0.0%	0.0%	7.4%	6.1%	0.0%	2.6%	0.0%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	5.2%	7.2%	2.8%	0.0%	6.8%	5.2%	3.9%	0.0%

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

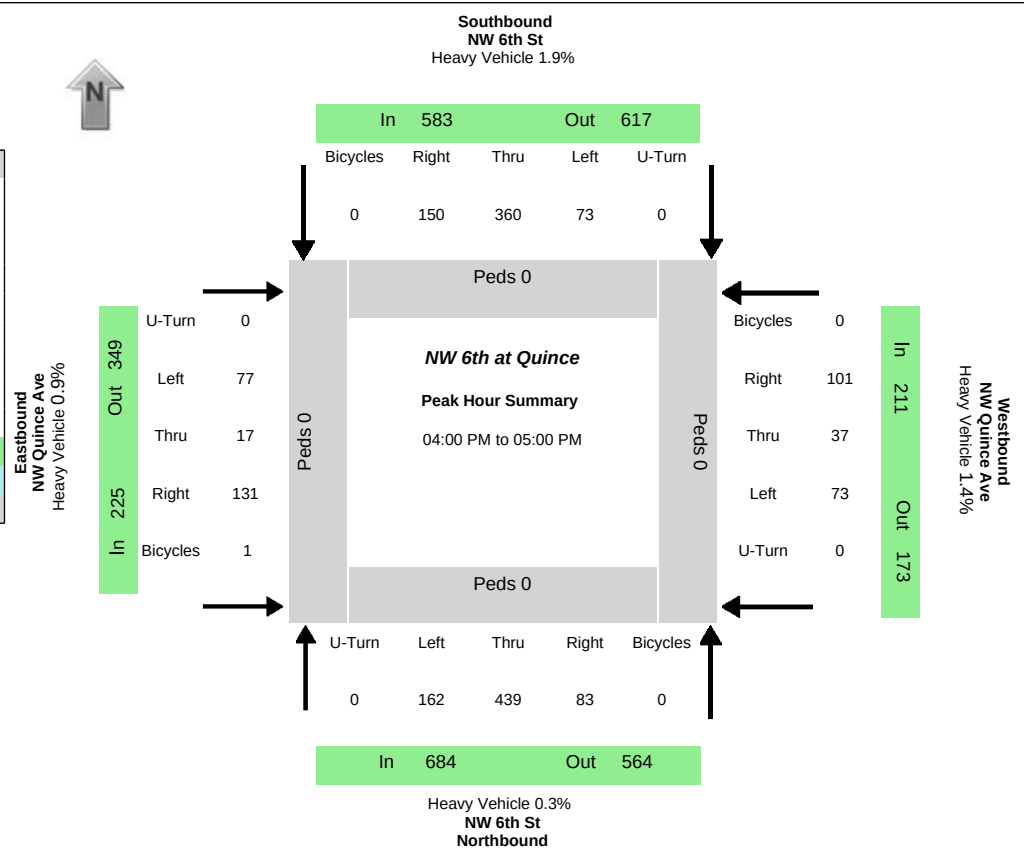
All Vehicle Volumes																		
Time	Northbound Hwy 97				Southbound Hwy 97				Eastbound SW Highland Ave				Westbound				15 Min	1 HR
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	38	100		0		69	25	0	29		11	0						
04:05:00 PM	22	95		0		96	20	0	25		13	0						
04:10:00 PM	29	73		0		84	21	0	34		18	0					802	
04:15:00 PM	26	108		0		70	23	0	28		11	0					796	
04:20:00 PM	26	89	2			91	17	0	16		10	0					776	
04:25:00 PM	28	84		0		70	15	0	21		23	0					758	
04:30:00 PM	25	96	1			77	24	0	32		11	0					758	
04:35:00 PM	21	91		0		107	20	0	31		14	0					791	
04:40:00 PM	22	80		0		90	23	0	25		8	0					798	
04:45:00 PM	21	97		0		76	18	0	34		15	0					793	
04:50:00 PM	18	83		0		55	12	0	41		15	0					733	
04:55:00 PM	30	86		0		62	19	0	24		12	0					718	3076
05:00:00 PM	20	115		0		93	21	0	20		11	0					737	3084
05:05:00 PM	22	118		0		102	14	0	40		15	0					824	3124
05:10:00 PM	28	91		0		90	22	0	28		16	1					867	3141
05:15:00 PM	20	71		0		52	18	0	32		12	0					792	3080
05:20:00 PM	20	84		0		86	20	0	24		22	0					737	3085
05:25:00 PM	18	135		0		71	22	0	27		14	0					748	3131
05:30:00 PM	15	84		0		70	21	0	31		20	0					784	3106
05:35:00 PM	23	87		0		82	13	0	29		15	0					777	3071
05:40:00 PM	29	85	1			89	14	0	12		8	0					728	3061
05:45:00 PM	19	78		0		75	15	0	26		18	0					718	3031
05:50:00 PM	35	88	1			43	24	0	22		11	0					693	3031
05:55:00 PM	14	103		0		75	13	0	24		12	0					696	3039

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 6th St
E/W street	NW Maple Ave
City, State	Redmond OR
Site Notes	
Location	44.29102 - -121.17398
Start Date	Thursday, February 10, 2022
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:00:00 PM
PHF (15-Min Int)	0.92



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
194	444	214	0	43	370	182	0	150	154	186	0	195	181	58	0	852	595	490	434	751	652	557	411
Percent Heavy Vehicles																							
1.0%	0.5%	0.0%	0.0%	4.7%	0.0%	1.1%	0.0%	0.0%	1.3%	0.0%	0.0%	1.0%	1.1%	1.7%	0.0%	0.5%	0.7%	0.4%	1.2%	0.3%	0.5%	1.1%	1.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk				Sum			
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	5	6	0	0	11	
All Vehicle Volumes																							
Time	Northbound NW 6th St				Southbound NW 6th St				Eastbound NW Maple Ave				Westbound NW Maple Ave				15 Min		1 HR				
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum		Sum				
04:00:00 PM	18	49	23	0	5	39	15	0	8	18	16	0	14	13	14	0							
04:05:00 PM	14	37	25	0	5	28	13	0	9	12	16	0	20	21	7	0							
04:10:00 PM	15	32	20	0	7	29	12	0	17	12	19	0	22	16	3	0	643						
04:15:00 PM	20	35	16	0	2	36	20	0	10	14	9	0	21	13	3	0	610						
04:20:00 PM	15	37	20	0	3	31	16	0	13	4	17	0	11	15	7	0	592						
04:25:00 PM	13	33	16	0	5	22	8	0	7	18	17	0	15	13	5	0	560						
04:30:00 PM	19	42	18	0	3	28	15	0	12	9	10	0	18	11	3	0	549						
04:35:00 PM	20	39	13	0	5	28	16	0	12	11	16	0	11	12	7	0	550						
04:40:00 PM	16	50	16	0	4	43	17	0	12	15	15	0	14	18	3	0	601						
04:45:00 PM	14	33	11	0	2	33	20	0	15	9	10	0	12	13	2	0	587						
04:50:00 PM	11	20	14	0	1	19	14	0	19	14	23	0	17	19	1	0	569						
04:55:00 PM	19	37	22	0	1	34	16	0	16	18	18	0	20	17	3	0	567	2371					
05:00:00 PM	18	50	11	0	0	24	21	0	10	4	21	0	14	10	4	0	580	2326					
05:05:00 PM	16	46	17	0	4	24	14	0	14	19	11	0	14	17	8	0	612	2323					
05:10:00 PM	18	27	22	0	7	29	14	0	11	9	6	0	19	16	2	0	571	2299					
05:15:00 PM	17	48	21	0	2	25	16	0	14	12	11	0	13	17	4	0	584	2300					
05:20:00 PM	5	29	14	0	3	27	17	0	9	13	14	0	11	22	3	0	547	2278					
05:25:00 PM	19	30	11	0	3	22	14	0	12	6	15	0	11	12	5	0	527	2266					
05:30:00 PM	15	31	12	0	8	27	11	0	11	8	7	0	17	12	3	0	489	2240					
05:35:00 PM	15	28	15	0	4	21	15	0	8	11	13	0	13	7	2	0	474	2202					
05:40:00 PM	17	34	17	0	2	32	14	0	15	7	7	0	8	21	2	0	490	2155					
05:45:00 PM	17	27	21	0	4	30	12	0	5	10	10	0	11	14	3	0	492	2145					
05:50:00 PM	19	30	22	0	7	30	15	0	11	16	17	0	16	8	3	0	534	2167					
05:55:00 PM	18	33	16	0	4	35	13	0	14	9	7	0	15	10	3	0	535	2123					

Data Provided by K-D-N.com 503-594-4224	
N/S street	NW 6th St
E/W street	NW Quince Ave
City, State	Redmond OR
Site Notes	
Location	44.298235 - -121.173927
Start Date	Thursday, February 10, 2022
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)	0.94



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
162	439	83	0	73	360	150	0	77	17	131	0	73	37	101	0	684	583	225	211	564	617	349	173
Percent Heavy Vehicles																							
0.0%	0.5%	0.0%	0.0%	2.7%	1.1%	3.3%	0.0%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.3%	1.9%	0.9%	1.4%	0.7%	1.1%	1.4%	1.2%
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	1	0	0	0	0	0	1	0	0	0	0	0		
All Vehicle Volumes																							
Time	Northbound NW 6th St				Southbound NW 6th St				Eastbound NW Quince Ave				Westbound NW Quince Ave				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	14	36	10	0	6	33	15	0	9	0	12	0	6	3	12	0							
04:05:00 PM	14	37	12	0	5	27	10	0	7	0	11	0	9	3	11	0							
04:10:00 PM	11	34	4	0	3	27	17	0	9	1	14	0	9	1	9	0	441						
04:15:00 PM	13	33	9	0	10	31	11	0	9	1	17	0	6	1	3	0	429						
04:20:00 PM	15	28	5	0	7	33	11	0	6	1	11	0	6	2	11	0	419						
04:25:00 PM	14	23	9	0	2	27	13	0	5	2	14	0	3	4	10	0	406						
04:30:00 PM	11	52	7	0	7	31	13	0	4	3	14	0	6	5	9	0	424						
04:35:00 PM	14	39	7	0	4	27	14	0	8	1	9	0	6	5	4	0	426						
04:40:00 PM	18	46	4	0	7	33	11	0	9	2	8	0	5	3	9	0	455						
04:45:00 PM	11	37	3	0	9	29	9	0	4	3	14	0	6	4	12	0	434						
04:50:00 PM	10	38	6	0	6	32	14	0	5	1	3	0	6	2	5	0	424						
04:55:00 PM	17	36	7	0	7	30	12	0	2	2	4	0	5	4	6	0	401	1703					
05:00:00 PM	10	32	6	0	5	31	8	0	6	2	4	0	6	3	7	0	380	1667					
05:05:00 PM	21	35	5	0	5	23	11	0	8	1	8	0	7	4	11	0	391	1660					
05:10:00 PM	10	52	3	0	12	32	12	0	3	0	14	0	4	5	6	0	412	1674					
05:15:00 PM	14	35	5	0	4	28	18	0	5	1	5	0	8	3	5	0	423	1661					
05:20:00 PM	16	32	7	0	6	34	12	0	8	3	14	0	8	1	13	0	438	1679					
05:25:00 PM	14	28	9	0	3	26	7	0	11	2	15	0	2	0	7	0	409	1677					
05:30:00 PM	14	34	9	0	5	22	9	0	0	0	9	0	5	0	5	0	390	1627					
05:35:00 PM	16	27	6	0	4	26	13	0	5	2	8	0	5	2	5	0	355	1608					
05:40:00 PM	15	32	5	0	3	23	9	0	5	1	7	0	4	6	7	0	348	1570					
05:45:00 PM	9	24	4	0	3	24	14	0	7	1	12	0	9	4	9	0	356	1549					
05:50:00 PM	11	35	6	0	2	22	12	0	6	1	17	0	6	1	7	0	363	1547					
05:55:00 PM	8	24	3	0	4	23	10	0	7	1	13	0	2	2	5	0	348	1517					

HCM 6th TWSC

1: NW Northwest Way & NW Upas Ave

Intersection

Int Delay, s/veh 0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	1	0	168	108	2
Future Vol, veh/h	8	1	0	168	108	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	5	0
Mvmt Flow	9	1	0	195	126	2

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	322	127	128
Stage 1	127	-	-
Stage 2	195	-	-
Critical Hdwy	6.4	6.2	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.2
Pot Cap-1 Maneuver	676	929	1470
Stage 1	904	-	-
Stage 2	843	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	676	929	1470
Mov Cap-2 Maneuver	676	-	-
Stage 1	904	-	-
Stage 2	843	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1470	-	697	-	-
HCM Lane V/C Ratio	-	-	0.015	-	-
HCM Control Delay (s)	0	-	10.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th TWSC

2: NW Northwest Way & NW Spruce Ave

Intersection

Int Delay, s/veh 0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	4	166	15	9	103
Future Vol, veh/h	9	4	166	15	9	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	35	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	1	7	0	5
Mvmt Flow	11	5	198	18	11	123

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	343	198	0
Stage 1	198	-	-
Stage 2	145	-	-
Critical Hdwy	6.4	6.2	-
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	-
Pot Cap-1 Maneuver	657	848	-
Stage 1	840	-	-
Stage 2	887	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	651	848	-
Mov Cap-2 Maneuver	651	-	-
Stage 1	840	-	-
Stage 2	879	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	701	1366
HCM Lane V/C Ratio	-	-	0.022	0.008
HCM Control Delay (s)	-	-	10.3	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th TWSC
4: NW 22nd St & NW Quince Ave

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	4	0	4	3	1	2	0
Future Vol, veh/h	0	0	0	0	0	4	0	4	3	1	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	5	0	5	3	1	2	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	13	12	2	11	11	7	2	0	0	8	0	0
Stage 1	4	4	-	7	7	-	-	-	-	-	-	-
Stage 2	9	8	-	4	4	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	1009	887	1088	1012	888	1081	1634	-	-	1625	-	-
Stage 1	1024	897	-	1020	894	-	-	-	-	-	-	-
Stage 2	1017	893	-	1024	897	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	1004	886	1088	1011	887	1081	1634	-	-	1625	-	-
Mov Cap-2 Maneuver	1004	886	-	1011	887	-	-	-	-	-	-	-
Stage 1	1024	896	-	1020	894	-	-	-	-	-	-	-
Stage 2	1013	893	-	1023	896	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		8.3			0			2.4			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1634	-	-	-	1081	1625	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.004	0.001	-	-				
HCM Control Delay (s)	0	-	-	0	8.3	7.2	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-				

HCM 6th TWSC
5: NW 19th St & NW Quince Ave

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	8	8	52	34	1
Future Vol, veh/h	0	8	8	52	34	1
Conflicting Peds, #/hr	0	0	5	0	0	5
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	9	9	60	40	1
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	124	46	46	0	-	0
Stage 1	46	-	-	-	-	-
Stage 2	78	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	876	1029	1575	-	-	-
Stage 1	982	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	862	1024	1568	-	-	-
Mov Cap-2 Maneuver	862	-	-	-	-	-
Stage 1	971	-	-	-	-	-
Stage 2	945	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.5	1		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1568	-	1024	-	-	
HCM Lane V/C Ratio	0.006	-	0.009	-	-	
HCM Control Delay (s)	7.3	0	8.5	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

HCM 6th TWSC
6: NW Northwest Way & NW Maple Ave

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	97	118	156	103	16
Future Vol, veh/h	17	97	118	156	103	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	0	0
Mvmt Flow	19	108	131	173	114	18
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	558	123	132	0	-	0
Stage 1	123	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Critical Hdwy	6.4	6.21	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	2.2	-	-	-
Pot Cap-1 Maneuver	494	931	1466	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	931	1466	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.3	3.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1466	-	801	-	-	
HCM Lane V/C Ratio	0.089	-	0.158	-	-	
HCM Control Delay (s)	7.7	0	10.3	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.3	-	0.6	-	-	

HCM 6th TWSC
7: NW 22nd St & NW Maple Ave

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	176	1	4	251	24	0	0	3	16	0	4
Future Vol, veh/h	13	176	1	4	251	24	0	0	3	16	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	6	0	0	1	4	0	0	0	0	0	0
Mvmt Flow	14	189	1	4	270	26	0	0	3	17	0	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	190	0	0	511	522	191	511	509	283
Stage 1	-	-	-	-	-	-	218	218	-	291	291	-
Stage 2	-	-	-	-	-	-	293	304	-	220	218	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1277	-	-	1396	-	-	476	462	856	476	470	761
Stage 1	-	-	-	-	-	-	789	726	-	721	675	-
Stage 2	-	-	-	-	-	-	719	667	-	787	726	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1277	-	-	1396	-	-	468	455	855	468	463	761
Mov Cap-2 Maneuver	-	-	-	-	-	-	468	455	-	468	463	-
Stage 1	-	-	-	-	-	-	780	717	-	712	673	-
Stage 2	-	-	-	-	-	-	713	665	-	774	717	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			0.1			9.2			12.4		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	855	1277	-	-	1396	-	-	507				
HCM Lane V/C Ratio	0.004	0.011	-	-	0.003	-	-	0.042				
HCM Control Delay (s)	9.2	7.8	0	-	7.6	0	-	12.4				
HCM Lane LOS	A	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1				

HCM 6th AWSC
8: NW 19th St & NW Maple Ave

Intersection												
Intersection Delay, s/veh	18.1											
Intersection LOS	C											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	139	74	329	187	77	98	52	265	56	36	5
Future Vol, veh/h	3	139	74	329	187	77	98	52	265	56	36	5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	0	1	4	1	0	0	0	0	0	0	0	0
Mvmt Flow	3	148	79	350	199	82	104	55	282	60	38	5
Number of Lanes	1	1	0	1	1	0	0	1	1	0	1	0
Approach	EB		WB				NB		SB			
Opposing Approach	WB		EB				SB		NB			
Opposing Lanes	2		2				1		2			
Conflicting Approach Left	SB		NB				EB		WB			
Conflicting Lanes Left	1		2				2		2			
Conflicting Approach Right	NB		SB				WB		EB			
Conflicting Lanes Right	2		1				2		2			
HCM Control Delay	15.8		21.6				15.4		13.5			
HCM LOS	C		C				C		B			
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1					
Vol Left, %	65%	0%	100%	0%	100%	0%	58%					
Vol Thru, %	35%	0%	0%	65%	0%	71%	37%					
Vol Right, %	0%	100%	0%	35%	0%	29%	5%					
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop					
Traffic Vol by Lane	150	265	3	213	329	264	97					
LT Vol	98	0	3	0	329	0	56					
Through Vol	52	0	0	139	0	187	36					
RT Vol	0	265	0	74	0	77	5					
Lane Flow Rate	160	282	3	227	350	281	103					
Geometry Grp	7	7	7	7	7	7	6					
Degree of Util (X)	0.337	0.514	0.007	0.454	0.711	0.513	0.231					
Departure Headway (Hd)	7.613	6.565	7.963	7.216	7.315	6.578	8.061					
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Cap	472	550	450	499	494	548	446					
Service Time	5.348	4.299	5.706	4.958	5.051	4.314	6.11					
HCM Lane V/C Ratio	0.339	0.513	0.007	0.455	0.709	0.513	0.231					
HCM Control Delay	14.2	16.1	10.8	15.9	26.1	16.1	13.5					
HCM Lane LOS	B	C	B	C	D	C	B					
HCM 95th-tile Q	1.5	2.9	0	2.3	5.6	2.9	0.9					

HCM 6th AWSC
9: NW 9th St & NW Maple Ave

Intersection

Intersection Delay, s/veh 47.2

Intersection LOS E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	421	21	12	537	33	41	40	14	37	18	102
Future Vol, veh/h	93	421	21	12	537	33	41	40	14	37	18	102
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	1	0	5	0	1	0	0	0	0	0	0	1
Mvmt Flow	99	448	22	13	571	35	44	43	15	39	19	109
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach Left SB		NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right NB		SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	28.6	78.9	12.9	13.6
HCM LOS	D	F	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	43%	100%	0%	100%	0%	24%
Vol Thru, %	42%	0%	95%	0%	94%	11%
Vol Right, %	15%	0%	5%	0%	6%	65%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	93	442	12	570	157
LT Vol	41	93	0	12	0	37
Through Vol	40	0	421	0	537	18
RT Vol	14	0	21	0	33	102
Lane Flow Rate	101	99	470	13	606	167
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.211	0.188	0.82	0.024	1.063	0.321
Departure Headway (Hd)	7.83	7.05	6.488	6.846	6.313	7.196
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	461	512	564	520	570	503
Service Time	5.83	4.75	4.188	4.63	4.096	5.196
HCM Lane V/C Ratio	0.219	0.193	0.833	0.025	1.063	0.332
HCM Control Delay	12.9	11.4	32.2	9.8	80.4	13.6
HCM Lane LOS	B	B	D	A	F	B
HCM 95th-tile Q	0.8	0.7	8.2	0.1	17.4	1.4

Queues

10: NW 6th St & NW Quince Ave

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	83	159	79	148	174	472	89	79	549
v/c Ratio	0.39	0.39	0.36	0.39	0.28	0.23	0.09	0.14	0.32
Control Delay	23.9	8.3	23.1	10.4	5.9	9.4	1.5	5.7	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	8.3	23.1	10.4	5.9	9.4	1.5	5.7	10.1
Queue Length 50th (ft)	22	5	21	10	17	46	0	7	47
Queue Length 95th (ft)	54	42	52	47	45	86	13	23	91
Internal Link Dist (ft)		513		592		1751			1332
Turn Bay Length (ft)	100		290		150		350	375	
Base Capacity (vph)	446	690	454	672	634	2054	975	569	1714
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.23	0.17	0.22	0.27	0.23	0.09	0.14	0.32
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	17	133	74	37	102	164	444	84	74	364	152
Future Volume (vph)	78	17	133	74	37	102	164	444	84	74	364	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.87		1.00	0.89		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	1647		1805	1654		1805	3610	1615	1752	3396	
Flt Permitted	0.66	1.00		0.66	1.00		0.40	1.00	1.00	0.48	1.00	
Satd. Flow (perm)	1223	1647		1247	1654		757	3610	1615	888	3396	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	83	18	141	79	39	109	174	472	89	79	387	162
RTOR Reduction (vph)	0	121	0	0	94	0	0	0	44	0	61	0
Lane Group Flow (vph)	83	38	0	79	54	0	174	472	45	79	488	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	0%	0%	3%	1%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	7.4	7.4		7.4	7.4		32.7	26.9	26.9	26.9	24.0	
Effective Green, g (s)	7.4	7.4		7.4	7.4		32.7	26.9	26.9	26.9	24.0	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.62	0.51	0.51	0.51	0.45	
Clearance Time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	170	229		173	230		580	1828	818	497	1534	
v/s Ratio Prot		0.02			0.03		c0.03	0.13		0.01	0.14	
v/s Ratio Perm	c0.07			0.06			c0.15		0.03	0.07		
v/c Ratio	0.49	0.16		0.46	0.24		0.30	0.26	0.06	0.16	0.32	
Uniform Delay, d1	21.1	20.1		21.0	20.3		4.4	7.4	6.6	6.8	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.3		1.9	0.5		0.3	0.3	0.1	0.2	0.5	
Delay (s)	23.3	20.5		22.9	20.9		4.7	7.8	6.8	6.9	9.9	
Level of Service	C	C		C	C		A	A	A	A	A	
Approach Delay (s)		21.4			21.6			6.9			9.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.5			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			53.1			Sum of lost time (s)			15.9			
Intersection Capacity Utilization			54.3%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	17	133	74	37	102	164	444	84	74	364	152
Future Volume (veh/h)	78	17	133	74	37	102	164	444	84	74	364	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1900	1900	1900	1856	1900	1900	1900	1856	1885	1856
Adj Flow Rate, veh/h	83	18	141	79	39	109	174	472	89	79	387	162
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	3	0	0	0	3	1	3
Cap, veh/h	301	36	283	291	86	241	576	1517	677	566	978	404
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.09	0.42	0.42	0.07	0.40	0.40
Sat Flow, veh/h	1335	185	1453	1354	442	1236	1810	3610	1610	1767	2472	1021
Grp Volume(v), veh/h	83	0	159	79	0	148	174	472	89	79	279	270
Grp Sat Flow(s),veh/h/ln	1335	0	1638	1354	0	1678	1810	1805	1610	1767	1791	1701
Q Serve(g_s), s	2.9	0.0	4.3	2.8	0.0	3.9	2.7	4.4	1.7	1.3	5.6	5.7
Cycle Q Clear(g_c), s	6.8	0.0	4.3	7.1	0.0	3.9	2.7	4.4	1.7	1.3	5.6	5.7
Prop In Lane	1.00		0.89	1.00		0.74	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	301	0	320	291	0	327	576	1517	677	566	709	673
V/C Ratio(X)	0.28	0.00	0.50	0.27	0.00	0.45	0.30	0.31	0.13	0.14	0.39	0.40
Avail Cap(c_a), veh/h	521	0	590	514	0	604	682	1517	677	629	709	673
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	0.0	17.9	21.1	0.0	17.8	7.7	9.7	8.9	7.7	10.8	10.8
Incr Delay (d2), s/veh	0.5	0.0	1.2	0.5	0.0	1.0	0.3	0.5	0.4	0.1	1.6	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	1.6	0.8	0.0	1.4	0.9	1.5	0.6	0.4	2.1	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	0.0	19.1	21.6	0.0	18.7	8.0	10.2	9.3	7.8	12.4	12.6
LnGrp LOS	C	A	B	C	A	B	A	B	A	A	B	B
Approach Vol, veh/h	242			227			735			628		
Approach Delay, s/veh	19.9			19.7			9.6			11.9		
Approach LOS	B			B			A			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	26.7		14.2	10.3	25.5		14.2				
Change Period (Y+Rc), s	5.7	5.7		4.5	5.7	5.7		4.5				
Max Green Setting (Gmax), s	5.1	21.0		18.0	7.5	18.6		18.0				
Max Q Clear Time (g_c+I1), s	3.3	6.4		8.8	4.7	7.7		9.1				
Green Ext Time (p_c), s	0.0	3.0		0.8	0.1	2.6		0.7				
Intersection Summary												
HCM 6th Ctrl Delay	13.0											
HCM 6th LOS	B											

Queues

11: NW 6th St & NW Maple Ave

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	165	170	204	214	263	213	724	48	607
v/c Ratio	0.49	0.42	0.35	0.60	0.63	0.57	0.50	0.14	0.51
Control Delay	18.7	23.3	4.1	22.0	26.0	19.4	14.7	11.0	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	23.3	4.1	22.0	26.0	19.4	14.7	11.0	15.4
Queue Length 50th (ft)	40	53	1	53	78	43	93	9	72
Queue Length 95th (ft)	75	101	34	96	143	#112	163	27	130
Internal Link Dist (ft)		909			1241		1329		1751
Turn Bay Length (ft)	200		200	105		105		105	
Base Capacity (vph)	335	592	591	358	589	374	1454	339	1189
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.29	0.35	0.60	0.45	0.57	0.50	0.14	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	156	188	197	183	59	196	449	217	44	374	184
Future Volume (vph)	152	156	188	197	183	59	196	449	217	44	374	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1597	1784	1808		1787	3400		1717	3420	
Flt Permitted	0.51	1.00	1.00	0.51	1.00		0.30	1.00		0.33	1.00	
Satd. Flow (perm)	961	1881	1597	951	1808		559	3400		590	3420	
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)	165	170	204	214	199	64	213	488	236	48	407	200
RTOR Reduction (vph)	0	0	145	0	20	0	0	78	0	0	86	0
Lane Group Flow (vph)	165	170	59	214	243	0	213	646	0	48	521	0
Confl. Peds. (#/hr)			5	5					6	6		
Heavy Vehicles (%)	0%	1%	0%	1%	1%	2%	1%	0%	0%	5%	0%	1%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	14.6	10.8	16.4	18.8	12.9		29.2	23.6		23.6	20.8	
Effective Green, g (s)	14.6	10.8	16.4	18.8	12.9		29.2	23.6		23.6	20.8	
Actuated g/C Ratio	0.24	0.18	0.27	0.31	0.21		0.48	0.39		0.39	0.34	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	332	546	373	381		379	1313		279	1164	
v/s Ratio Prot	0.04	0.09	0.01	c0.06	c0.13		c0.05	0.19		0.01	0.15	
v/s Ratio Perm	0.10		0.03	0.12			c0.22			0.06		
v/c Ratio	0.59	0.51	0.11	0.57	0.64		0.56	0.49		0.17	0.45	
Uniform Delay, d1	19.8	22.8	16.8	16.7	22.0		10.0	14.2		11.9	15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	1.3	0.1	2.1	3.5		1.9	1.3		0.3	1.2	
Delay (s)	22.9	24.1	16.9	18.9	25.5		11.9	15.5		12.2	16.9	
Level of Service	C	C	B	B	C		B	B		B	B	
Approach Delay (s)		21.0			22.5			14.7			16.6	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			61.1			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			63.7%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	152	156	188	197	183	59	196	449	217	44	374	184
Future Volume (veh/h)	152	156	188	197	183	59	196	449	217	44	374	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1900	1885	1885	1870	1885	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	165	170	204	214	199	64	213	488	236	48	407	200
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
Percent Heavy Veh, %	0	1	0	1	1	2	1	0	0	5	0	1
Cap, veh/h	351	368	463	407	268	86	443	856	411	355	740	359
Arrive On Green	0.09	0.19	0.19	0.09	0.20	0.20	0.09	0.36	0.36	0.05	0.32	0.32
Sat Flow, veh/h	1810	1885	1598	1795	1364	439	1795	2357	1133	1739	2348	1139
Grp Volume(v), veh/h	165	170	204	214	0	263	213	373	351	48	312	295
Grp Sat Flow(s),veh/h/ln	1810	1885	1598	1795	0	1802	1795	1805	1685	1739	1805	1682
Q Serve(g_s), s	4.2	4.7	6.1	5.1	0.0	8.0	4.6	9.7	9.8	1.1	8.3	8.5
Cycle Q Clear(g_c), s	4.2	4.7	6.1	5.1	0.0	8.0	4.6	9.7	9.8	1.1	8.3	8.5
Prop In Lane	1.00		1.00	1.00		0.24	1.00		0.67	1.00		0.68
Lane Grp Cap(c), veh/h	351	368	463	407	0	355	443	655	612	355	569	530
V/C Ratio(X)	0.47	0.46	0.44	0.53	0.00	0.74	0.48	0.57	0.57	0.14	0.55	0.56
Avail Cap(c_a), veh/h	351	581	644	407	0	559	443	655	612	423	569	530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	20.8	16.9	17.7	0.0	22.1	12.2	14.9	15.0	12.7	16.5	16.6
Incr Delay (d2), s/veh	1.0	0.9	0.7	1.3	0.0	3.1	0.8	3.6	3.9	0.2	3.8	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	2.0	2.1	2.3	0.0	3.4	1.7	4.1	4.0	0.4	3.7	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	21.7	17.6	19.0	0.0	25.1	13.0	18.5	18.8	12.9	20.3	20.8
LnGrp LOS	B	C	B	B	A	C	B	B	B	B	C	C
Approach Vol, veh/h		539			477			937			655	
Approach Delay, s/veh		19.1			22.4			17.4			20.0	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	25.7	9.6	15.9	10.0	22.9	9.5	16.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	18.9	5.1	18.0	5.5	18.4	5.0	18.1				
Max Q Clear Time (g_c+l1), s	3.1	11.8	7.1	8.1	6.6	10.5	6.2	10.0				
Green Ext Time (p_c), s	0.0	2.7	0.0	1.2	0.0	2.4	0.0	0.9				
Intersection Summary												
HCM 6th Ctrl Delay			19.3									
HCM 6th LOS			B									

HCM 6th TWSC
12: NW 6th St & NW Kingwood Ave

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↵	↕↕		↵	↕↕	
Traffic Vol, veh/h	5	0	9	19	0	12	11	899	14	6	682	14
Future Vol, veh/h	5	0	9	19	0	12	11	899	14	6	682	14
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	7
Mvmt Flow	5	0	10	20	0	13	12	967	15	6	733	15
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1265	1764	378	1379	1764	492	752	0	0	983	0	0
Stage 1	757	757	-	1000	1000	-	-	-	-	-	-	-
Stage 2	508	1007	-	379	764	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	128	85	625	106	85	528	867	-	-	711	-	-
Stage 1	370	419	-	264	324	-	-	-	-	-	-	-
Stage 2	521	321	-	620	416	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	122	83	623	103	83	527	864	-	-	710	-	-
Mov Cap-2 Maneuver	122	83	-	103	83	-	-	-	-	-	-	-
Stage 1	363	414	-	260	319	-	-	-	-	-	-	-
Stage 2	501	316	-	605	411	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	20.1		35.7		0.1		0.1					
HCM LOS	C		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	864	-	-	253	150	710	-	-				
HCM Lane V/C Ratio	0.014	-	-	0.06	0.222	0.009	-	-				
HCM Control Delay (s)	9.2	-	-	20.1	35.7	10.1	-	-				
HCM Lane LOS	A	-	-	C	E	B	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.8	0	-	-				

HCM 6th TWSC
13: NW 27th St & NW Hemlock Ave

Intersection

Int Delay, s/veh 6.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	26	7	76	21	12	82
Future Vol, veh/h	26	7	76	21	12	82
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	31	8	92	25	14	99

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	39
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.1
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.2
Pot Cap-1 Maneuver	-	-	1584
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1584
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.8	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	703	1044	-	-	1584	-
HCM Lane V/C Ratio	0.021	0.095	-	-	0.058	-
HCM Control Delay (s)	10.2	8.8	-	-	7.4	0
HCM Lane LOS	B	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.3	-	-	0.2	-

HCM 6th AWSC
14: SW 27th St & W Antler Ave

Intersection

Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	66	46	99	104	39	57	151	81	12	105	5
Future Vol, veh/h	17	66	46	99	104	39	57	151	81	12	105	5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	18	71	49	106	112	42	61	162	87	13	113	5
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10	10.5	11.5	10.2
HCM LOS	A	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	65%	0%	59%	0%	73%	0%	95%
Vol Right, %	0%	35%	0%	41%	0%	27%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	232	17	112	99	143	12	110
LT Vol	57	0	17	0	99	0	12	0
Through Vol	0	151	0	66	0	104	0	105
RT Vol	0	81	0	46	0	39	0	5
Lane Flow Rate	61	249	18	120	106	154	13	118
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.108	0.388	0.034	0.196	0.191	0.247	0.024	0.199
Departure Headway (Hd)	6.357	5.605	6.772	5.87	6.474	5.775	6.61	6.071
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	564	644	529	612	555	623	542	591
Service Time	4.087	3.335	4.509	3.607	4.205	3.506	4.347	3.808
HCM Lane V/C Ratio	0.108	0.387	0.034	0.196	0.191	0.247	0.024	0.2
HCM Control Delay	9.9	11.9	9.7	10	10.7	10.4	9.5	10.3
HCM Lane LOS	A	B	A	A	B	B	A	B
HCM 95th-tile Q	0.4	1.8	0.1	0.7	0.7	1	0.1	0.7

Queues

15: SW 27th St & SW Highland Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	66	751	141	830	64	321	128	177	47
v/c Ratio	0.41	0.94	0.71	0.99	0.21	0.86	0.71	0.42	0.11
Control Delay	16.8	44.8	32.0	54.4	26.8	59.1	50.7	37.6	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	44.8	32.0	54.4	26.8	59.1	50.7	37.6	0.5
Queue Length 50th (ft)	17	421	37	~512	29	187	60	100	0
Queue Length 95th (ft)	34	#674	#91	#787	61	#346	#121	167	0
Internal Link Dist (ft)		2552		1143		760		2545	
Turn Bay Length (ft)	210		260		110		140		140
Base Capacity (vph)	161	828	199	840	307	372	181	417	434
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.91	0.71	0.99	0.21	0.86	0.71	0.42	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	669	45	134	661	127	61	204	101	122	168	45
Future Volume (vph)	63	669	45	134	661	127	61	204	101	122	168	45
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1684		1646	1671		1630	1644		1662	1733	1413
Flt Permitted	0.09	1.00		0.13	1.00		0.59	1.00		0.22	1.00	1.00
Satd. Flow (perm)	152	1684		217	1671		1007	1644		377	1733	1413
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	704	47	141	696	134	64	215	106	128	177	47
RTOR Reduction (vph)	0	3	0	0	7	0	0	17	0	0	0	37
Lane Group Flow (vph)	66	748	0	141	823	0	64	304	0	128	177	10
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	3%	2%	1%	2%	1%	2%	0%	1%	0%	1%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	52.6	48.4		55.6	49.9		24.9	20.7		28.1	22.3	22.3
Effective Green, g (s)	52.6	48.4		55.6	49.9		24.9	20.7		28.1	22.3	22.3
Actuated g/C Ratio	0.53	0.48		0.56	0.50		0.25	0.21		0.28	0.22	0.22
Clearance Time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	142	815		202	833		276	340		180	386	315
v/s Ratio Prot	0.02	0.44		c0.04	c0.49		0.01	c0.18		c0.04	0.10	
v/s Ratio Perm	0.22			0.35			0.05			0.16		0.01
v/c Ratio	0.46	0.92		0.70	0.99		0.23	0.89		0.71	0.46	0.03
Uniform Delay, d1	19.1	24.0		17.9	24.8		29.4	38.6		29.5	33.6	30.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	15.1		10.0	27.9		0.4	27.9		12.4	3.9	0.2
Delay (s)	21.5	39.0		27.9	52.7		29.8	66.5		41.9	37.5	30.6
Level of Service	C	D		C	D		C	E		D	D	C
Approach Delay (s)		37.6			49.1			60.4			38.2	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			45.6			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			19.4			
Intersection Capacity Utilization			92.2%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	669	45	134	661	127	61	204	101	122	168	45
Future Volume (veh/h)	63	669	45	134	661	127	61	204	101	122	168	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1736	1709	1723	1736	1723	1736	1723	1750	1736	1750	1736	1709
Adj Flow Rate, veh/h	66	704	47	141	696	134	64	215	106	128	177	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	3	2	1	2	1	2	0	1	0	1	3
Cap, veh/h	141	759	51	204	688	132	308	244	120	196	404	328
Arrive On Green	0.04	0.48	0.48	0.05	0.49	0.49	0.04	0.22	0.22	0.05	0.23	0.23
Sat Flow, veh/h	1654	1584	106	1654	1404	270	1641	1105	545	1667	1736	1411
Grp Volume(v), veh/h	66	0	751	141	0	830	64	0	321	128	177	47
Grp Sat Flow(s),veh/h/ln	1654	0	1690	1654	0	1674	1641	0	1649	1667	1736	1411
Q Serve(g_s), s	2.0	0.0	41.7	4.4	0.0	49.0	3.0	0.0	18.8	5.3	8.7	2.6
Cycle Q Clear(g_c), s	2.0	0.0	41.7	4.4	0.0	49.0	3.0	0.0	18.8	5.3	8.7	2.6
Prop In Lane	1.00		0.06	1.00		0.16	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	141	0	809	204	0	820	308	0	364	196	404	328
V/C Ratio(X)	0.47	0.00	0.93	0.69	0.00	1.01	0.21	0.00	0.88	0.65	0.44	0.14
Avail Cap(c_a), veh/h	160	0	828	204	0	820	327	0	364	196	404	328
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	24.4	22.5	0.0	25.5	28.6	0.0	37.7	32.5	32.8	30.5
Incr Delay (d2), s/veh	2.4	0.0	16.3	9.5	0.0	34.4	0.3	0.0	24.9	7.6	3.4	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	19.3	2.1	0.0	26.0	1.2	0.0	10.0	2.8	4.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.8	0.0	40.7	31.9	0.0	59.9	28.9	0.0	62.6	40.1	36.2	31.4
LnGrp LOS	C	A	D	C	A	F	C	A	E	D	D	C
Approach Vol, veh/h	817			971			385			352		
Approach Delay, s/veh	39.5			55.9			57.0			37.0		
Approach LOS	D			E			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	27.1	10.0	52.9	8.9	28.2	8.9	54.0				
Change Period (Y+Rc), s	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0				
Max Green Setting (Gmax), s	* 5.3	21.0	* 5.3	49.0	* 5.3	21.0	* 5.3	49.0				
Max Q Clear Time (g_c+I1), s	7.3	20.8	6.4	43.7	5.0	10.7	4.0	51.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.4	0.0	0.8	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	48.1											
HCM 6th LOS	D											
Notes												

Queues

16: W Rimrock Way & W Antler Ave

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	70	185	63	218	189	87	446	85	435
v/c Ratio	0.19	0.42	0.17	0.50	0.27	0.21	0.66	0.20	0.61
Control Delay	14.8	19.6	14.7	25.1	3.3	9.9	24.2	9.5	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	19.6	14.7	25.1	3.3	9.9	24.2	9.5	20.0
Queue Length 50th (ft)	17	46	15	73	0	15	137	15	126
Queue Length 95th (ft)	41	101	38	137	31	40	#311	40	242
Internal Link Dist (ft)		1246		2345			1244		2564
Turn Bay Length (ft)	115		115		210	165		250	
Base Capacity (vph)	372	706	369	736	791	423	798	519	936
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.26	0.17	0.30	0.24	0.21	0.56	0.16	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	108	64	59	203	176	81	364	51	79	341	63
Future Volume (vph)	65	108	64	59	203	176	81	364	51	79	341	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1798	1765		1685	1900	1581	1804	1860		1787	1833	
Flt Permitted	0.53	1.00		0.59	1.00	1.00	0.35	1.00		0.27	1.00	
Satd. Flow (perm)	1000	1765		1039	1900	1581	668	1860		515	1833	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	70	116	69	63	218	189	87	391	55	85	367	68
RTOR Reduction (vph)	0	33	0	0	0	128	0	7	0	0	9	0
Lane Group Flow (vph)	70	152	0	63	218	61	87	439	0	85	426	0
Confl. Peds. (#/hr)	7		2	2		7	2		1	1		2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	2%	7%	0%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	15.0	12.3		15.2	12.4	17.8	23.2	19.1		25.8	20.4	
Effective Green, g (s)	15.0	12.3		15.2	12.4	17.8	23.2	19.1		25.8	20.4	
Actuated g/C Ratio	0.27	0.22		0.27	0.22	0.32	0.42	0.34		0.46	0.37	
Clearance Time (s)	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	
Lane Grp Cap (vph)	308	390		316	423	619	362	638		362	672	
v/s Ratio Prot	c0.01	0.09		0.01	c0.11	0.01	0.02	c0.24		c0.02	0.23	
v/s Ratio Perm	0.05			0.04		0.03	0.08			0.09		
v/c Ratio	0.23	0.39		0.20	0.52	0.10	0.24	0.69		0.23	0.63	
Uniform Delay, d1	15.5	18.5		15.3	19.0	13.3	10.3	15.7		9.2	14.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		0.3	1.1	0.1	0.3	3.1		0.3	2.0	
Delay (s)	15.8	19.1		15.6	20.0	13.3	10.6	18.8		9.6	16.5	
Level of Service	B	B		B	C	B	B	B		A	B	
Approach Delay (s)		18.2			16.7			17.5			15.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.8									
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			55.6									
Intersection Capacity Utilization			55.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	108	64	59	203	176	81	364	51	79	341	63
Future Volume (veh/h)	65	108	64	59	203	176	81	364	51	79	341	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1870	1796	1900	1900	1900	1900	1900	1885	1885	1900
Adj Flow Rate, veh/h	70	116	69	63	218	189	87	391	55	85	367	68
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	2	7	0	0	0	0	0	1	1	0
Cap, veh/h	378	226	134	398	379	432	391	508	71	386	478	89
Arrive On Green	0.06	0.20	0.20	0.06	0.20	0.20	0.07	0.31	0.31	0.07	0.31	0.31
Sat Flow, veh/h	1810	1108	659	1711	1900	1582	1810	1629	229	1795	1540	285
Grp Volume(v), veh/h	70	0	185	63	218	189	87	0	446	85	0	435
Grp Sat Flow(s),veh/h/ln	1810	0	1768	1711	1900	1582	1810	0	1858	1795	0	1825
Q Serve(g_s), s	1.3	0.0	4.2	1.3	4.7	4.5	1.4	0.0	9.9	1.4	0.0	9.8
Cycle Q Clear(g_c), s	1.3	0.0	4.2	1.3	4.7	4.5	1.4	0.0	9.9	1.4	0.0	9.8
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.12	1.00		0.16
Lane Grp Cap(c), veh/h	378	0	360	398	379	432	391	0	579	386	0	567
V/C Ratio(X)	0.19	0.00	0.51	0.16	0.58	0.44	0.22	0.00	0.77	0.22	0.00	0.77
Avail Cap(c_a), veh/h	480	0	720	506	778	764	481	0	830	635	0	976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.1	0.0	16.1	13.1	16.5	13.7	10.2	0.0	14.2	10.2	0.0	14.2
Incr Delay (d2), s/veh	0.2	0.0	1.1	0.2	1.4	0.7	0.3	0.0	2.8	0.3	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.6	0.4	1.9	1.4	0.5	0.0	3.9	0.5	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	0.0	17.2	13.3	17.8	14.4	10.5	0.0	17.0	10.5	0.0	16.4
LnGrp LOS	B	A	B	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h	255			470			533			520		
Approach Delay, s/veh	16.2			15.8			15.9			15.4		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	18.2	6.7	13.3	7.3	18.1	6.9	13.1				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.6	20.3	5.6	18.5	5.6	24.3	5.5	18.6				
Max Q Clear Time (g_c+I1), s	3.4	11.9	3.3	6.2	3.4	11.8	3.3	6.7				
Green Ext Time (p_c), s	0.1	1.8	0.0	0.8	0.0	2.2	0.0	1.5				
Intersection Summary												
HCM 6th Ctrl Delay	15.8											
HCM 6th LOS	B											

HCM 6th TWSC
17: SW Canyon Dr & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↗
Traffic Vol, veh/h	6	214	20	31	372	2	58	20	26	0	2	20
Future Vol, veh/h	6	214	20	31	372	2	58	20	26	0	2	20
Conflicting Peds, #/hr	4	0	1	1	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	7	238	22	34	413	2	64	22	29	0	2	22
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	419	0	0	261	0	0	759	751	250	-	761	419
Stage 1	-	-	-	-	-	-	264	264	-	-	486	-
Stage 2	-	-	-	-	-	-	495	487	-	-	275	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	4	3.3
Pot Cap-1 Maneuver	1151	-	-	1315	-	-	326	342	794	0	337	638
Stage 1	-	-	-	-	-	-	746	694	-	0	554	-
Stage 2	-	-	-	-	-	-	560	554	-	0	686	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1147	-	-	1314	-	-	303	326	793	-	321	635
Mov Cap-2 Maneuver	-	-	-	-	-	-	303	326	-	-	321	-
Stage 1	-	-	-	-	-	-	740	688	-	-	533	-
Stage 2	-	-	-	-	-	-	519	533	-	-	681	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.6			19.4			10.9		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	364	1147	-	-	1314	-	-	635				
HCM Lane V/C Ratio	0.317	0.006	-	-	0.026	-	-	0.035				
HCM Control Delay (s)	19.4	8.2	0	-	7.8	0	-	10.9				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1.3	0	-	-	0.1	-	-	0.1				

HCM 6th TWSC
18: SW 9th St & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	194	14	5	304	2	48	27	14	6	12	6
Future Vol, veh/h	1	194	14	5	304	2	48	27	14	6	12	6
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	223	16	6	349	2	55	31	16	7	14	7
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	355	0	0	239	0	0	606	600	232	624	607	354
Stage 1	-	-	-	-	-	-	233	233	-	366	366	-
Stage 2	-	-	-	-	-	-	373	367	-	258	241	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1215	-	-	1340	-	-	409	417	812	401	414	694
Stage 1	-	-	-	-	-	-	770	716	-	657	626	-
Stage 2	-	-	-	-	-	-	648	626	-	751	710	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1210	-	-	1340	-	-	392	412	811	367	409	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	392	412	-	367	409	-
Stage 1	-	-	-	-	-	-	769	715	-	654	620	-
Stage 2	-	-	-	-	-	-	623	620	-	703	709	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			15.8			13.7		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	434	1210	-	-	1340	-	-	441				
HCM Lane V/C Ratio	0.236	0.001	-	-	0.004	-	-	0.063				
HCM Control Delay (s)	15.8	8	0	-	7.7	0	-	13.7				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.9	0	-	-	0	-	-	0.2				

HCM 6th TWSC
19: NW 5th St & NW Dogwood Ave

Intersection

Int Delay, s/veh 1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	3	0	0	24	32	22	943	14	0	0	0
Future Vol, veh/h	15	3	0	0	24	32	22	943	14	0	0	0
Conflicting Peds, #/hr	2	0	1	1	0	2	9	0	0	0	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	3	0	0	0	0	0	0
Mvmt Flow	16	3	0	0	26	34	24	1014	15	0	0	0

Major/Minor	Minor2		Minor1		Major1				
Conflicting Flow All	579	1086	-	-	1079	517	9	0	0
Stage 1	9	9	-	-	1070	-	-	-	-
Stage 2	570	1077	-	-	9	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.5	6.96	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4	3.33	2.2	-	-
Pot Cap-1 Maneuver	403	218	0	0	220	501	1624	-	-
Stage 1	-	-	0	0	300	-	-	-	-
Stage 2	479	298	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	328	208	-	-	210	501	1610	-	-
Mov Cap-2 Maneuver	328	208	-	-	210	-	-	-	-
Stage 1	-	-	-	-	290	-	-	-	-
Stage 2	392	288	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	17.9	19.2	0.3
HCM LOS	C	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1
Capacity (veh/h)	1610	-	-	299 314
HCM Lane V/C Ratio	0.015	-	-	0.065 0.192
HCM Control Delay (s)	7.3	0.1	-	17.9 19.2
HCM Lane LOS	A	A	-	C C
HCM 95th %tile Q(veh)	0	-	-	0.2 0.7

HCM 6th TWSC
20: NW 5th St & W Antler Ave

Intersection

Int Delay, s/veh 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰↱				
Traffic Vol, veh/h	26	35	0	0	40	45	20	962	29	0	0	0
Future Vol, veh/h	26	35	0	0	40	45	20	962	29	0	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	28	38	0	0	43	49	22	1046	32	0	0	0

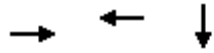
Major/Minor	Minor2		Minor1		Major1				
Conflicting Flow All	590	1122	-	-	1106	540	0	0	0
Stage 1	0	0	-	-	1106	-	-	-	-
Stage 2	590	1122	-	-	0	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.5	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	395	208	0	0	212	491	-	-	-
Stage 1	-	-	0	0	289	-	-	-	-
Stage 2	466	284	0	0	-	-	-	-	-
Platoon blocked, %							-	-	-
Mov Cap-1 Maneuver	299	208	-	-	212	491	-	-	-
Mov Cap-2 Maneuver	299	208	-	-	212	-	-	-	-
Stage 1	-	-	-	-	289	-	-	-	-
Stage 2	356	284	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	25.7	22	
HCM LOS	D	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1
Capacity (veh/h)	-	-	-	239 303
HCM Lane V/C Ratio	-	-	-	0.277 0.305
HCM Control Delay (s)	-	-	-	25.7 22
HCM Lane LOS	-	-	-	D C
HCM 95th %tile Q(veh)	-	-	-	1.1 1.3

Queues

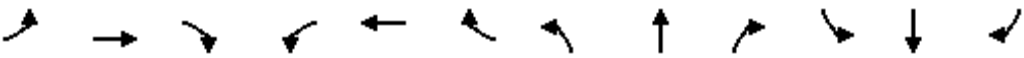
21: SW 6th St & SW Black Butte Blvd



Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	196	181	924
v/c Ratio	0.44	0.48	0.39
Control Delay	11.5	18.8	5.4
Queue Delay	0.0	0.0	0.0
Total Delay	11.5	18.8	5.4
Queue Length 50th (ft)	24	41	50
Queue Length 95th (ft)	58	75	103
Internal Link Dist (ft)	519	235	258
Turn Bay Length (ft)			
Base Capacity (vph)	775	716	2344
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	0.25	0.39
Intersection Summary			

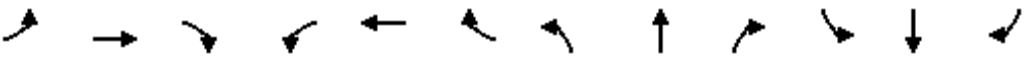
HCM Signalized Intersection Capacity Analysis

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↶			↷						↶↷	
Traffic Volume (vph)	0	94	92	28	144	0	0	0	0	25	740	113
Future Volume (vph)	0	94	92	28	144	0	0	0	0	25	740	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.93			1.00						0.98	
Flt Protected		1.00			0.99						1.00	
Satd. Flow (prot)		1762			1885						3495	
Flt Permitted		1.00			0.92						1.00	
Satd. Flow (perm)		1762			1743						3495	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	99	97	29	152	0	0	0	0	26	779	119
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	126	0	0	181	0	0	0	0	0	908	0
Confl. Peds. (#/hr)	3		1	1		3	2			5	5	2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		8.6			8.6						28.4	
Effective Green, g (s)		8.6			8.6						28.4	
Actuated g/C Ratio		0.19			0.19						0.63	
Clearance Time (s)		4.0			4.0						4.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		336			333						2205	
v/s Ratio Prot		0.07										
v/s Ratio Perm					0.10						0.26	
v/c Ratio		0.37			0.54						0.41	
Uniform Delay, d1		15.9			16.4						4.1	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.7			1.8						0.6	
Delay (s)		16.6			18.2						4.7	
Level of Service		B			B						A	
Approach Delay (s)		16.6			18.2			0.0			4.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.4		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			45.0		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			58.3%		ICU Level of Service					B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩			↩						↩↩	
Traffic Volume (veh/h)	0	94	92	28	144	0	0	0	0	25	740	113
Future Volume (veh/h)	0	94	92	28	144	0	0	0	0	25	740	113
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1885	1900
Adj Flow Rate, veh/h	0	99	97	29	152	0				26	779	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0				0	1	0
Cap, veh/h	0	161	158	115	254	0				63	1968	318
Arrive On Green	0.00	0.18	0.18	0.18	0.18	0.00				0.64	0.64	0.64
Sat Flow, veh/h	0	880	863	123	1388	0				99	3078	497
Grp Volume(v), veh/h	0	0	196	181	0	0				495	0	429
Grp Sat Flow(s),veh/h/ln	0	0	1743	1511	0	0				1880	0	1793
Q Serve(g_s), s	0.0	0.0	4.7	0.9	0.0	0.0				5.8	0.0	5.1
Cycle Q Clear(g_c), s	0.0	0.0	4.7	5.5	0.0	0.0				5.8	0.0	5.1
Prop In Lane	0.00		0.49	0.16		0.00				0.05		0.28
Lane Grp Cap(c), veh/h	0	0	318	369	0	0				1203	0	1147
V/C Ratio(X)	0.00	0.00	0.62	0.49	0.00	0.00				0.41	0.00	0.37
Avail Cap(c_a), veh/h	0	0	717	774	0	0				1203	0	1147
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.99	0.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	16.9	16.9	0.0	0.0				4.0	0.0	3.8
Incr Delay (d2), s/veh	0.0	0.0	1.9	1.0	0.0	0.0				1.0	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.8	1.6	0.0	0.0				1.4	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	18.9	17.9	0.0	0.0				5.0	0.0	4.8
LnGrp LOS	A	A	B	B	A	A				A	A	A
Approach Vol, veh/h		196			181						924	
Approach Delay, s/veh		18.9			17.9						4.9	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				12.2		32.8		12.2				
Change Period (Y+Rc), s				4.0		4.0		4.0				
Max Green Setting (Gmax), s				18.5		18.5		18.5				
Max Q Clear Time (g_c+I1), s				6.7		7.8		7.5				
Green Ext Time (p_c), s				0.8		4.4		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			8.8									
HCM 6th LOS			A									

Queues

22: SW 5th St & SW Black Butte Blvd

	→	←	↑
Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	104	49	1093
v/c Ratio	0.43	0.15	0.43
Control Delay	22.8	15.2	8.4
Queue Delay	0.0	0.0	0.0
Total Delay	22.8	15.2	8.4
Queue Length 50th (ft)	27	10	107
Queue Length 95th (ft)	58	29	195
Internal Link Dist (ft)	235	336	1062
Turn Bay Length (ft)			
Base Capacity (vph)	507	692	2560
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.21	0.07	0.43
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	13	0	1	40	7	141	911	9	0	0	0
Future Volume (vph)	88	13	0	1	40	7	141	911	9	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			1.00			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			1.00				
Flt Protected		0.96			1.00			0.99				
Satd. Flow (prot)		1820			1858			3581				
Flt Permitted		0.72			0.99			0.99				
Satd. Flow (perm)		1364			1848			3581				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	91	13	0	1	41	7	145	939	9	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	104	0	0	43	0	0	1092	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		7.9			7.9			34.1				
Effective Green, g (s)		7.9			7.9			34.1				
Actuated g/C Ratio		0.16			0.16			0.68				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		215			291			2442				
v/s Ratio Prot												
v/s Ratio Perm		0.08			0.02			0.31				
v/c Ratio		0.48			0.15			0.45				
Uniform Delay, d1		19.2			18.1			3.6				
Progression Factor		1.00			1.00			1.78				
Incremental Delay, d2		1.7			0.2			0.5				
Delay (s)		20.9			18.4			7.0				
Level of Service		C			B			A				
Approach Delay (s)		20.9			18.4			7.0			0.0	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.6			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		48.5%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 				
Traffic Volume (veh/h)	88	13	0	1	40	7	141	911	9	0	0	0
Future Volume (veh/h)	88	13	0	1	40	7	141	911	9	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	1900	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	91	13	0	1	41	7	145	939	9			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	269	19	0	75	149	25	356	2428	24			
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.25	0.25	0.25			
Sat Flow, veh/h	1410	201	0	18	1568	264	478	3260	33			
Grp Volume(v), veh/h	104	0	0	49	0	0	570	0	523			
Grp Sat Flow(s),veh/h/ln	1611	0	0	1851	0	0	1876	0	1894			
Q Serve(g_s), s	1.8	0.0	0.0	0.0	0.0	0.0	12.7	0.0	11.5			
Cycle Q Clear(g_c), s	3.0	0.0	0.0	1.2	0.0	0.0	12.7	0.0	11.5			
Prop In Lane	0.87		0.00	0.02		0.14	0.25		0.02			
Lane Grp Cap(c), veh/h	288	0	0	250	0	0	1397	0	1411			
V/C Ratio(X)	0.36	0.00	0.00	0.20	0.00	0.00	0.41	0.00	0.37			
Avail Cap(c_a), veh/h	714	0	0	759	0	0	1397	0	1411			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.90	0.00	0.00	1.00	0.00	0.00	0.87	0.00	0.87			
Uniform Delay (d), s/veh	21.8	0.0	0.0	21.0	0.0	0.0	9.6	0.0	9.1			
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.4	0.0	0.0	0.8	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	0.5	0.0	0.0	6.3	0.0	5.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	0.0	0.0	21.4	0.0	0.0	10.4	0.0	9.8			
LnGrp LOS	C	A	A	C	A	A	B	A	A			
Approach Vol, veh/h		104			49			1093				
Approach Delay, s/veh		22.5			21.4			10.1				
Approach LOS		C			C			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		41.2		8.8				8.8				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.4		18.6				18.6				
Max Q Clear Time (g_c+I1), s		14.7		5.0				3.2				
Green Ext Time (p_c), s		4.5		0.4				0.1				
Intersection Summary												
HCM 6th Ctrl Delay			11.6									
HCM 6th LOS			B									

Queues

23: SW 5th St & SW Evergreen Ave

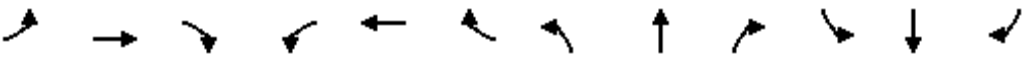
	→	←	↑
Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	182	437	933
v/c Ratio	0.46	0.75	0.48
Control Delay	17.0	20.3	9.1
Queue Delay	0.0	0.0	0.0
Total Delay	17.0	20.3	9.1
Queue Length 50th (ft)	42	87	80
Queue Length 95th (ft)	78	154	141
Internal Link Dist (ft)	219	269	451
Turn Bay Length (ft)			
Base Capacity (vph)	499	716	1930
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	0.61	0.48
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↰				
Traffic Volume (vph)	38	131	0	0	181	225	37	802	29	0	0	0
Future Volume (vph)	38	131	0	0	181	225	37	802	29	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.93			1.00				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1864			1744			3580				
Flt Permitted		0.70			1.00			1.00				
Satd. Flow (perm)		1315			1744			3580				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	141	0	0	195	242	40	862	31	0	0	0
RTOR Reduction (vph)	0	0	0	0	60	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	182	0	0	377	0	0	929	0	0	0	0
Confl. Peds. (#/hr)	2		1	1		2			8	8		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			8		5	2				
Permitted Phases	4											
Actuated Green, G (s)		15.1			15.1			26.9				
Effective Green, g (s)		15.1			15.1			26.9				
Actuated g/C Ratio		0.30			0.30			0.54				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		397			526			1926				
v/s Ratio Prot					c0.22			c0.26				
v/s Ratio Perm		0.14										
v/c Ratio		0.46			0.72			0.48				
Uniform Delay, d1		14.1			15.5			7.2				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.8			4.6			0.2				
Delay (s)		15.0			20.2			7.4				
Level of Service		B			C			A				
Approach Delay (s)		15.0			20.2			7.4			0.0	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		11.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		66.7%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (veh/h)	38	131	0	0	181	225	37	802	29	0	0	0
Future Volume (veh/h)	38	131	0	0	181	225	37	802	29	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1885	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	41	141	0	0	195	242	40	862	31			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	0	1	0	0	0	0	0	0	0			
Cap, veh/h	112	303	0	0	233	289	83	1872	71			
Arrive On Green	0.30	0.30	0.00	0.00	0.30	0.30	0.54	0.54	0.54			
Sat Flow, veh/h	78	1002	0	0	770	956	154	3482	131			
Grp Volume(v), veh/h	182	0	0	0	0	437	491	0	442			
Grp Sat Flow(s),veh/h/ln	1080	0	0	0	0	1726	1892	0	1875			
Q Serve(g_s), s	0.8	0.0	0.0	0.0	0.0	11.8	8.1	0.0	7.1			
Cycle Q Clear(g_c), s	12.6	0.0	0.0	0.0	0.0	11.8	8.1	0.0	7.1			
Prop In Lane	0.23		0.00	0.00		0.55	0.08		0.07			
Lane Grp Cap(c), veh/h	415	0	0	0	0	522	1017	0	1008			
V/C Ratio(X)	0.44	0.00	0.00	0.00	0.00	0.84	0.48	0.00	0.44			
Avail Cap(c_a), veh/h	539	0	0	0	0	656	1017	0	1008			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.83	0.00	0.83			
Uniform Delay (d), s/veh	13.9	0.0	0.0	0.0	0.0	16.3	7.2	0.0	7.0			
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	7.7	0.3	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.0	0.0	5.1	2.4	0.0	2.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.6	0.0	0.0	0.0	0.0	24.0	7.5	0.0	7.2			
LnGrp LOS	B	A	A	A	A	C	A	A	A			
Approach Vol, veh/h		182			437			933				
Approach Delay, s/veh		14.6			24.0			7.4				
Approach LOS		B			C			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		30.9		19.1				19.1				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.0		19.0				19.0				
Max Q Clear Time (g_c+I1), s		10.1		14.6				13.8				
Green Ext Time (p_c), s		4.9		0.4				1.3				
Intersection Summary												
HCM 6th Ctrl Delay				12.9								
HCM 6th LOS				B								

Date:	January 31, 2022
To:	Mike Caccavano, PE, City of Redmond
From:	Joe Bessman, PE
Project Reference No.:	1361
Project Name:	Northwest Area Plan Lands



The purpose of this memorandum is to address Transportation Planning Rule compliance for the proposed Hayden Homes development located within the Northwest Area Plan lands. The overall site consists of 76.82 acres of land west of NW Northwest Way that is bisected by Spruce Avenue (see Figure 1). The land is designated for 60.39 acres of *General Residential (R-4)* and 16.43 acres of *High Density Residential (R-5)* development. The proposal will slightly modify the location of the R-4 and R-5 lands but will maintain the same overall acreage of each. The land is located within the City's Urban Growth Boundary but outside City limits, and is currently finalizing an annexation agreement that will formally bring these lands into the City.



Figure 1. Site vicinity map. Source: Deschutes County DIAL.



Figure 2. Preliminary site plan. Source: KnowLedge Engineering

The proposed development plan for the property will slightly revise the location but maintained the acreage of the existing R-4 and R-5 zoning designations. The preliminary plans include a net density of 11.1 dwelling units per acre, with 498 total units. This is broken down to include the following:

- 277 single-family detached residential units
- 49 detached cottage units
- 66 attached cottage units
- 106 apartment units

The preliminary site layout is provided in Figure 2 illustrating the circulation and access plan for these lands. As shown, this plan includes placement of the higher-density lands along the NW Northwest Way corridor, with reducing density toward the west. Parks lands surround the adjacent taxlot on the north side of the site, and additional parks and green space is interspersed throughout the development.

PRELIMINARY TRIP GENERATION ESTIMATES

Preliminary trip generation estimates were prepared to assess the overall trip generation potential of the proposed project. These estimates remain preliminary subject to more detailed site layout review; the specific density may vary slightly throughout the development review process.

Trip generation estimates were based on national data within the Institute of Transportation Engineers' standard reference *Trip Generation, 11th Edition*. This reference provides cordon-area trip generation surveys of similar uses throughout the US. For the subject site located on the west edge of Redmond the *General Urban/Suburban* data has been applied.

Based on the different unit types, the following ITE land use classifications were applied to the housing products:

- Single-family detached units and Detached Cottage Units: (ITE Land Use 210) - A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.
- Attached Cottage Units: (ITE Land Use 215) - Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space. The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).
- Apartment units: (ITE Land Use 220) - Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.
 - A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.
 - A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.
 - A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Using these land use descriptions as summarized above, Table 1 provides the estimated trip generation for the proposed development. Note that ITE's average rate equations were applied to each of the housing types.

Table 1. Trip Generation Estimates (ITE 11th Edition, General Urban/Suburban Area Classification)

ITE Land Use	ITE Code	Size (Units)	Weekday Daily Trips	Weekday PM Peak Hour		
				Total	In	Out
Single Family Detached Housing <i>ITE Trip Rate</i>	210	326 Units	3,074 <i>(9.43/Unit)</i>	306 <i>(0.94/Unit)</i>	193 63%	113 37%
Single Family Attached Housing <i>ITE Trip Rate</i>	215	66 Units	475 <i>(7.20/Unit)</i>	38 <i>(0.57/Unit)</i>	21 57%	17 43%
Multifamily Housing (Low-Rise)	220	106 Units	714 <i>(6.74/Unit)</i>	54 <i>(0.51/Unit)</i>	34 63%	20 37%
Total		498 Units	3,655	398	248	150

Table 1 shows that the residential development will produce about 3,655 trips on a weekday daily basis, with nearly 400 trips during the weekday p.m. peak hour. This translates to about 5.2 weekday p.m. peak hour trips per gross acre.

CITY OF REDMOND TRANSPORTATION SYSTEM PLAN

In 2019 our overall team worked with the City of Redmond to ensure that the 2020 Transportation System Plan was being developed to account for the Northwest Area Plan lands. A travel demand model request was obtained from ODOT's Transportation and Planning Analysis Unit (TPAU) in 2019 to review the development assumptions for the overall lands. This entire site is contained within Transportation Analysis Zone 617 (see Figure 3).

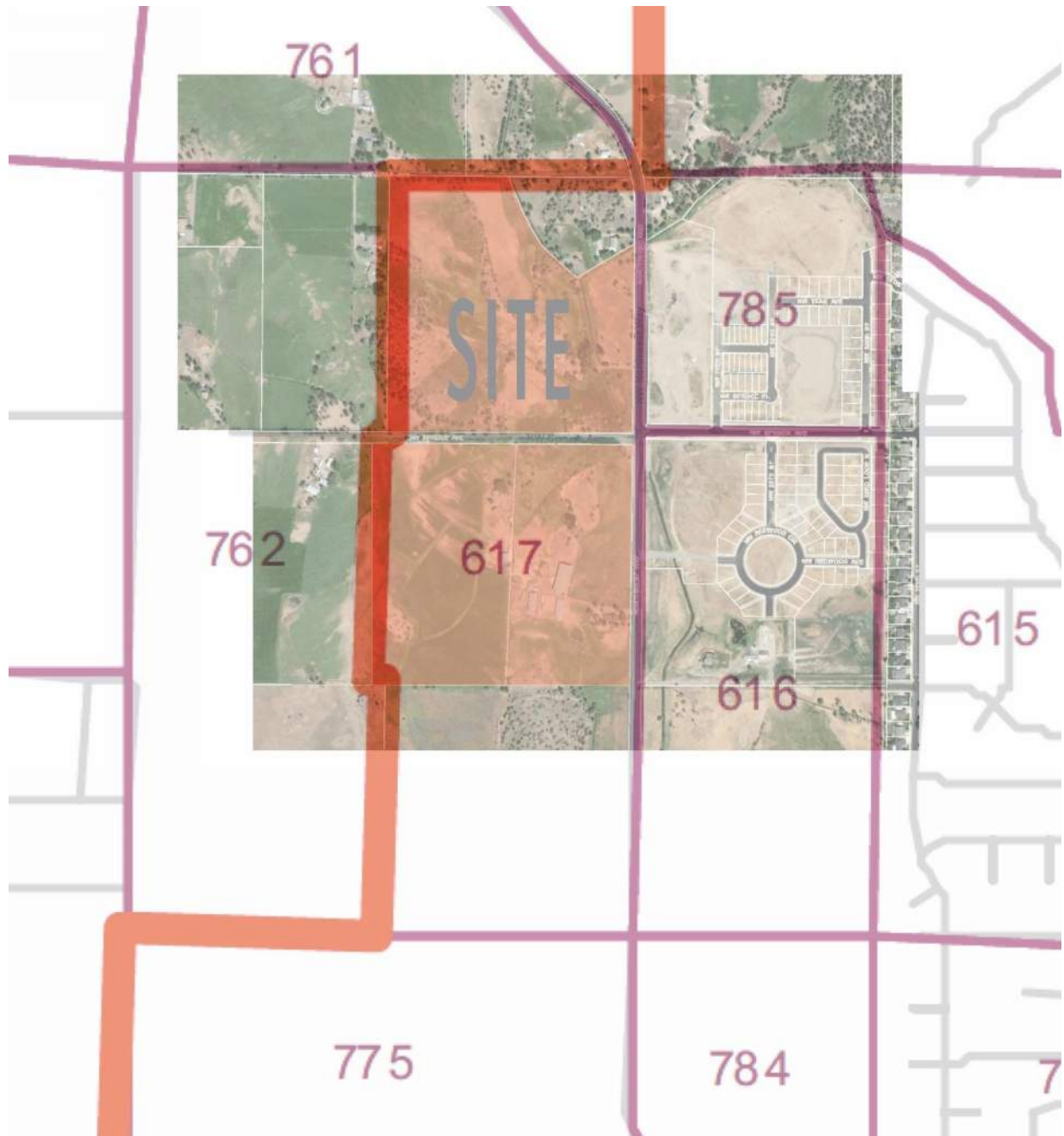


Figure 3. City of Redmond Transportation Analysis Zone overlaid on aerial.

Based on review of the population and employment within the travel demand modeling for this area, these lands were planned for the growth shown in Table 2. This indicates that there would be an increase of 319 housing units within this TAZ.

Table 2. Summary of Growth within TAZ 617

TAZ	Base Households (2010)	Future Households (2040)	Base Employees (2010)	Future Employees (2040)
617	4	323	0	0

The modeling further breaks down housing by type, showing that despite the lower number of total housing units that a quarter of the housing would be two person units, a quarter would be three-person units, and half would be occupied by four or more persons per unit. The modeling also identifies 372 persons within K-12 education within the area. As Figure 4 shows, this TAZ extends beyond the boundary of the specific site, with the subject property comprising about 64% of land area within TAZ 617. This indicates that despite being identified as the highest-growth area in Redmond within the City's long-range planning, the actual density of this area, projecting a similar density across the remaining lands within this TAZ, could result in about 140% more units than was assumed in the plan.

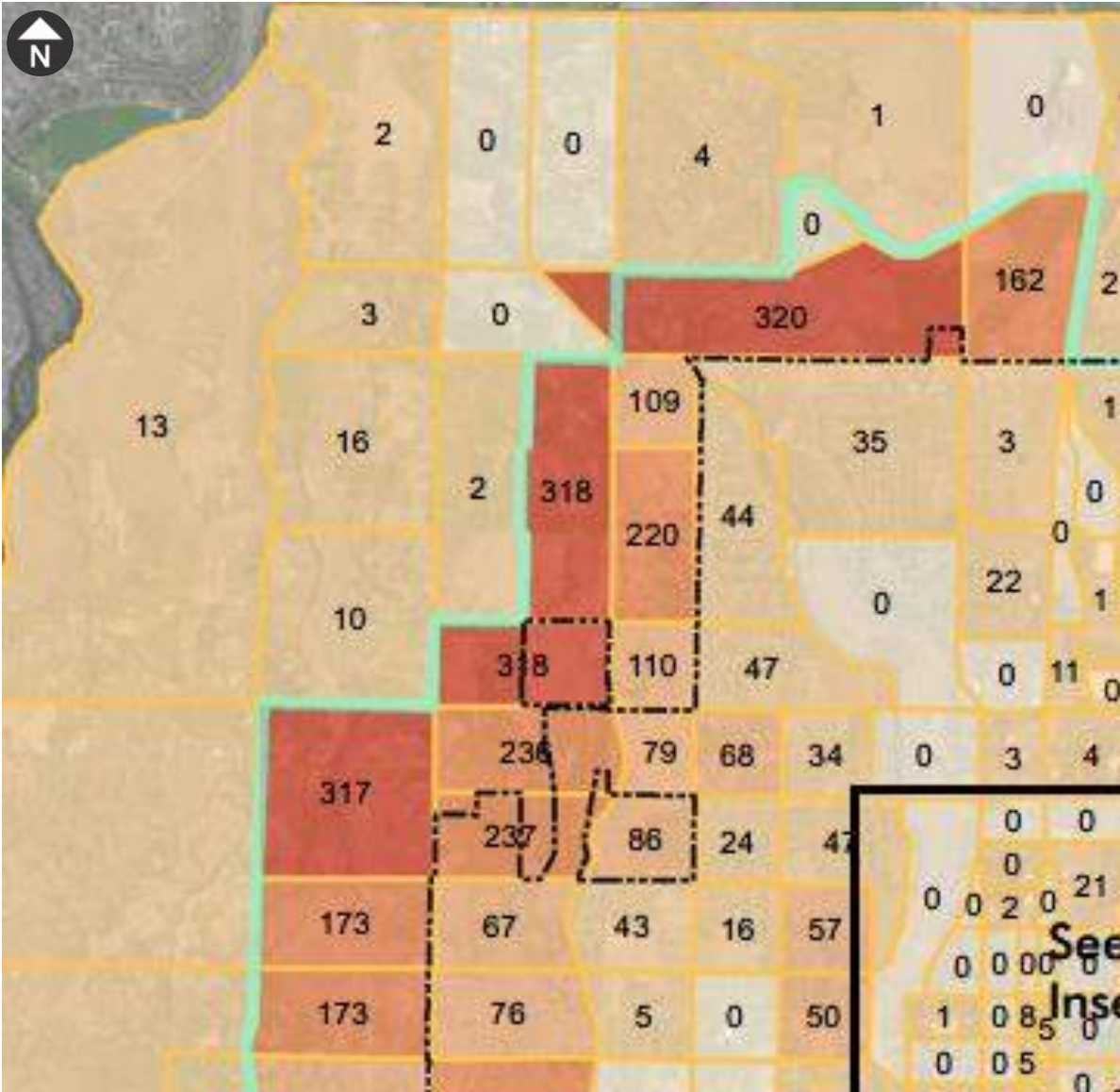


Figure 4. City of Redmond Transportation System Plan land use assumptions illustrating the forecast change in households (2010 to 2040). *Source: TSP Appendices.*

TRANSPORTATION PLANNING RULE COMPLIANCE

As the Northwest Area Plan lands were already accounted for in the land use assumptions of the City's adopted Transportation System Plan a rezone analysis will not be required. The subject NWAP lands have R4 and R5 Comprehensive Plan designations and general location and total acreages of the designated lands will not change. Furthermore, the TSP planned for development at the Comprehensive Plan designated densities. Given that the TSP anticipated development at Comprehensive Plan designated R-4 and R-5 densities, a TPR Analysis will result in no significant impact. Pending review by staff of these TPR compliance materials, we understand that a formal Transportation Impact Analysis will be required per City of Redmond Code requirements within RDC 8.2815. This report will be separately scoped with staff.

Thank you for the opportunity to provide these transportation materials, if you have any questions I can be reached at (503) 997-4473 or via email at joe@transightconsulting.com.

HCM 6th TWSC

1: NW Northwest Way & NW Upas Ave

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	1	0	193	136	2
Future Vol, veh/h	9	1	0	193	136	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	5	0
Mvmt Flow	10	1	0	224	158	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	383	159	160	0	-	0
Stage 1	159	-	-	-	-	-
Stage 2	224	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	624	892	1432	-	-	-
Stage 1	875	-	-	-	-	-
Stage 2	818	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	624	892	1432	-	-	-
Mov Cap-2 Maneuver	624	-	-	-	-	-
Stage 1	875	-	-	-	-	-
Stage 2	818	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.7	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1432	-	643	-	-	
HCM Lane V/C Ratio	-	-	0.018	-	-	
HCM Control Delay (s)	0	-	10.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th TWSC

2: NW Northwest Way & NW Spruce Ave

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	64	6	206	87	17	123
Future Vol, veh/h	64	6	206	87	17	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	35	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	1	7	0	5
Mvmt Flow	76	7	245	104	20	146
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	431	245	0	0	349	0
Stage 1	245	-	-	-	-	-
Stage 2	186	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	585	799	-	-	1221	-
Stage 1	800	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	574	799	-	-	1221	-
Mov Cap-2 Maneuver	574	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	836	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.1	0		1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 588		1221	-	
HCM Lane V/C Ratio	-	- 0.142		0.017	-	
HCM Control Delay (s)	-	- 12.1		8	0	
HCM Lane LOS	-	- B		A	A	
HCM 95th %tile Q(veh)	-	- 0.5		0.1	-	

HCM 6th TWSC

3: Northwest Way & NW Quince Ave

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	1	292	40	2	186
Future Vol, veh/h	20	1	292	40	2	186
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	24	1	348	48	2	221
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	597	372	0	0	396	0
Stage 1	372	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	469	678	-	-	1174	-
Stage 1	702	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	468	678	-	-	1174	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	475	1174	-	
HCM Lane V/C Ratio	-	-	0.053	0.002	-	
HCM Control Delay (s)	-	-	13	8.1	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM 6th TWSC
4: NW 22nd St & NW Quince Ave

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	6	0	4	3	3	2	0
Future Vol, veh/h	0	0	0	0	0	6	0	4	3	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	7	0	5	3	3	2	0
Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	18	16	2	15	15	7	2	0	0	8	0	0
Stage 1	8	8	-	7	7	-	-	-	-	-	-	-
Stage 2	10	8	-	8	8	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	1001	882	1088	1006	883	1081	1634	-	-	1625	-	-
Stage 1	1019	893	-	1020	894	-	-	-	-	-	-	-
Stage 2	1016	893	-	1019	893	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	993	880	1088	1004	881	1081	1634	-	-	1625	-	-
Mov Cap-2 Maneuver	993	880	-	1004	881	-	-	-	-	-	-	-
Stage 1	1019	891	-	1020	894	-	-	-	-	-	-	-
Stage 2	1010	893	-	1017	891	-	-	-	-	-	-	-
Approach	EB		WB		NB			SB				
HCM Control Delay, s	0		8.4		0			4.3				
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1634	-	-	-	1081	1625	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.006	0.002	-	-				
HCM Control Delay (s)	0	-	-	0	8.4	7.2	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-				

HCM 6th TWSC
5: NW 19th St & NW Quince Ave

Intersection

Int Delay, s/veh 0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	11	11	100	60	1
Future Vol, veh/h	0	11	11	100	60	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	13	13	116	70	1

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	213	71	71	0	-	0
Stage 1	71	-	-	-	-	-
Stage 2	142	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	780	997	1542	-	-	-
Stage 1	957	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	773	997	1542	-	-	-
Mov Cap-2 Maneuver	773	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1542	-	997	-	-
HCM Lane V/C Ratio	0.008	-	0.013	-	-
HCM Control Delay (s)	7.4	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

HCM 6th Roundabout
6: NW Northwest Way & NW Maple Ave

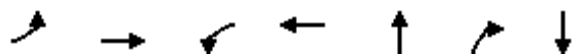
Intersection				
Intersection Delay, s/veh	7.5			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	147	470	151	236
Demand Flow Rate, veh/h	147	470	151	418
Vehicles Circulating, veh/h	470	111	493	221
Vehicles Exiting, veh/h	169	533	124	360
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.9	6.6	6.2	11.2
Approach LOS	A	A	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	147	470	151	418
Cap Entry Lane, veh/h	854	1232	835	1101
Entry HV Adj Factor	1.000	1.000	1.000	0.565
Flow Entry, veh/h	147	470	151	236
Cap Entry, veh/h	854	1232	835	622
V/C Ratio	0.172	0.381	0.181	0.380
Control Delay, s/veh	5.9	6.6	6.2	11.2
LOS	A	A	A	B
95th %tile Queue, veh	1	2	1	2

HCM 6th TWSC
7: NW 22nd St & NW Maple Ave

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	295	1	4	410	26	0	0	3	17	0	4
Future Vol, veh/h	14	295	1	4	410	26	0	0	3	17	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	6	0	0	1	4	0	0	0	0	0	0
Mvmt Flow	15	317	1	4	441	28	0	0	3	18	0	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	469	0	0	318	0	0	813	825	319	813	811	455
Stage 1	-	-	-	-	-	-	348	348	-	463	463	-
Stage 2	-	-	-	-	-	-	465	477	-	350	348	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1103	-	-	1253	-	-	299	310	726	299	316	609
Stage 1	-	-	-	-	-	-	672	638	-	583	568	-
Stage 2	-	-	-	-	-	-	581	559	-	671	638	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1103	-	-	1253	-	-	292	303	725	293	309	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	292	303	-	293	309	-
Stage 1	-	-	-	-	-	-	661	627	-	573	566	-
Stage 2	-	-	-	-	-	-	575	557	-	656	627	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.1			10			16.9		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	725	1103	-	-	1253	-	-	325				
HCM Lane V/C Ratio	0.004	0.014	-	-	0.003	-	-	0.069				
HCM Control Delay (s)	10	8.3	0	-	7.9	0	-	16.9				
HCM Lane LOS	B	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2				

Queues

8: NW 19th St & NW Maple Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	3	357	351	531	143	288	140
v/c Ratio	0.01	0.42	0.83	0.62	0.26	0.37	0.26
Control Delay	6.7	9.6	29.7	12.5	16.2	4.1	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	9.6	29.7	12.5	16.2	4.1	16.0
Queue Length 50th (ft)	0	61	84	101	32	0	31
Queue Length 95th (ft)	4	107	#218	174	80	46	78
Internal Link Dist (ft)		1024		2888	2569		1124
Turn Bay Length (ft)	120		120			100	
Base Capacity (vph)	395	1175	591	1184	552	770	529
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.30	0.59	0.45	0.26	0.37	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

8: NW 19th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	279	56	330	377	122	71	63	271	81	45	6
Future Volume (vph)	3	279	56	330	377	122	71	63	271	81	45	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.96			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.97	
Satd. Flow (prot)	1805	1825		1787	1830			1851	1615		1833	
Flt Permitted	0.33	1.00		0.49	1.00			0.80	1.00		0.77	
Satd. Flow (perm)	620	1825		926	1830			1519	1615		1449	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	3	297	60	351	401	130	76	67	288	86	48	6
RTOR Reduction (vph)	0	14	0	0	23	0	0	0	183	0	3	0
Lane Group Flow (vph)	3	343	0	351	508	0	0	143	105	0	137	0
Heavy Vehicles (%)	0%	1%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2		6		
Permitted Phases	4			8			2		2			
Actuated Green, G (s)	24.0	24.0		24.0	24.0			19.0	19.0		19.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0			19.0	19.0		19.0	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.37	0.37		0.37	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	286	842		427	844			555	590		529	
v/s Ratio Prot		0.19			0.28							
v/s Ratio Perm	0.00			c0.38				0.09	0.07		c0.09	
v/c Ratio	0.01	0.41		0.82	0.60			0.26	0.18		0.26	
Uniform Delay, d1	7.6	9.3		12.1	10.4			11.6	11.2		11.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	0.3		12.0	1.2			1.1	0.7		1.2	
Delay (s)	7.6	9.6		24.2	11.7			12.7	11.9		12.8	
Level of Service	A	A		C	B			B	B		B	
Approach Delay (s)		9.6			16.6			12.1			12.8	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			52.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			61.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 8: NW 19th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	279	56	330	377	122	71	63	271	81	45	6
Future Volume (veh/h)	3	279	56	330	377	122	71	63	271	81	45	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1841	1885	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	297	60	351	401	130	76	67	288	86	48	6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	4	1	0	0	0	0	0	0	0	0
Cap, veh/h	414	761	154	556	687	223	375	303	541	336	170	18
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.34	0.34	0.34	0.34	0.34	0.34
Sat Flow, veh/h	963	1522	308	1121	1374	446	818	902	1610	686	505	53
Grp Volume(v), veh/h	3	0	357	351	0	531	143	0	288	140	0	0
Grp Sat Flow(s),veh/h/ln	963	0	1830	1121	0	1820	1721	0	1610	1245	0	0
Q Serve(g_s), s	0.1	0.0	6.7	15.6	0.0	11.3	0.0	0.0	8.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	11.5	0.0	6.7	22.2	0.0	11.3	3.0	0.0	8.0	5.7	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.24	0.53		1.00	0.61		0.04
Lane Grp Cap(c), veh/h	414	0	915	556	0	910	679	0	541	524	0	0
V/C Ratio(X)	0.01	0.00	0.39	0.63	0.00	0.58	0.21	0.00	0.53	0.27	0.00	0.00
Avail Cap(c_a), veh/h	501	0	1081	657	0	1075	679	0	541	524	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.7	0.0	8.5	15.4	0.0	9.7	13.1	0.0	14.8	14.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.3	1.5	0.0	0.6	0.7	0.0	3.7	1.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.2	3.6	0.0	3.7	1.3	0.0	3.1	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.8	0.0	8.8	16.9	0.0	10.3	13.8	0.0	18.5	15.3	0.0	0.0
LnGrp LOS	B	A	A	B	A	B	B	A	B	B	A	A
Approach Vol, veh/h	360			882			431			140		
Approach Delay, s/veh	8.9			12.9			16.9			15.3		
Approach LOS	A			B			B			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	23.0			32.0			23.0			32.0		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	18.5			32.5			18.5			32.5		
Max Q Clear Time (g_c+l1), s	10.0			13.5			7.7			24.2		
Green Ext Time (p_c), s	1.2			2.1			0.6			3.3		
Intersection Summary												
HCM 6th Ctrl Delay	13.3											
HCM 6th LOS	B											

Queues

9: NW 9th St & NW Maple Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	151	614	14	859	150	254
v/c Ratio	0.68	0.55	0.03	0.96	0.38	0.54
Control Delay	28.2	12.4	5.8	42.0	25.0	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	12.4	5.8	42.0	25.0	20.2
Queue Length 50th (ft)	26	141	2	357	54	64
Queue Length 95th (ft)	#110	312	8	#614	105	135
Internal Link Dist (ft)		2888		909	535	885
Turn Bay Length (ft)	120		120			
Base Capacity (vph)	223	1112	433	917	391	471
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.55	0.03	0.94	0.38	0.54

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: NW 9th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	550	27	13	738	70	52	74	15	63	39	137
Future Volume (vph)	142	550	27	13	738	70	52	74	15	63	39	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1787	1882		1805	1855			1839			1720	
Flt Permitted	0.09	1.00		0.34	1.00			0.78			0.89	
Satd. Flow (perm)	172	1882		641	1855			1465			1548	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	151	585	29	14	785	74	55	79	16	67	41	146
RTOR Reduction (vph)	0	2	0	0	4	0	0	6	0	0	66	0
Lane Group Flow (vph)	151	612	0	14	855	0	0	144	0	0	188	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	1%	0%	5%	0%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	49.3	43.8		40.3	39.3			19.5			19.5	
Effective Green, g (s)	49.3	43.8		40.3	39.3			19.5			19.5	
Actuated g/C Ratio	0.63	0.56		0.52	0.51			0.25			0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	223	1059		346	937			367			387	
v/s Ratio Prot	c0.05	0.33		0.00	c0.46							
v/s Ratio Perm	0.38			0.02				0.10			c0.12	
v/c Ratio	0.68	0.58		0.04	0.91			0.39			0.49	
Uniform Delay, d1	15.3	11.0		9.6	17.7			24.2			24.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	7.9	0.8		0.0	12.9			3.1			4.3	
Delay (s)	23.2	11.8		9.6	30.5			27.4			29.2	
Level of Service	C	B		A	C			C			C	
Approach Delay (s)		14.0			30.2			27.4			29.2	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			23.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			77.8			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			78.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

9: NW 9th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	550	27	13	738	70	52	74	15	63	39	137
Future Volume (veh/h)	142	550	27	13	738	70	52	74	15	63	39	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1826	1900	1885	1900	1900	1900	1900	1900	1900	1885
Adj Flow Rate, veh/h	151	585	29	14	785	74	55	79	16	67	41	146
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	5	0	1	0	0	0	0	0	0	1
Cap, veh/h	244	959	48	404	823	78	195	261	46	146	100	249
Arrive On Green	0.06	0.53	0.53	0.02	0.49	0.49	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1795	1795	89	1810	1693	160	482	984	175	317	376	937
Grp Volume(v), veh/h	151	0	614	14	0	859	150	0	0	254	0	0
Grp Sat Flow(s),veh/h/ln	1795	0	1884	1810	0	1852	1641	0	0	1631	0	0
Q Serve(g_s), s	2.9	0.0	16.6	0.3	0.0	32.7	0.0	0.0	0.0	4.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	16.6	0.3	0.0	32.7	5.0	0.0	0.0	9.7	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.09	0.37		0.11	0.26		0.57
Lane Grp Cap(c), veh/h	244	0	1007	404	0	901	502	0	0	494	0	0
V/C Ratio(X)	0.62	0.00	0.61	0.03	0.00	0.95	0.30	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	262	0	1007	499	0	920	502	0	0	494	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.5	0.0	11.8	10.3	0.0	18.1	21.6	0.0	0.0	23.3	0.0	0.0
Incr Delay (d2), s/veh	3.9	0.0	1.1	0.0	0.0	19.2	1.5	0.0	0.0	3.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	6.3	0.1	0.0	17.0	2.2	0.0	0.0	4.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	0.0	12.9	10.4	0.0	37.3	23.1	0.0	0.0	27.1	0.0	0.0
LnGrp LOS	C	A	B	B	A	D	C	A	A	C	A	A
Approach Vol, veh/h		765			873			150			254	
Approach Delay, s/veh		14.4			36.8			23.1			27.1	
Approach LOS		B			D			C			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		24.0	5.7	43.8		24.0	9.3	40.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.1	36.9		19.5	5.5	36.5				
Max Q Clear Time (g_c+I1), s		7.0	2.3	18.6		11.7	4.9	34.7				
Green Ext Time (p_c), s		0.6	0.0	4.0		0.9	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			26.2									
HCM 6th LOS			C									

Queues

10: NW 6th St & NW Quince Ave

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	130	223	110	218	250	532	126	147	699
v/c Ratio	0.60	0.44	0.50	0.45	0.54	0.34	0.16	0.32	0.55
Control Delay	30.9	7.5	26.6	9.0	11.3	12.8	3.6	8.7	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	7.5	26.6	9.0	11.3	12.8	3.6	8.7	13.3
Queue Length 50th (ft)	37	8	31	15	32	61	0	18	67
Queue Length 95th (ft)	83	51	70	58	81	112	27	50	133
Internal Link Dist (ft)		513		592		1751			1332
Turn Bay Length (ft)	100		290		150		350	375	
Base Capacity (vph)	337	684	340	663	465	1574	778	458	1277
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.33	0.32	0.33	0.54	0.34	0.16	0.32	0.55
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	31	179	103	53	152	235	500	118	138	431	226
Future Volume (vph)	122	31	179	103	53	152	235	500	118	138	431	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.87		1.00	0.89		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	1657		1805	1651		1805	3610	1615	1752	3367	
Flt Permitted	0.54	1.00		0.53	1.00		0.28	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	1001	1657		1010	1651		525	3610	1615	838	3367	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	130	33	190	110	56	162	250	532	126	147	459	240
RTOR Reduction (vph)	0	150	0	0	128	0	0	0	72	0	103	0
Lane Group Flow (vph)	130	73	0	110	90	0	250	532	54	147	596	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	0%	0%	3%	1%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		30.9	23.5	23.5	24.1	20.1	
Effective Green, g (s)	11.6	11.6		11.6	11.6		30.9	23.5	23.5	24.1	20.1	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.56	0.43	0.43	0.44	0.37	
Clearance Time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	211	349		213	348		467	1542	690	433	1230	
v/s Ratio Prot		0.04			0.05		c0.07	c0.15		0.02	0.18	
v/s Ratio Perm	c0.13			0.11			c0.23		0.03	0.12		
v/c Ratio	0.62	0.21		0.52	0.26		0.54	0.35	0.08	0.34	0.48	
Uniform Delay, d1	19.7	17.9		19.2	18.1		6.7	10.6	9.3	9.5	13.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	0.3		2.1	0.4		1.2	0.6	0.2	0.5	1.4	
Delay (s)	24.9	18.2		21.3	18.5		7.9	11.2	9.6	9.9	14.8	
Level of Service	C	B		C	B		A	B	A	A	B	
Approach Delay (s)		20.7			19.5			10.1			14.0	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.2			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			55.0			Sum of lost time (s)			15.9			
Intersection Capacity Utilization			68.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	31	179	103	53	152	235	500	118	138	431	226
Future Volume (veh/h)	122	31	179	103	53	152	235	500	118	138	431	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1900	1900	1900	1856	1900	1900	1900	1856	1885	1856
Adj Flow Rate, veh/h	130	33	190	110	56	162	250	532	126	147	459	240
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	3	0	0	0	3	1	3
Cap, veh/h	314	63	363	311	111	322	486	1358	606	496	765	397
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.12	0.38	0.38	0.08	0.34	0.34
Sat Flow, veh/h	1253	244	1404	1277	430	1245	1810	3610	1610	1767	2280	1184
Grp Volume(v), veh/h	130	0	223	110	0	218	250	532	126	147	360	339
Grp Sat Flow(s),veh/h/ln	1253	0	1647	1277	0	1676	1810	1805	1610	1767	1791	1672
Q Serve(g_s), s	5.5	0.0	6.5	4.5	0.0	6.2	4.9	6.0	3.0	3.0	9.3	9.4
Cycle Q Clear(g_c), s	11.7	0.0	6.5	11.0	0.0	6.2	4.9	6.0	3.0	3.0	9.3	9.4
Prop In Lane	1.00		0.85	1.00		0.74	1.00		1.00	1.00		0.71
Lane Grp Cap(c), veh/h	314	0	426	311	0	433	486	1358	606	496	601	561
V/C Ratio(X)	0.41	0.00	0.52	0.35	0.00	0.50	0.51	0.39	0.21	0.30	0.60	0.60
Avail Cap(c_a), veh/h	394	0	531	393	0	541	509	1358	606	515	601	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	0.0	17.8	22.5	0.0	17.6	10.7	12.7	11.8	10.5	15.4	15.5
Incr Delay (d2), s/veh	0.9	0.0	1.0	0.7	0.0	0.9	0.8	0.9	0.8	0.3	4.4	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	2.3	1.3	0.0	2.3	1.7	2.3	1.1	1.0	4.1	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	0.0	18.8	23.1	0.0	18.5	11.5	13.6	12.6	10.9	19.8	20.2
LnGrp LOS	C	A	B	C	A	B	B	B	B	B	B	C
Approach Vol, veh/h	353			328			908			846		
Approach Delay, s/veh	20.5			20.1			12.9			18.4		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	26.7		18.9	12.5	24.4		18.9				
Change Period (Y+Rc), s	5.7	5.7		4.5	5.7	5.7		4.5				
Max Green Setting (Gmax), s	5.1	21.0		18.0	7.5	18.6		18.0				
Max Q Clear Time (g_c+I1), s	5.0	8.0		13.7	6.9	11.4		13.0				
Green Ext Time (p_c), s	0.0	3.3		0.7	0.1	2.6		0.7				
Intersection Summary												
HCM 6th Ctrl Delay	16.9											
HCM 6th LOS	B											

Queues

11: NW 6th St & NW Maple Ave

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	211	211	289	234	361	320	844	58	746
v/c Ratio	0.79	0.46	0.41	0.61	0.81	0.90	0.60	0.22	0.73
Control Delay	39.4	25.6	8.1	23.6	39.4	45.8	17.8	13.1	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	25.6	8.1	23.6	39.4	45.8	17.8	13.1	23.0
Queue Length 50th (ft)	59	75	36	67	135	88	144	13	123
Queue Length 95th (ft)	#132	133	82	117	#257	#234	207	32	184
Internal Link Dist (ft)		909			1241		1329		1751
Turn Bay Length (ft)	200		200	105		105		105	
Base Capacity (vph)	267	507	701	384	493	356	1414	267	1028
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.42	0.41	0.61	0.73	0.90	0.60	0.22	0.73

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	194	266	215	259	73	294	542	235	53	440	247
Future Volume (vph)	194	194	266	215	259	73	294	542	235	53	440	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1597	1783	1816		1787	3414		1718	3403	
Flt Permitted	0.24	1.00	1.00	0.54	1.00		0.16	1.00		0.29	1.00	
Satd. Flow (perm)	458	1881	1597	1015	1816		305	3414		518	3403	
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)	211	211	289	234	282	79	320	589	255	58	478	268
RTOR Reduction (vph)	0	0	87	0	15	0	0	63	0	0	107	0
Lane Group Flow (vph)	211	211	202	234	346	0	320	781	0	58	639	0
Confl. Peds. (#/hr)			5	5					6	6		
Heavy Vehicles (%)	0%	1%	0%	1%	1%	2%	1%	0%	0%	5%	0%	1%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	22.5	16.6	26.3	21.7	16.2		34.5	27.0		23.3	20.3	
Effective Green, g (s)	22.5	16.6	26.3	21.7	16.2		34.5	27.0		23.3	20.3	
Actuated g/C Ratio	0.32	0.24	0.38	0.31	0.23		0.49	0.39		0.33	0.29	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	445	701	374	419		355	1314		223	985	
v/s Ratio Prot	c0.07	0.11	0.04	0.05	0.19		c0.12	0.23		0.01	0.19	
v/s Ratio Perm	c0.19		0.09	0.14			c0.32			0.08		
v/c Ratio	0.81	0.47	0.29	0.63	0.83		0.90	0.59		0.26	0.65	
Uniform Delay, d1	19.6	23.0	15.3	19.8	25.6		14.3	17.2		16.2	21.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.2	0.8	0.2	3.3	12.6		24.9	2.0		0.6	3.3	
Delay (s)	36.8	23.8	15.6	23.1	38.2		39.2	19.2		16.9	25.1	
Level of Service	D	C	B	C	D		D	B		B	C	
Approach Delay (s)		24.3			32.3			24.7			24.5	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			25.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			70.1			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			80.2%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	194	266	215	259	73	294	542	235	53	440	247
Future Volume (veh/h)	194	194	266	215	259	73	294	542	235	53	440	247
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1900	1885	1885	1870	1885	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	211	211	289	234	282	79	320	589	255	58	478	268
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
Percent Heavy Veh, %	0	1	0	1	1	2	1	0	0	5	0	1
Cap, veh/h	311	451	613	392	330	92	418	894	387	304	604	337
Arrive On Green	0.09	0.24	0.24	0.08	0.23	0.23	0.14	0.37	0.37	0.05	0.27	0.27
Sat Flow, veh/h	1810	1885	1600	1795	1415	396	1795	2447	1058	1739	2225	1240
Grp Volume(v), veh/h	211	211	289	234	0	361	320	434	410	58	387	359
Grp Sat Flow(s),veh/h/ln	1810	1885	1600	1795	0	1811	1795	1805	1699	1739	1805	1660
Q Serve(g_s), s	5.9	6.5	9.2	5.5	0.0	12.9	8.2	13.6	13.7	1.6	13.5	13.6
Cycle Q Clear(g_c), s	5.9	6.5	9.2	5.5	0.0	12.9	8.2	13.6	13.7	1.6	13.5	13.6
Prop In Lane	1.00		1.00	1.00		0.22	1.00		0.62	1.00		0.75
Lane Grp Cap(c), veh/h	311	451	613	392	0	422	418	660	621	304	490	451
V/C Ratio(X)	0.68	0.47	0.47	0.60	0.00	0.86	0.77	0.66	0.66	0.19	0.79	0.80
Avail Cap(c_a), veh/h	311	512	665	392	0	481	418	660	621	350	490	451
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.6	22.1	15.8	20.0	0.0	24.9	15.4	18.0	18.0	16.6	22.9	23.0
Incr Delay (d2), s/veh	5.8	0.8	0.6	2.5	0.0	12.8	8.2	5.1	5.4	0.3	12.3	13.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.8	3.2	3.0	0.0	6.7	3.9	6.1	5.8	0.6	7.0	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	22.9	16.4	22.4	0.0	37.7	23.6	23.1	23.4	16.9	35.2	36.5
LnGrp LOS	C	C	B	C	A	D	C	C	C	B	D	D
Approach Vol, veh/h		711			595			1164			804	
Approach Delay, s/veh		21.0			31.7			23.3			34.5	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	29.3	10.0	20.7	14.2	22.9	10.4	20.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	23.0	5.5	18.4	9.7	18.4	5.9	18.0				
Max Q Clear Time (g_c+l1), s	3.6	15.7	7.5	11.2	10.2	15.6	7.9	14.9				
Green Ext Time (p_c), s	0.0	3.2	0.0	1.4	0.0	1.3	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			27.1									
HCM 6th LOS			C									

HCM 6th TWSC
12: NW 6th St & NW Kingwood Ave

Intersection

Int Delay, s/veh 1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↙	↕		↙	↕	
Traffic Vol, veh/h	6	0	12	21	0	13	16	1092	15	7	811	15
Future Vol, veh/h	6	0	12	21	0	13	16	1092	15	7	811	15
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	7
Mvmt Flow	6	0	13	23	0	14	17	1174	16	8	872	16

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1521	2125	448	1669	2125	596	892	0	0	1191	0	0
Stage 1	900	900	-	1217	1217	-	-	-	-	-	-	-
Stage 2	621	1225	-	452	908	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	83	51	564	64	51	452	769	-	-	593	-	-
Stage 1	304	360	-	195	256	-	-	-	-	-	-	-
Stage 2	446	254	-	562	357	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	78	49	562	61	49	452	766	-	-	592	-	-
Mov Cap-2 Maneuver	78	49	-	61	49	-	-	-	-	-	-	-
Stage 1	296	354	-	191	250	-	-	-	-	-	-	-
Stage 2	423	248	-	542	351	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27	68.9	0.1	0.1
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	766	-	-	183	91	592	-
HCM Lane V/C Ratio	0.022	-	-	0.106	0.402	0.013	-
HCM Control Delay (s)	9.8	-	-	27	68.9	11.2	-
HCM Lane LOS	A	-	-	D	F	B	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	1.6	0	-

HCM 6th TWSC
13: NW 27th St & NW Hemlock Ave

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	26	8	86	19	10	13	119	94	10	94	5
Future Vol, veh/h	6	26	8	86	19	10	13	119	94	10	94	5
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	7	31	10	104	23	12	16	143	113	12	113	6
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	390	429	117	393	376	200	120	0	0	256	0	0
Stage 1	141	141	-	232	232	-	-	-	-	-	-	-
Stage 2	249	288	-	161	144	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	573	521	941	570	558	846	1480	-	-	1321	-	-
Stage 1	867	784	-	775	716	-	-	-	-	-	-	-
Stage 2	759	677	-	846	782	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	538	510	940	530	546	846	1479	-	-	1321	-	-
Mov Cap-2 Maneuver	538	510	-	530	546	-	-	-	-	-	-	-
Stage 1	857	776	-	766	708	-	-	-	-	-	-	-
Stage 2	716	670	-	796	774	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12		13.7		0.4		0.7					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1479	-	-	566	551	1321	-	-				
HCM Lane V/C Ratio	0.011	-	-	0.085	0.251	0.009	-	-				
HCM Control Delay (s)	7.5	-	-	12	13.7	7.8	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	1	0	-	-				

HCM 6th AWSC
14: SW 27th St & W Antler Ave

Intersection

Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	74	50	109	114	43	62	288	91	13	211	6
Future Vol, veh/h	19	74	50	109	114	43	62	288	91	13	211	6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	20	80	54	117	123	46	67	310	98	14	227	6
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	12.1	12.9	21.5	14.5
HCM LOS	B	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	76%	0%	60%	0%	73%	0%	97%
Vol Right, %	0%	24%	0%	40%	0%	27%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	62	379	19	124	109	157	13	217
LT Vol	62	0	19	0	109	0	13	0
Through Vol	0	288	0	74	0	114	0	211
RT Vol	0	91	0	50	0	43	0	6
Lane Flow Rate	67	408	20	133	117	169	14	233
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.13	0.715	0.045	0.262	0.247	0.322	0.028	0.441
Departure Headway (Hd)	6.999	6.32	7.98	7.073	7.573	6.866	7.337	6.807
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	515	575	449	508	475	523	488	530
Service Time	4.699	4.02	5.729	4.822	5.315	4.608	5.077	4.547
HCM Lane V/C Ratio	0.13	0.71	0.045	0.262	0.246	0.323	0.029	0.44
HCM Control Delay	10.7	23.3	11.1	12.3	12.8	12.9	10.3	14.8
HCM Lane LOS	B	C	B	B	B	B	B	B
HCM 95th-tile Q	0.4	5.8	0.1	1	1	1.4	0.1	2.2

Queues

15: SW 27th St & SW Highland Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	74	820	123	949	69	433	142	292	53
v/c Ratio	0.47	1.03	0.79	1.15	0.31	1.10	0.88	0.67	0.12
Control Delay	21.0	68.6	51.0	109.9	27.4	110.1	76.3	43.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	68.6	51.0	109.9	27.4	110.1	76.3	43.9	0.5
Queue Length 50th (ft)	20	~563	34	~738	30	~306	66	173	0
Queue Length 95th (ft)	43	#799	#131	#981	63	#498	#157	#288	0
Internal Link Dist (ft)		2552		1025		760		2545	
Turn Bay Length (ft)	210		260		110		140		140
Base Capacity (vph)	156	793	155	822	226	395	161	433	446
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	1.03	0.79	1.15	0.31	1.10	0.88	0.67	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	730	49	117	720	181	66	301	110	135	277	50
Future Volume (vph)	70	730	49	117	720	181	66	301	110	135	277	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1684		1646	1660		1630	1664		1662	1733	1413
Flt Permitted	0.08	1.00		0.08	1.00		0.35	1.00		0.17	1.00	1.00
Satd. Flow (perm)	145	1684		141	1660		601	1664		302	1733	1413
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	768	52	123	758	191	69	317	116	142	292	53
RTOR Reduction (vph)	0	3	0	0	9	0	0	13	0	0	0	41
Lane Group Flow (vph)	74	817	0	123	940	0	69	420	0	142	292	12
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	3%	2%	1%	2%	1%	2%	0%	1%	0%	1%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	52.1	47.9		54.3	49.0		26.3	22.1		28.5	23.2	23.2
Effective Green, g (s)	52.1	47.9		54.3	49.0		26.3	22.1		28.5	23.2	23.2
Actuated g/C Ratio	0.52	0.48		0.54	0.49		0.26	0.22		0.28	0.23	0.23
Clearance Time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	138	806		156	813		201	367		158	402	327
v/s Ratio Prot	0.02	0.49		c0.04	c0.57		0.01	c0.25		c0.05	0.17	
v/s Ratio Perm	0.26			0.38			0.08			0.21		0.01
v/c Ratio	0.54	1.01		0.79	1.16		0.34	1.14		0.90	0.73	0.04
Uniform Delay, d1	22.1	26.1		20.7	25.5		28.8	39.0		33.0	35.5	29.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	35.3		22.7	84.2		1.0	92.1		42.9	10.9	0.2
Delay (s)	26.0	61.3		43.4	109.7		29.8	131.0		75.9	46.4	30.0
Level of Service	C	E		D	F		C	F		E	D	C
Approach Delay (s)		58.4			102.1			117.1			53.2	
Approach LOS		E			F			F			D	
Intersection Summary												
HCM 2000 Control Delay			83.4			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			19.4			
Intersection Capacity Utilization			106.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	730	49	117	720	181	66	301	110	135	277	50
Future Volume (veh/h)	70	730	49	117	720	181	66	301	110	135	277	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1736	1709	1723	1736	1723	1736	1723	1750	1736	1750	1736	1709
Adj Flow Rate, veh/h	74	768	52	123	758	191	69	317	116	142	292	53
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	3	2	1	2	1	2	0	1	0	1	3
Cap, veh/h	144	744	50	160	636	160	232	281	103	160	415	337
Arrive On Green	0.04	0.47	0.47	0.05	0.48	0.48	0.04	0.23	0.23	0.05	0.24	0.24
Sat Flow, veh/h	1654	1582	107	1654	1328	335	1641	1221	447	1667	1736	1411
Grp Volume(v), veh/h	74	0	820	123	0	949	69	0	433	142	292	53
Grp Sat Flow(s),veh/h/ln	1654	0	1690	1654	0	1662	1641	0	1667	1667	1736	1411
Q Serve(g_s), s	2.3	0.0	47.0	3.8	0.0	47.9	3.2	0.0	23.0	5.3	15.4	3.0
Cycle Q Clear(g_c), s	2.3	0.0	47.0	3.8	0.0	47.9	3.2	0.0	23.0	5.3	15.4	3.0
Prop In Lane	1.00		0.06	1.00		0.20	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	144	0	794	160	0	797	232	0	383	160	415	337
V/C Ratio(X)	0.51	0.00	1.03	0.77	0.00	1.19	0.30	0.00	1.13	0.89	0.70	0.16
Avail Cap(c_a), veh/h	160	0	794	160	0	797	247	0	383	160	415	337
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	26.5	23.3	0.0	26.0	28.6	0.0	38.5	34.0	34.8	30.1
Incr Delay (d2), s/veh	2.8	0.0	40.6	20.3	0.0	98.3	0.7	0.0	85.9	40.1	9.6	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	26.7	2.3	0.0	39.5	1.3	0.0	18.4	2.9	7.5	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.2	0.0	67.1	43.6	0.0	124.3	29.3	0.0	124.4	74.1	44.5	31.1
LnGrp LOS	C	A	F	D	A	F	C	A	F	E	D	C
Approach Vol, veh/h	894			1072			502			487		
Approach Delay, s/veh	63.7			115.0			111.3			51.7		
Approach LOS	E			F			F			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	28.0	10.0	52.0	9.1	28.9	9.1	52.9				
Change Period (Y+Rc), s	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0				
Max Green Setting (Gmax), s	* 5.3	23.0	* 5.3	47.0	* 5.3	23.0	* 5.3	47.0				
Max Q Clear Time (g_c+l1), s	7.3	25.0	5.8	49.0	5.2	17.4	4.3	49.9				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			88.4									
HCM 6th LOS			F									
Notes												

Queues

16: W Rimrock Way & W Antler Ave

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	201	69	238	229	95	428	102	417
v/c Ratio	0.22	0.46	0.20	0.54	0.32	0.21	0.73	0.25	0.57
Control Delay	15.0	20.2	14.7	25.8	3.2	10.3	27.7	10.3	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	20.2	14.7	25.8	3.2	10.3	27.7	10.3	19.4
Queue Length 50th (ft)	18	52	16	80	0	17	133	18	122
Queue Length 95th (ft)	45	111	41	149	33	44	#302	47	234
Internal Link Dist (ft)		1246		2345			1244		2564
Turn Bay Length (ft)	115		115		210	165		250	
Base Capacity (vph)	348	659	352	685	794	446	736	486	868
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.31	0.20	0.35	0.29	0.21	0.58	0.21	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	118	69	64	221	213	88	343	55	95	318	70
Future Volume (vph)	72	118	69	64	221	213	88	343	55	95	318	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1799	1767		1685	1900	1584	1804	1855		1787	1826	
Flt Permitted	0.47	1.00		0.55	1.00	1.00	0.42	1.00		0.24	1.00	
Satd. Flow (perm)	899	1767		976	1900	1584	804	1855		452	1826	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	77	127	74	69	238	229	95	369	59	102	342	75
RTOR Reduction (vph)	0	32	0	0	0	148	0	8	0	0	11	0
Lane Group Flow (vph)	77	169	0	69	238	81	95	420	0	102	406	0
Confl. Peds. (#/hr)	7		2	2		7	2		1	1		2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	2%	7%	0%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	15.5	12.7		15.5	12.7	20.3	22.6	18.4		29.4	21.8	
Effective Green, g (s)	15.5	12.7		15.5	12.7	20.3	22.6	18.4		29.4	21.8	
Actuated g/C Ratio	0.27	0.22		0.27	0.22	0.35	0.39	0.32		0.51	0.38	
Clearance Time (s)	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	
Lane Grp Cap (vph)	286	390		297	419	669	389	593		407	692	
v/s Ratio Prot	c0.01	0.10		0.01	c0.13	0.02	0.02	c0.23		c0.03	0.22	
v/s Ratio Perm	0.06			0.05		0.04	0.08			0.09		
v/c Ratio	0.27	0.43		0.23	0.57	0.12	0.24	0.71		0.25	0.59	
Uniform Delay, d1	16.1	19.3		16.0	20.0	12.6	11.3	17.2		8.6	14.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.8		0.4	1.8	0.1	0.3	3.9		0.3	1.3	
Delay (s)	16.6	20.1		16.4	21.7	12.7	11.6	21.0		8.9	15.5	
Level of Service	B	C		B	C	B	B	C		A	B	
Approach Delay (s)		19.1			17.2			19.3			14.2	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.2		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			57.5		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			56.5%		ICU Level of Service					B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	118	69	64	221	213	88	343	55	95	318	70
Future Volume (veh/h)	72	118	69	64	221	213	88	343	55	95	318	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1796	1900	1900	1900	1900	1900	1885	1885	1900
Adj Flow Rate, veh/h	77	127	74	69	238	229	95	369	59	102	342	75
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	2	7	0	0	0	0	0	1	1	0
Cap, veh/h	380	245	143	408	408	467	388	474	76	384	446	98
Arrive On Green	0.07	0.22	0.22	0.06	0.21	0.21	0.08	0.30	0.30	0.08	0.30	0.30
Sat Flow, veh/h	1810	1118	652	1711	1900	1584	1810	1598	255	1795	1490	327
Grp Volume(v), veh/h	77	0	201	69	238	229	95	0	428	102	0	417
Grp Sat Flow(s),veh/h/ln	1810	0	1770	1711	1900	1584	1810	0	1853	1795	0	1817
Q Serve(g_s), s	1.5	0.0	4.7	1.4	5.3	5.6	1.6	0.0	9.9	1.8	0.0	9.8
Cycle Q Clear(g_c), s	1.5	0.0	4.7	1.4	5.3	5.6	1.6	0.0	9.9	1.8	0.0	9.8
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.14	1.00		0.18
Lane Grp Cap(c), veh/h	380	0	388	408	408	467	388	0	549	384	0	544
V/C Ratio(X)	0.20	0.00	0.52	0.17	0.58	0.49	0.24	0.00	0.78	0.27	0.00	0.77
Avail Cap(c_a), veh/h	471	0	701	505	757	757	468	0	805	612	0	945
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	16.1	12.9	16.5	13.6	10.8	0.0	15.0	10.8	0.0	14.9
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.2	1.3	0.8	0.3	0.0	3.0	0.4	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.8	0.5	2.1	1.8	0.6	0.0	3.9	0.6	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	0.0	17.1	13.1	17.8	14.4	11.1	0.0	18.0	11.2	0.0	17.2
LnGrp LOS	B	A	B	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h		278			536			523			519	
Approach Delay, s/veh		16.0			15.7			16.8			16.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	17.8	7.0	14.2	7.5	18.0	7.2	14.0				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.6	20.3	5.6	18.5	5.6	24.3	5.5	18.6				
Max Q Clear Time (g_c+I1), s	3.8	11.9	3.4	6.7	3.6	11.8	3.5	7.6				
Green Ext Time (p_c), s	0.1	1.7	0.0	0.8	0.0	2.1	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			16.2									
HCM 6th LOS			B									

HCM 6th TWSC
17: SW Canyon Dr & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↗
Traffic Vol, veh/h	7	241	22	34	419	2	63	22	29	0	2	22
Future Vol, veh/h	7	241	22	34	419	2	63	22	29	0	2	22
Conflicting Peds, #/hr	4	0	1	1	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	8	268	24	38	466	2	70	24	32	0	2	24
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	472	0	0	293	0	0	854	845	281	-	856	472
Stage 1	-	-	-	-	-	-	297	297	-	-	547	-
Stage 2	-	-	-	-	-	-	557	548	-	-	309	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	4	3.3
Pot Cap-1 Maneuver	1100	-	-	1280	-	-	281	302	763	0	297	596
Stage 1	-	-	-	-	-	-	716	671	-	0	521	-
Stage 2	-	-	-	-	-	-	518	520	-	0	663	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1096	-	-	1279	-	-	257	286	762	-	281	593
Mov Cap-2 Maneuver	-	-	-	-	-	-	257	286	-	-	281	-
Stage 1	-	-	-	-	-	-	709	664	-	-	498	-
Stage 2	-	-	-	-	-	-	474	497	-	-	656	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.6			23.7			11.3		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	317	1096	-	-	1279	-	-	593				
HCM Lane V/C Ratio	0.4	0.007	-	-	0.03	-	-	0.041				
HCM Control Delay (s)	23.7	8.3	0	-	7.9	0	-	11.3				
HCM Lane LOS	C	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1.9	0	-	-	0.1	-	-	0.1				

HCM 6th TWSC
18: SW 9th St & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	215	15	6	339	2	52	30	15	7	13	7
Future Vol, veh/h	1	215	15	6	339	2	52	30	15	7	13	7
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	247	17	7	390	2	60	34	17	8	15	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	396	0	0	264	0	0	675	668	257	693	675	395
Stage 1	-	-	-	-	-	-	258	258	-	409	409	-
Stage 2	-	-	-	-	-	-	417	410	-	284	266	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1174	-	-	1312	-	-	368	382	787	360	378	659
Stage 1	-	-	-	-	-	-	747	698	-	623	600	-
Stage 2	-	-	-	-	-	-	613	599	-	727	692	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1170	-	-	1312	-	-	350	377	786	324	373	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	377	-	324	373	-
Stage 1	-	-	-	-	-	-	746	697	-	620	593	-
Stage 2	-	-	-	-	-	-	586	592	-	675	691	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			17.8			14.7		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	392	1170	-	-	1312	-	-	402
HCM Lane V/C Ratio	0.284	0.001	-	-	0.005	-	-	0.077
HCM Control Delay (s)	17.8	8.1	0	-	7.8	0	-	14.7
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.2	0	-	-	0	-	-	0.2

HCM 6th TWSC
19: NW 5th St & NW Dogwood Ave

Intersection

Int Delay, s/veh 1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	3	0	0	26	35	24	1111	15	0	0	0
Future Vol, veh/h	17	3	0	0	26	35	24	1111	15	0	0	0
Conflicting Peds, #/hr	2	0	1	1	0	2	9	0	0	0	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	3	0	0	0	0	0	0
Mvmt Flow	18	3	0	0	28	38	26	1195	16	0	0	0

Major/Minor	Minor2		Minor1		Major1				
Conflicting Flow All	675	1272	-	-	1264	608	9	0	0
Stage 1	9	9	-	-	1255	-	-	-	-
Stage 2	666	1263	-	-	9	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.5	6.96	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4	3.33	2.2	-	-
Pot Cap-1 Maneuver	344	169	0	0	171	436	1624	-	-
Stage 1	-	-	0	0	245	-	-	-	-
Stage 2	420	243	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	260	159	-	-	161	436	1610	-	-
Mov Cap-2 Maneuver	260	159	-	-	161	-	-	-	-
Stage 1	-	-	-	-	233	-	-	-	-
Stage 2	321	231	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	21.7	24.2	0.3
HCM LOS	C	C	

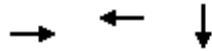
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1
Capacity (veh/h)	1610	-	-	237 252
HCM Lane V/C Ratio	0.016	-	-	0.091 0.26
HCM Control Delay (s)	7.3	0.2	-	21.7 24.2
HCM Lane LOS	A	A	-	C C
HCM 95th %tile Q(veh)	0	-	-	0.3 1

HCM 6th TWSC
20: NW 5th St & W Antler Ave

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕				
Traffic Vol, veh/h	29	39	0	0	44	48	22	1111	32	0	0	0
Future Vol, veh/h	29	39	0	0	44	48	22	1111	32	0	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	32	42	0	0	48	52	24	1208	35	0	0	0
Major/Minor	Minor2		Minor1		Major1							
Conflicting Flow All	677	1291	-	-	1274	623	0	0	0			
Stage 1	0	0	-	-	1274	-	-	-	-			
Stage 2	677	1291	-	-	0	-	-	-	-			
Critical Hdwy	7.5	6.5	-	-	6.5	6.9	4.1	-	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-			
Follow-up Hdwy	3.5	4	-	-	4	3.3	2.2	-	-			
Pot Cap-1 Maneuver	343	165	0	0	169	434	-	-	-			
Stage 1	-	-	0	0	240	-	-	-	-			
Stage 2	414	236	0	0	-	-	-	-	-			
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	236	165	-	-	169	434	-	-	-			
Mov Cap-2 Maneuver	236	165	-	-	169	-	-	-	-			
Stage 1	-	-	-	-	240	-	-	-	-			
Stage 2	292	236	-	-	-	-	-	-	-			
Approach	EB		WB		NB							
HCM Control Delay, s	35.8		29									
HCM LOS	E		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1							
Capacity (veh/h)	-	-	-	189	248							
HCM Lane V/C Ratio	-	-	-	0.391	0.403							
HCM Control Delay (s)	-	-	-	35.8	29							
HCM Lane LOS	-	-	-	E	D							
HCM 95th %tile Q(veh)	-	-	-	1.7	1.8							

Queues

21: SW 6th St & SW Black Butte Blvd



Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	213	198	1037
v/c Ratio	0.48	0.50	0.45
Control Delay	13.7	18.9	6.1
Queue Delay	0.0	0.0	0.0
Total Delay	13.7	18.9	6.1
Queue Length 50th (ft)	33	45	62
Queue Length 95th (ft)	68	80	126
Internal Link Dist (ft)	519	235	258
Turn Bay Length (ft)			
Base Capacity (vph)	760	711	2314
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.28	0.28	0.45
Intersection Summary			

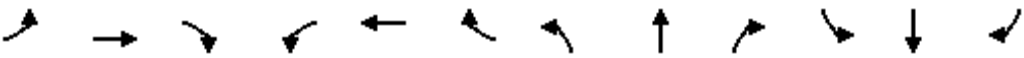
HCM Signalized Intersection Capacity Analysis

21: SW 6th St & SW Black Butte Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩			↩						↩↪	
Traffic Volume (vph)	0	102	101	31	157	0	0	0	0	28	835	123
Future Volume (vph)	0	102	101	31	157	0	0	0	0	28	835	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.93			1.00						0.98	
Flt Protected		1.00			0.99						1.00	
Satd. Flow (prot)		1761			1884						3497	
Flt Permitted		1.00			0.91						1.00	
Satd. Flow (perm)		1761			1730						3497	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	107	106	33	165	0	0	0	0	29	879	129
RTOR Reduction (vph)	0	50	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	163	0	0	198	0	0	0	0	0	1021	0
Confl. Peds. (#/hr)	3		1	1		3	2			5	5	2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		9.0			9.0						28.0	
Effective Green, g (s)		9.0			9.0						28.0	
Actuated g/C Ratio		0.20			0.20						0.62	
Clearance Time (s)		4.0			4.0						4.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		352			346						2175	
v/s Ratio Prot		0.09										
v/s Ratio Perm					0.11						0.29	
v/c Ratio		0.46			0.57						0.47	
Uniform Delay, d1		15.9			16.3						4.5	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		1.0			2.3						0.7	
Delay (s)		16.8			18.5						5.3	
Level of Service		B			B						A	
Approach Delay (s)		16.8			18.5			0.0			5.3	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.8			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			45.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			63.0%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩			↩						↩↩	
Traffic Volume (veh/h)	0	102	101	31	157	0	0	0	0	28	835	123
Future Volume (veh/h)	0	102	101	31	157	0	0	0	0	28	835	123
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1885	1900
Adj Flow Rate, veh/h	0	107	106	33	165	0				29	879	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0				0	1	0
Cap, veh/h	0	172	171	118	269	0				61	1937	300
Arrive On Green	0.00	0.20	0.20	0.20	0.20	0.00				0.63	0.63	0.63
Sat Flow, veh/h	0	875	867	127	1366	0				98	3098	480
Grp Volume(v), veh/h	0	0	213	198	0	0				555	0	482
Grp Sat Flow(s),veh/h/ln	0	0	1742	1493	0	0				1880	0	1796
Q Serve(g_s), s	0.0	0.0	5.0	1.1	0.0	0.0				7.1	0.0	6.2
Cycle Q Clear(g_c), s	0.0	0.0	5.0	6.1	0.0	0.0				7.1	0.0	6.2
Prop In Lane	0.00		0.50	0.17		0.00				0.05		0.27
Lane Grp Cap(c), veh/h	0	0	343	387	0	0				1176	0	1123
V/C Ratio(X)	0.00	0.00	0.62	0.51	0.00	0.00				0.47	0.00	0.43
Avail Cap(c_a), veh/h	0	0	716	764	0	0				1176	0	1123
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.99	0.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	16.5	16.5	0.0	0.0				4.5	0.0	4.3
Incr Delay (d2), s/veh	0.0	0.0	1.8	1.0	0.0	0.0				1.4	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.9	1.7	0.0	0.0				1.9	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	18.4	17.5	0.0	0.0				5.8	0.0	5.5
LnGrp LOS	A	A	B	B	A	A				A	A	A
Approach Vol, veh/h		213			198						1037	
Approach Delay, s/veh		18.4			17.5						5.7	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				12.9		32.1		12.9				
Change Period (Y+Rc), s				4.0		4.0		4.0				
Max Green Setting (Gmax), s				18.5		18.5		18.5				
Max Q Clear Time (g_c+I1), s				7.0		9.1		8.1				
Green Ext Time (p_c), s				0.9		4.6		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			9.2									
HCM 6th LOS			A									

Queues

22: SW 5th St & SW Black Butte Blvd

	→	←	↑
Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	113	54	1249
v/c Ratio	0.45	0.16	0.49
Control Delay	23.0	14.9	9.9
Queue Delay	0.0	0.0	0.0
Total Delay	23.0	14.9	9.9
Queue Length 50th (ft)	30	11	171
Queue Length 95th (ft)	61	31	232
Internal Link Dist (ft)	235	336	1062
Turn Bay Length (ft)			
Base Capacity (vph)	504	692	2541
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.22	0.08	0.49
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↰				
Traffic Volume (vph)	96	14	0	1	44	8	154	1048	10	0	0	0
Future Volume (vph)	96	14	0	1	44	8	154	1048	10	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			1.00			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			1.00				
Flt Protected		0.96			1.00			0.99				
Satd. Flow (prot)		1820			1857			3582				
Flt Permitted		0.71			0.99			0.99				
Satd. Flow (perm)		1357			1848			3582				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	99	14	0	1	45	8	159	1080	10	0	0	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	113	0	0	47	0	0	1248	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		8.2			8.2			33.8				
Effective Green, g (s)		8.2			8.2			33.8				
Actuated g/C Ratio		0.16			0.16			0.68				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		222			303			2421				
v/s Ratio Prot												
v/s Ratio Perm		0.08			0.03			0.35				
v/c Ratio		0.51			0.16			0.52				
Uniform Delay, d1		19.1			17.9			4.0				
Progression Factor		1.00			1.00			1.87				
Incremental Delay, d2		1.8			0.2			0.6				
Delay (s)		20.9			18.2			8.2				
Level of Service		C			B			A				
Approach Delay (s)		20.9			18.2			8.2			0.0	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.6				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			50.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			53.1%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

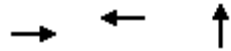
HCM 6th Signalized Intersection Summary

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	14	0	1	44	8	154	1048	10	0	0	0
Future Volume (veh/h)	96	14	0	1	44	8	154	1048	10	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	1900	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	99	14	0	1	45	8	159	1080	10			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	280	20	0	75	160	28	338	2419	23			
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.24	0.24	0.24			
Sat Flow, veh/h	1408	199	0	15	1559	274	458	3281	32			
Grp Volume(v), veh/h	113	0	0	54	0	0	651	0	598			
Grp Sat Flow(s),veh/h/ln	1607	0	0	1848	0	0	1877	0	1894			
Q Serve(g_s), s	1.9	0.0	0.0	0.0	0.0	0.0	14.8	0.0	13.3			
Cycle Q Clear(g_c), s	3.3	0.0	0.0	1.4	0.0	0.0	14.8	0.0	13.3			
Prop In Lane	0.88		0.00	0.02		0.15	0.24		0.02			
Lane Grp Cap(c), veh/h	300	0	0	264	0	0	1384	0	1396			
V/C Ratio(X)	0.38	0.00	0.00	0.20	0.00	0.00	0.47	0.00	0.43			
Avail Cap(c_a), veh/h	713	0	0	758	0	0	1384	0	1396			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.87	0.00	0.00	1.00	0.00	0.00	0.80	0.00	0.80			
Uniform Delay (d), s/veh	21.5	0.0	0.0	20.7	0.0	0.0	10.6	0.0	10.0			
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.4	0.0	0.0	0.9	0.0	0.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.6	0.0	0.0	7.4	0.0	6.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	0.0	21.1	0.0	0.0	11.5	0.0	10.8			
LnGrp LOS	C	A	A	C	A	A	B	A	B			
Approach Vol, veh/h		113			54			1249				
Approach Delay, s/veh		22.2			21.1			11.2				
Approach LOS		C			C			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		40.9		9.1				9.1				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.4		18.6				18.6				
Max Q Clear Time (g_c+I1), s		16.8		5.3				3.4				
Green Ext Time (p_c), s		4.1		0.4				0.2				
Intersection Summary												
HCM 6th Ctrl Delay				12.4								
HCM 6th LOS				B								

Queues

23: SW 5th St & SW Evergreen Ave



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	199	475	1058
v/c Ratio	0.48	0.78	0.57
Control Delay	16.9	22.9	10.6
Queue Delay	0.0	0.0	0.0
Total Delay	16.9	22.9	10.6
Queue Length 50th (ft)	43	100	108
Queue Length 95th (ft)	86	#183	167
Internal Link Dist (ft)	219	269	451
Turn Bay Length (ft)			
Base Capacity (vph)	484	699	1848
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.41	0.68	0.57

Intersection Summary

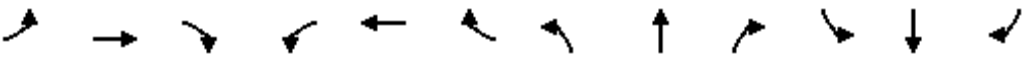
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (vph)	42	143	0	0	197	245	41	911	32	0	0	0
Future Volume (vph)	42	143	0	0	197	245	41	911	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.93			1.00				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1864			1744			3581				
Flt Permitted		0.68			1.00			1.00				
Satd. Flow (perm)		1273			1744			3581				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	45	154	0	0	212	263	44	980	34	0	0	0
RTOR Reduction (vph)	0	0	0	0	40	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	199	0	0	435	0	0	1054	0	0	0	0
Confl. Peds. (#/hr)	2		1	1		2			8	8		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			8		5	2				
Permitted Phases	4											
Actuated Green, G (s)		16.3			16.3			25.7				
Effective Green, g (s)		16.3			16.3			25.7				
Actuated g/C Ratio		0.33			0.33			0.51				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		414			568			1840				
v/s Ratio Prot					c0.25			c0.29				
v/s Ratio Perm		0.16										
v/c Ratio		0.48			0.77			0.57				
Uniform Delay, d1		13.5			15.1			8.4				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.9			6.1			0.4				
Delay (s)		14.3			21.2			8.8				
Level of Service		B			C			A				
Approach Delay (s)		14.3			21.2			8.8			0.0	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		12.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		72.8%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (veh/h)	42	143	0	0	197	245	41	911	32	0	0	0
Future Volume (veh/h)	42	143	0	0	197	245	41	911	32	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1885	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	45	154	0	0	212	263	44	980	34			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	0	1	0	0	0	0	0	0	0			
Cap, veh/h	112	306	0	0	249	309	77	1805	66			
Arrive On Green	0.32	0.32	0.00	0.00	0.32	0.32	0.52	0.52	0.52			
Sat Flow, veh/h	73	947	0	0	770	956	150	3492	127			
Grp Volume(v), veh/h	199	0	0	0	0	475	556	0	502			
Grp Sat Flow(s),veh/h/ln	1020	0	0	0	0	1726	1893	0	1876			
Q Serve(g_s), s	1.0	0.0	0.0	0.0	0.0	12.9	10.1	0.0	8.8			
Cycle Q Clear(g_c), s	13.8	0.0	0.0	0.0	0.0	12.9	10.1	0.0	8.8			
Prop In Lane	0.23		0.00	0.00		0.55	0.08		0.07			
Lane Grp Cap(c), veh/h	418	0	0	0	0	558	978	0	970			
V/C Ratio(X)	0.48	0.00	0.00	0.00	0.00	0.85	0.57	0.00	0.52			
Avail Cap(c_a), veh/h	507	0	0	0	0	656	978	0	970			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	1.00	0.00	0.00	0.00	0.00	1.00	0.79	0.00	0.79			
Uniform Delay (d), s/veh	13.3	0.0	0.0	0.0	0.0	15.8	8.3	0.0	8.0			
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	0.0	9.2	0.6	0.0	0.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.0	0.0	5.7	3.2	0.0	2.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.2	0.0	0.0	0.0	0.0	25.0	8.9	0.0	8.3			
LnGrp LOS	B	A	A	A	A	C	A	A	A			
Approach Vol, veh/h		199			475			1058				
Approach Delay, s/veh		14.2			25.0			8.6				
Approach LOS		B			C			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		29.8		20.2				20.2				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.0		19.0				19.0				
Max Q Clear Time (g_c+l1), s		12.1		15.8				14.9				
Green Ext Time (p_c), s		5.1		0.3				1.2				
Intersection Summary												
HCM 6th Ctrl Delay			13.8									
HCM 6th LOS			B									

HCM 6th TWSC

1: NW Northwest Way & NW Upas Ave

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	7	10	200	148	5
Future Vol, veh/h	11	7	10	200	148	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	5	0
Mvmt Flow	13	8	12	233	172	6
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	432	175	178	0	-	0
Stage 1	175	-	-	-	-	-
Stage 2	257	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	584	874	1410	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	578	874	1410	-	-	-
Mov Cap-2 Maneuver	578	-	-	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.6	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1410	-	666	-	-	
HCM Lane V/C Ratio	0.008	-	0.031	-	-	
HCM Control Delay (s)	7.6	0	10.6	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

HCM 6th TWSC

2: NW Northwest Way & NW Spruce Ave

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	73	64	0	6	112	219	87	17	134	7
Future Vol, veh/h	4	0	73	64	0	6	112	219	87	17	134	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	35	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	1	7	0	5	0
Mvmt Flow	5	0	87	76	0	7	133	261	104	20	160	8
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	787	835	164	775	735	261	168	0	0	365	0	0
Stage 1	204	204	-	527	527	-	-	-	-	-	-	-
Stage 2	583	631	-	248	208	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	312	306	886	318	349	783	1422	-	-	1205	-	-
Stage 1	803	737	-	538	532	-	-	-	-	-	-	-
Stage 2	502	477	-	760	734	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	277	265	886	257	302	783	1422	-	-	1205	-	-
Mov Cap-2 Maneuver	277	265	-	257	302	-	-	-	-	-	-	-
Stage 1	707	724	-	474	469	-	-	-	-	-	-	-
Stage 2	438	420	-	673	721	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.1		23.9		2.1		0.9					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1422	-	-	795	273	1205	-	-				
HCM Lane V/C Ratio	0.094	-	-	0.115	0.305	0.017	-	-				
HCM Control Delay (s)	7.8	0	-	10.1	23.9	8	0	-				
HCM Lane LOS	A	A	-	B	C	A	A	-				
HCM 95th %tile Q(veh)	0.3	-	-	0.4	1.3	0.1	-	-				

HCM 6th TWSC
3: Northwest Way & NW Quince Ave

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	39	53	0	4	65	414	94	7	264	0
Future Vol, veh/h	0	0	39	53	0	4	65	414	94	7	264	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	46	63	0	5	77	493	112	8	314	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1036	1089	314	1056	1033	549	314	0	0	605	0	0
Stage 1	330	330	-	703	703	-	-	-	-	-	-	-
Stage 2	706	759	-	353	330	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	212	217	731	205	234	539	1258	-	-	983	-	-
Stage 1	687	649	-	431	443	-	-	-	-	-	-	-
Stage 2	430	418	-	668	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	194	195	731	177	210	539	1258	-	-	983	-	-
Mov Cap-2 Maneuver	194	195	-	177	210	-	-	-	-	-	-	-
Stage 1	622	643	-	390	401	-	-	-	-	-	-	-
Stage 2	386	379	-	619	643	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.3		35.1		0.9		0.2					
HCM LOS	B		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1258	-	-	731	186	983	-	-				
HCM Lane V/C Ratio	0.062	-	-	0.064	0.365	0.008	-	-				
HCM Control Delay (s)	8	0	-	10.3	35.1	8.7	0	-				
HCM Lane LOS	A	A	-	B	E	A	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.2	1.6	0	-	-				

HCM 6th TWSC
4: NW 22nd St & NW Quince Ave

Intersection												
Int Delay, s/veh	7.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	19	2	0	32	6	4	4	3	3	2	0
Future Vol, veh/h	0	19	2	0	32	6	4	4	3	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	22	2	0	36	7	5	5	3	3	2	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	46	26	2	37	25	7	2	0	0	8	0	0
Stage 1	8	8	-	17	17	-	-	-	-	-	-	-
Stage 2	38	18	-	20	8	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	961	871	1088	973	872	1081	1634	-	-	1625	-	-
Stage 1	1019	893	-	1008	885	-	-	-	-	-	-	-
Stage 2	982	884	-	1004	893	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	921	867	1088	949	868	1081	1634	-	-	1625	-	-
Mov Cap-2 Maneuver	921	867	-	949	868	-	-	-	-	-	-	-
Stage 1	1016	891	-	1005	882	-	-	-	-	-	-	-
Stage 2	933	881	-	976	891	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	9.2		9.2			2.6			4.3			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1634	-	-	884	896	1625	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.027	0.048	0.002	-	-				
HCM Control Delay (s)	7.2	0	-	9.2	9.2	7.2	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-				

HCM 6th TWSC
5: NW 19th St & NW Quince Ave

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	30	43	100	60	1
Future Vol, veh/h	0	30	43	100	60	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	35	50	116	70	1
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	287	71	71	0	-	0
Stage 1	71	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	708	997	1542	-	-	-
Stage 1	957	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	683	997	1542	-	-	-
Mov Cap-2 Maneuver	683	-	-	-	-	-
Stage 1	924	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.7	2.2		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1542	-	997	-	-	
HCM Lane V/C Ratio	0.032	-	0.035	-	-	
HCM Control Delay (s)	7.4	0	8.7	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	

HCM 6th Roundabout
6: NW Northwest Way & NW Maple Ave

Intersection				
Intersection Delay, s/veh	12.1			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	147	635	253	403
Demand Flow Rate, veh/h	147	635	253	686
Vehicles Circulating, veh/h	738	213	695	221
Vehicles Exiting, veh/h	169	735	190	627
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.3	10.3	10.3	17.4
Approach LOS	A	B	B	C
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	147	635	253	686
Cap Entry Lane, veh/h	650	1110	679	1101
Entry HV Adj Factor	1.000	1.000	1.000	0.587
Flow Entry, veh/h	147	635	253	403
Cap Entry, veh/h	650	1110	679	647
V/C Ratio	0.226	0.572	0.372	0.623
Control Delay, s/veh	8.3	10.3	10.3	17.4
LOS	A	B	B	C
95th %tile Queue, veh	1	4	2	4

HCM 6th TWSC
7: NW 22nd St & NW Maple Ave

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	386	1	4	559	30	0	0	3	19	0	4
Future Vol, veh/h	14	386	1	4	559	30	0	0	3	19	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	6	0	0	1	4	0	0	0	0	0	0
Mvmt Flow	15	415	1	4	601	32	0	0	3	20	0	4
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	633	0	0	416	0	0	1073	1087	417	1073	1071	617
Stage 1	-	-	-	-	-	-	446	446	-	625	625	-
Stage 2	-	-	-	-	-	-	627	641	-	448	446	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	960	-	-	1154	-	-	200	218	640	200	223	494
Stage 1	-	-	-	-	-	-	595	577	-	476	480	-
Stage 2	-	-	-	-	-	-	475	473	-	594	577	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	960	-	-	1154	-	-	194	213	639	195	217	494
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	213	-	195	217	-
Stage 1	-	-	-	-	-	-	583	565	-	466	478	-
Stage 2	-	-	-	-	-	-	469	471	-	579	565	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0.3		0.1			10.7			23.6			
HCM LOS						B			C			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	639	960	-	-	1154	-	-	218				
HCM Lane V/C Ratio	0.005	0.016	-	-	0.004	-	-	0.113				
HCM Control Delay (s)	10.7	8.8	0	-	8.1	0	-	23.6				
HCM Lane LOS	B	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.4				

Queues

8: NW 19th St & NW Maple Ave

							
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	3	455	351	708	163	288	160
v/c Ratio	0.02	0.49	0.90	0.75	0.33	0.39	0.35
Control Delay	6.7	10.3	41.8	16.1	18.2	4.3	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	10.3	41.8	16.1	18.2	4.3	18.3
Queue Length 50th (ft)	0	84	95	160	45	0	44
Queue Length 95th (ft)	4	145	#249	275	90	46	89
Internal Link Dist (ft)		1024		2888	2569		1124
Turn Bay Length (ft)	120		120			100	
Base Capacity (vph)	229	1086	457	1095	488	732	461
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.42	0.77	0.65	0.33	0.39	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

8: NW 19th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	362	66	330	513	152	88	65	271	99	46	6
Future Volume (vph)	3	362	66	330	513	152	88	65	271	99	46	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.97			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.97	
Satd. Flow (prot)	1805	1829		1787	1835			1847	1615		1830	
Flt Permitted	0.21	1.00		0.41	1.00			0.77	1.00		0.73	
Satd. Flow (perm)	392	1829		778	1835			1459	1615		1374	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	3	385	70	351	546	162	94	69	288	105	49	6
RTOR Reduction (vph)	0	12	0	0	19	0	0	0	191	0	2	0
Lane Group Flow (vph)	3	443	0	351	689	0	0	163	97	0	158	0
Heavy Vehicles (%)	0%	1%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	28.1	28.1		28.1	28.1			18.7	18.7		18.7	
Effective Green, g (s)	28.1	28.1		28.1	28.1			18.7	18.7		18.7	
Actuated g/C Ratio	0.50	0.50		0.50	0.50			0.34	0.34		0.34	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	197	921		391	924			488	541		460	
v/s Ratio Prot		0.24			0.38							
v/s Ratio Perm	0.01			c0.45				0.11	0.06		c0.12	
v/c Ratio	0.02	0.48		0.90	0.75			0.33	0.18		0.34	
Uniform Delay, d1	6.9	9.1		12.5	11.0			13.9	13.1		13.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	0.4		22.4	3.3			1.8	0.7		2.0	
Delay (s)	7.0	9.5		34.9	14.3			15.7	13.8		16.0	
Level of Service	A	A		C	B			B	B		B	
Approach Delay (s)		9.5			21.1			14.5			16.0	
Approach LOS		A			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			55.8			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			67.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 8: NW 19th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	362	66	330	513	152	88	65	271	99	46	6
Future Volume (veh/h)	3	362	66	330	513	152	88	65	271	99	46	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1841	1885	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	3	385	70	351	546	162	94	69	288	105	49	6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	4	1	0	0	0	0	0	0	0	0
Cap, veh/h	318	830	151	512	753	223	364	244	504	306	128	13
Arrive On Green	0.53	0.53	0.53	0.53	0.53	0.53	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	817	1552	282	1024	1407	418	856	779	1610	656	409	41
Grp Volume(v), veh/h	3	0	455	351	0	708	163	0	288	160	0	0
Grp Sat Flow(s),veh/h/ln	817	0	1834	1024	0	1825	1634	0	1610	1106	0	0
Q Serve(g_s), s	0.2	0.0	9.1	19.1	0.0	17.4	0.0	0.0	8.8	4.5	0.0	0.0
Cycle Q Clear(g_c), s	17.6	0.0	9.1	28.1	0.0	17.4	4.3	0.0	8.8	8.9	0.0	0.0
Prop In Lane	1.00		0.15	1.00		0.23	0.58		1.00	0.66		0.04
Lane Grp Cap(c), veh/h	318	0	981	512	0	976	607	0	504	447	0	0
V/C Ratio(X)	0.01	0.00	0.46	0.68	0.00	0.73	0.27	0.00	0.57	0.36	0.00	0.00
Avail Cap(c_a), veh/h	330	0	1009	528	0	1003	607	0	504	447	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.1	0.0	8.5	17.2	0.0	10.5	15.4	0.0	17.0	17.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.3	3.5	0.0	2.6	1.1	0.0	4.7	2.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.0	4.4	0.0	6.2	1.7	0.0	3.6	2.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	0.0	8.8	20.7	0.0	13.0	16.5	0.0	21.6	19.8	0.0	0.0
LnGrp LOS	B	A	A	C	A	B	B	A	C	B	A	A
Approach Vol, veh/h	458		1059				451		160			
Approach Delay, s/veh	8.9		15.6				19.8		19.8			
Approach LOS	A		B				B		B			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	23.0		36.1		23.0		36.1					
Change Period (Y+Rc), s	4.5		4.5		4.5		4.5					
Max Green Setting (Gmax), s	18.5		32.5		18.5		32.5					
Max Q Clear Time (g_c+I1), s	10.8		19.6		10.9		30.1					
Green Ext Time (p_c), s	1.2		2.4		0.5		1.5					
Intersection Summary												
HCM 6th Ctrl Delay	15.3											
HCM 6th LOS	B											

Queues

9: NW 9th St & NW Maple Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	151	721	14	1022	164	254
v/c Ratio	0.68	0.64	0.04	1.13	0.46	0.55
Control Delay	28.7	14.5	5.9	92.6	27.2	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	14.5	5.9	92.6	27.2	20.5
Queue Length 50th (ft)	26	182	2	~562	61	64
Queue Length 95th (ft)	#111	403	8	#790	117	136
Internal Link Dist (ft)		2888		909	535	885
Turn Bay Length (ft)	120		120			
Base Capacity (vph)	221	1119	360	908	358	463
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.64	0.04	1.13	0.46	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: NW 9th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	642	36	13	891	70	65	74	15	63	39	137
Future Volume (vph)	142	642	36	13	891	70	65	74	15	63	39	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1787	1880		1805	1859			1836			1720	
Flt Permitted	0.09	1.00		0.26	1.00			0.72			0.88	
Satd. Flow (perm)	169	1880		489	1859			1358			1534	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	151	683	38	14	948	74	69	79	16	67	41	146
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	66	0
Lane Group Flow (vph)	151	719	0	14	1019	0	0	159	0	0	188	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	1%	0%	5%	0%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.1	44.6		41.1	40.1			19.5			19.5	
Effective Green, g (s)	50.1	44.6		41.1	40.1			19.5			19.5	
Actuated g/C Ratio	0.64	0.57		0.52	0.51			0.25			0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	220	1066		272	948			336			380	
v/s Ratio Prot	c0.05	0.38		0.00	c0.55							
v/s Ratio Perm	0.39			0.03				0.12			c0.12	
v/c Ratio	0.69	0.67		0.05	1.07			0.47			0.49	
Uniform Delay, d1	17.0	11.9		10.2	19.2			25.2			25.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.6	1.7		0.1	51.4			4.7			4.5	
Delay (s)	25.6	13.6		10.3	70.6			29.9			29.9	
Level of Service	C	B		B	E			C			C	
Approach Delay (s)		15.7			69.8			29.9			29.9	
Approach LOS		B			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			42.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			78.6			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			86.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

9: NW 9th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	642	36	13	891	70	65	74	15	63	39	137
Future Volume (veh/h)	142	642	36	13	891	70	65	74	15	63	39	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1826	1900	1885	1900	1900	1900	1900	1900	1900	1885
Adj Flow Rate, veh/h	151	683	38	14	948	74	69	79	16	67	41	146
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	5	0	1	0	0	0	0	0	0	1
Cap, veh/h	212	961	53	331	847	66	215	229	41	146	99	248
Arrive On Green	0.06	0.54	0.54	0.02	0.49	0.49	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1795	1783	99	1810	1723	135	556	873	154	323	377	946
Grp Volume(v), veh/h	151	0	721	14	0	1022	164	0	0	254	0	0
Grp Sat Flow(s), veh/h/ln	1795	0	1882	1810	0	1858	1583	0	0	1646	0	0
Q Serve(g_s), s	2.9	0.0	21.3	0.3	0.0	36.5	0.0	0.0	0.0	3.6	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	21.3	0.3	0.0	36.5	6.0	0.0	0.0	9.7	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.07	0.42		0.10	0.26		0.57
Lane Grp Cap(c), veh/h	212	0	1014	331	0	913	484	0	0	493	0	0
V/C Ratio(X)	0.71	0.00	0.71	0.04	0.00	1.12	0.34	0.00	0.00	0.51	0.00	0.00
Avail Cap(c_a), veh/h	230	0	1014	425	0	913	484	0	0	493	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.0	0.0	12.8	11.2	0.0	18.9	22.3	0.0	0.0	23.7	0.0	0.0
Incr Delay (d2), s/veh	9.0	0.0	2.3	0.1	0.0	68.4	1.9	0.0	0.0	3.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	8.4	0.1	0.0	31.0	2.5	0.0	0.0	4.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.0	0.0	15.1	11.3	0.0	87.2	24.2	0.0	0.0	27.5	0.0	0.0
LnGrp LOS	C	A	B	B	A	F	C	A	A	C	A	A
Approach Vol, veh/h		872			1036			164			254	
Approach Delay, s/veh		17.0			86.2			24.2			27.5	
Approach LOS		B			F			C			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		24.0	5.8	44.5		24.0	9.3	41.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.1	36.9		19.5	5.5	36.5				
Max Q Clear Time (g_c+l1), s		8.0	2.3	23.3		11.7	4.9	38.5				
Green Ext Time (p_c), s		0.6	0.0	4.3		0.9	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			49.5									
HCM 6th LOS			D									

Queues

10: NW 6th St & NW Quince Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	130	223	110	218	250	555	126	147	735
v/c Ratio	0.60	0.44	0.50	0.45	0.56	0.35	0.16	0.33	0.58
Control Delay	30.9	7.5	26.6	9.0	12.2	12.9	3.6	8.8	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	7.5	26.6	9.0	12.2	12.9	3.6	8.8	14.4
Queue Length 50th (ft)	37	8	31	15	32	63	0	18	76
Queue Length 95th (ft)	83	51	70	58	#84	117	27	50	146
Internal Link Dist (ft)		513		592		1751			1332
Turn Bay Length (ft)	100		290		150		350	375	
Base Capacity (vph)	337	683	340	663	449	1575	778	451	1266
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.33	0.32	0.33	0.56	0.35	0.16	0.33	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	31	179	103	53	152	235	522	118	138	465	226
Future Volume (vph)	122	31	179	103	53	152	235	522	118	138	465	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.87		1.00	0.89		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	1657		1805	1651		1805	3610	1615	1752	3377	
Flt Permitted	0.54	1.00		0.53	1.00		0.26	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1001	1657		1010	1651		485	3610	1615	819	3377	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	130	33	190	110	56	162	250	555	126	147	495	240
RTOR Reduction (vph)	0	150	0	0	128	0	0	0	72	0	90	0
Lane Group Flow (vph)	130	73	0	110	90	0	250	555	54	147	645	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	0%	0%	3%	1%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		31.0	23.5	23.5	24.0	20.0	
Effective Green, g (s)	11.6	11.6		11.6	11.6		31.0	23.5	23.5	24.0	20.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.56	0.43	0.43	0.44	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	211	349		213	348		453	1542	690	425	1228	
v/s Ratio Prot		0.04			0.05		c0.08	c0.15		0.03	0.19	
v/s Ratio Perm	c0.13			0.11			c0.24		0.03	0.13		
v/c Ratio	0.62	0.21		0.52	0.26		0.55	0.36	0.08	0.35	0.52	
Uniform Delay, d1	19.7	17.9		19.2	18.1		6.8	10.7	9.3	9.5	13.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	0.3		2.1	0.4		1.5	0.7	0.2	0.5	1.6	
Delay (s)	24.9	18.2		21.3	18.5		8.3	11.3	9.6	10.0	15.4	
Level of Service	C	B		C	B		A	B	A	B	B	
Approach Delay (s)		20.7			19.5			10.3			14.5	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.4			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			55.0			Sum of lost time (s)			15.9			
Intersection Capacity Utilization			69.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	31	179	103	53	152	235	522	118	138	465	226
Future Volume (veh/h)	122	31	179	103	53	152	235	522	118	138	465	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1900	1900	1900	1856	1900	1900	1900	1856	1885	1856
Adj Flow Rate, veh/h	130	33	190	110	56	162	250	555	126	147	495	240
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	3	0	0	0	3	1	3
Cap, veh/h	314	63	363	311	111	322	473	1358	606	486	786	379
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.12	0.38	0.38	0.08	0.34	0.34
Sat Flow, veh/h	1253	244	1404	1277	430	1245	1810	3610	1610	1767	2343	1130
Grp Volume(v), veh/h	130	0	223	110	0	218	250	555	126	147	378	357
Grp Sat Flow(s),veh/h/ln	1253	0	1647	1277	0	1676	1810	1805	1610	1767	1791	1682
Q Serve(g_s), s	5.5	0.0	6.5	4.5	0.0	6.2	4.9	6.3	3.0	3.0	9.9	10.0
Cycle Q Clear(g_c), s	11.7	0.0	6.5	11.0	0.0	6.2	4.9	6.3	3.0	3.0	9.9	10.0
Prop In Lane	1.00		0.85	1.00		0.74	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	314	0	426	311	0	433	473	1358	606	486	601	564
V/C Ratio(X)	0.41	0.00	0.52	0.35	0.00	0.50	0.53	0.41	0.21	0.30	0.63	0.63
Avail Cap(c_a), veh/h	394	0	531	393	0	541	497	1358	606	506	601	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	0.0	17.8	22.5	0.0	17.6	10.9	12.8	11.8	10.6	15.6	15.6
Incr Delay (d2), s/veh	0.9	0.0	1.0	0.7	0.0	0.9	0.9	0.9	0.8	0.3	4.9	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	2.3	1.3	0.0	2.3	1.7	2.4	1.1	1.0	4.4	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	0.0	18.8	23.1	0.0	18.5	11.8	13.7	12.6	10.9	20.6	21.0
LnGrp LOS	C	A	B	C	A	B	B	B	B	B	C	C
Approach Vol, veh/h		353			328			931			882	
Approach Delay, s/veh		20.5			20.1			13.1			19.1	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.2	26.7		18.9	12.5	24.4		18.9				
Change Period (Y+Rc), s	5.7	5.7		4.5	5.7	5.7		4.5				
Max Green Setting (Gmax), s	5.1	21.0		18.0	7.5	18.6		18.0				
Max Q Clear Time (g_c+I1), s	5.0	8.3		13.7	6.9	12.0		13.0				
Green Ext Time (p_c), s	0.0	3.4		0.7	0.1	2.6		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				17.2								
HCM 6th LOS				B								

Queues

11: NW 6th St & NW Maple Ave

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	245	221	346	234	377	416	844	58	800
v/c Ratio	0.81	0.53	0.46	0.59	0.91	0.94	0.56	0.23	0.84
Control Delay	41.3	32.6	10.0	24.5	58.3	52.5	18.0	14.6	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	32.6	10.0	24.5	58.3	52.5	18.0	14.6	31.1
Queue Length 50th (ft)	84	97	58	79	177	156	157	14	154
Queue Length 95th (ft)	#183	165	118	134	#336	#333	219	33	#249
Internal Link Dist (ft)		909			1241		1329		1751
Turn Bay Length (ft)	200		200	105		105		105	
Base Capacity (vph)	301	425	755	397	422	441	1500	254	957
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.52	0.46	0.59	0.89	0.94	0.56	0.23	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	203	318	215	274	73	383	542	235	53	440	296
Future Volume (vph)	225	203	318	215	274	73	383	542	235	53	440	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1599	1784	1818		1787	3412		1717	3378	
Flt Permitted	0.23	1.00	1.00	0.47	1.00		0.16	1.00		0.33	1.00	
Satd. Flow (perm)	429	1881	1599	879	1818		296	3412		605	3378	
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)	245	221	346	234	298	79	416	589	255	58	478	322
RTOR Reduction (vph)	0	0	84	0	12	0	0	57	0	0	143	0
Lane Group Flow (vph)	245	221	262	234	365	0	416	787	0	58	657	0
Confl. Peds. (#/hr)			5	5					6	6		
Heavy Vehicles (%)	0%	1%	0%	1%	1%	2%	1%	0%	0%	5%	0%	1%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	26.8	17.7	33.5	26.6	17.6		41.2	33.7		23.9	20.9	
Effective Green, g (s)	26.8	17.7	33.5	26.6	17.6		41.2	33.7		23.9	20.9	
Actuated g/C Ratio	0.33	0.22	0.41	0.33	0.22		0.51	0.41		0.29	0.26	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	295	409	746	387	393		439	1412		218	867	
v/s Ratio Prot	c0.09	0.12	0.07	0.07	c0.20		c0.18	0.23		0.01	0.19	
v/s Ratio Perm	0.18		0.10	0.13			c0.30			0.07		
v/c Ratio	0.83	0.54	0.35	0.60	0.93		0.95	0.56		0.27	0.76	
Uniform Delay, d1	22.3	28.2	16.5	21.4	31.3		20.9	18.2		21.0	27.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.7	1.5	0.3	2.7	28.0		29.7	1.6		0.7	6.2	
Delay (s)	40.0	29.7	16.8	24.0	59.2		50.6	19.8		21.7	34.1	
Level of Service	D	C	B	C	E		D	B		C	C	
Approach Delay (s)		27.3			45.8			29.9			33.2	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			81.4			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			89.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	225	203	318	215	274	73	383	542	235	53	440	296
Future Volume (veh/h)	225	203	318	215	274	73	383	542	235	53	440	296
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1900	1885	1885	1870	1885	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	245	221	346	234	298	79	416	589	255	58	478	322
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
Percent Heavy Veh, %	0	1	0	1	1	2	1	0	0	5	0	1
Cap, veh/h	320	424	678	407	323	86	450	957	414	305	491	329
Arrive On Green	0.11	0.22	0.22	0.11	0.22	0.22	0.20	0.39	0.39	0.05	0.24	0.24
Sat Flow, veh/h	1810	1885	1599	1795	1434	380	1795	2447	1058	1739	2056	1380
Grp Volume(v), veh/h	245	221	346	234	0	377	416	434	410	58	419	381
Grp Sat Flow(s),veh/h/ln	1810	1885	1599	1795	0	1814	1795	1805	1700	1739	1805	1631
Q Serve(g_s), s	8.3	8.2	12.8	7.9	0.0	16.3	13.8	15.4	15.5	2.0	18.4	18.5
Cycle Q Clear(g_c), s	8.3	8.2	12.8	7.9	0.0	16.3	13.8	15.4	15.5	2.0	18.4	18.5
Prop In Lane	1.00		1.00	1.00		0.21	1.00		0.62	1.00		0.85
Lane Grp Cap(c), veh/h	320	424	678	407	0	408	450	706	665	305	431	389
V/C Ratio(X)	0.77	0.52	0.51	0.58	0.00	0.92	0.92	0.62	0.62	0.19	0.97	0.98
Avail Cap(c_a), veh/h	320	424	678	407	0	408	450	706	665	337	431	389
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	27.2	17.0	20.7	0.0	30.3	19.9	19.5	19.5	21.3	30.2	30.2
Incr Delay (d2), s/veh	10.6	1.1	0.6	2.0	0.0	26.5	25.0	4.0	4.2	0.3	37.1	40.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	3.7	4.5	3.4	0.0	9.8	8.4	6.9	6.5	0.8	12.1	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.8	28.4	17.7	22.7	0.0	56.9	44.8	23.5	23.8	21.6	67.3	70.6
LnGrp LOS	C	C	B	C	A	E	D	C	C	C	E	E
Approach Vol, veh/h	812			611			1260			858		
Approach Delay, s/veh	25.1			43.8			30.7			65.7		
Approach LOS	C			D			C			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	35.8	13.6	22.5	20.3	23.6	13.6	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	29.8	9.1	18.0	15.8	19.1	9.1	18.0				
Max Q Clear Time (g_c+l1), s	4.0	17.5	9.9	14.8	15.8	20.5	10.3	18.3				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.9	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	40.1											
HCM 6th LOS	D											

HCM 6th TWSC
12: NW 6th St & NW Kingwood Ave

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	12	21	0	13	16	1181	15	7	832	15
Future Vol, veh/h	6	0	12	21	0	13	16	1181	15	7	832	15
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	7
Mvmt Flow	6	0	13	23	0	14	17	1270	16	8	895	16
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1592	2244	460	1777	2244	644	915	0	0	1287	0	0
Stage 1	923	923	-	1313	1313	-	-	-	-	-	-	-
Stage 2	669	1321	-	464	931	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	73	43	554	53	43	420	754	-	-	546	-	-
Stage 1	294	351	-	170	230	-	-	-	-	-	-	-
Stage 2	418	228	-	553	348	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	68	41	552	50	41	420	751	-	-	545	-	-
Mov Cap-2 Maneuver	68	41	-	50	41	-	-	-	-	-	-	-
Stage 1	286	344	-	166	224	-	-	-	-	-	-	-
Stage 2	395	223	-	532	341	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	29.9		92		0.1		0.1					
HCM LOS	D		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	751	-	-	164	75	545	-	-				
HCM Lane V/C Ratio	0.023	-	-	0.118	0.487	0.014	-	-				
HCM Control Delay (s)	9.9	-	-	29.9	92	11.7	-	-				
HCM Lane LOS	A	-	-	D	F	B	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.4	2	0	-	-				

HCM 6th TWSC
13: NW 27th St & NW Hemlock Ave

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	26	8	86	19	10	13	211	94	10	153	5
Future Vol, veh/h	6	26	8	86	19	10	13	211	94	10	153	5
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	7	31	10	104	23	12	16	254	113	12	184	6
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	572	611	188	575	558	311	191	0	0	367	0	0
Stage 1	212	212	-	343	343	-	-	-	-	-	-	-
Stage 2	360	399	-	232	215	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	434	411	859	432	441	734	1395	-	-	1203	-	-
Stage 1	795	731	-	676	641	-	-	-	-	-	-	-
Stage 2	662	606	-	775	729	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	403	402	858	395	431	734	1394	-	-	1203	-	-
Mov Cap-2 Maneuver	403	402	-	395	431	-	-	-	-	-	-	-
Stage 1	785	723	-	669	634	-	-	-	-	-	-	-
Stage 2	620	599	-	726	721	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	14		17.8		0.3		0.5					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL		NBT	NBR EBLn1WBLn1		SBL	SBT	SBR				
Capacity (veh/h)	1394		-	-	450	418	1203	-	-			
HCM Lane V/C Ratio	0.011		-	-	0.107	0.331	0.01	-	-			
HCM Control Delay (s)	7.6		-	-	14	17.8	8	-	-			
HCM Lane LOS	A		-	-	B	C	A	-	-			
HCM 95th %tile Q(veh)	0		-	-	0.4	1.4	0	-	-			

HCM 6th AWSC
14: SW 27th St & W Antler Ave

Intersection												
Intersection Delay, s/veh	25.6											
Intersection LOS	D											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	74	50	109	114	62	62	361	91	26	257	6
Future Vol, veh/h	19	74	50	109	114	62	62	361	91	26	257	6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	20	80	54	117	123	67	67	388	98	28	276	6
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			2			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			2			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			2		
HCM Control Delay	13.4			14.4			39.4			18.3		
HCM LOS	B			B			E			C		
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2				
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%				
Vol Thru, %	0%	80%	0%	60%	0%	65%	0%	98%				
Vol Right, %	0%	20%	0%	40%	0%	35%	0%	2%				
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop				
Traffic Vol by Lane	62	452	19	124	109	176	26	263				
LT Vol	62	0	19	0	109	0	26	0				
Through Vol	0	361	0	74	0	114	0	257				
RT Vol	0	91	0	50	0	62	0	6				
Lane Flow Rate	67	486	20	133	117	189	28	283				
Geometry Grp	7	7	7	7	7	7	7	7				
Degree of Util (X)	0.135	0.898	0.049	0.286	0.265	0.387	0.06	0.565				
Departure Headway (Hd)	7.304	6.65	8.637	7.723	8.128	7.36	7.72	7.191				
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Cap	491	544	414	464	442	488	463	501				
Service Time	5.056	4.402	6.408	5.494	5.89	5.122	5.482	4.953				
HCM Lane V/C Ratio	0.136	0.893	0.048	0.287	0.265	0.387	0.06	0.565				
HCM Control Delay	11.2	43.3	11.9	13.6	13.8	14.7	11	19				
HCM Lane LOS	B	E	B	B	B	B	B	C				
HCM 95th-tile Q	0.5	10.5	0.2	1.2	1.1	1.8	0.2	3.5				

Queues

15: SW 27th St & SW Highland Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	104	820	123	979	69	449	161	301	73
v/c Ratio	0.66	1.06	0.78	1.27	0.29	1.09	1.02	0.67	0.16
Control Delay	34.7	76.2	49.1	158.7	26.3	106.8	109.1	42.7	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	76.2	49.1	158.7	26.3	106.8	109.1	42.7	1.9
Queue Length 50th (ft)	29	~575	35	~791	30	~316	~78	177	0
Queue Length 95th (ft)	#94	#811	#127	#1036	62	#510	#191	#290	8
Internal Link Dist (ft)		2552		985		760		2545	
Turn Bay Length (ft)	210		260		110		140		140
Base Capacity (vph)	157	776	157	770	237	412	158	450	459
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	1.06	0.78	1.27	0.29	1.09	1.02	0.67	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	730	49	117	720	210	66	316	110	153	286	69
Future Volume (vph)	99	730	49	117	720	210	66	316	110	153	286	69
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1684		1646	1653		1630	1667		1662	1733	1413
Flt Permitted	0.09	1.00		0.09	1.00		0.36	1.00		0.16	1.00	1.00
Satd. Flow (perm)	151	1684		151	1653		621	1667		279	1733	1413
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	768	52	123	758	221	69	333	116	161	301	73
RTOR Reduction (vph)	0	3	0	0	10	0	0	13	0	0	0	55
Lane Group Flow (vph)	104	817	0	123	969	0	69	436	0	161	301	18
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	3%	2%	1%	2%	1%	2%	0%	1%	0%	1%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	51.3	46.0		51.3	46.0		28.2	24.0		30.4	25.1	25.1
Effective Green, g (s)	51.3	46.0		51.3	46.0		28.2	24.0		30.4	25.1	25.1
Actuated g/C Ratio	0.51	0.46		0.51	0.46		0.28	0.24		0.30	0.25	0.25
Clearance Time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	156	774		156	760		217	400		158	434	354
v/s Ratio Prot	0.04	0.49		c0.04	c0.59		0.01	c0.26		c0.05	0.17	
v/s Ratio Perm	0.31			0.36			0.08			0.26		0.01
v/c Ratio	0.67	1.06		0.79	1.27		0.32	1.09		1.02	0.69	0.05
Uniform Delay, d1	22.0	27.0		21.8	27.0		27.3	38.0		33.6	34.0	28.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.3	48.1		22.7	133.8		0.8	71.5		76.7	8.8	0.3
Delay (s)	32.3	75.1		44.5	160.8		28.2	109.5		110.3	42.8	28.7
Level of Service	C	E		D	F		C	F		F	D	C
Approach Delay (s)		70.3			147.8			98.6			61.2	
Approach LOS		E			F			F			E	
Intersection Summary												
HCM 2000 Control Delay			101.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.17									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			19.4			
Intersection Capacity Utilization			111.7%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	730	49	117	720	210	66	316	110	153	286	69
Future Volume (veh/h)	99	730	49	117	720	210	66	316	110	153	286	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1736	1709	1723	1736	1723	1736	1723	1750	1736	1750	1736	1709
Adj Flow Rate, veh/h	104	768	52	123	758	221	69	333	116	161	301	73
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	3	2	1	2	1	2	0	1	0	1	3
Cap, veh/h	155	728	49	160	593	173	236	297	104	160	433	352
Arrive On Green	0.05	0.46	0.46	0.05	0.46	0.46	0.04	0.24	0.24	0.05	0.25	0.25
Sat Flow, veh/h	1654	1582	107	1654	1281	374	1641	1239	431	1667	1736	1412
Grp Volume(v), veh/h	104	0	820	123	0	979	69	0	449	161	301	73
Grp Sat Flow(s),veh/h/ln	1654	0	1690	1654	0	1655	1641	0	1670	1667	1736	1412
Q Serve(g_s), s	3.3	0.0	46.0	3.9	0.0	46.3	3.1	0.0	24.0	5.3	15.7	4.1
Cycle Q Clear(g_c), s	3.3	0.0	46.0	3.9	0.0	46.3	3.1	0.0	24.0	5.3	15.7	4.1
Prop In Lane	1.00		0.06	1.00		0.23	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	155	0	777	160	0	766	236	0	401	160	433	352
V/C Ratio(X)	0.67	0.00	1.06	0.77	0.00	1.28	0.29	0.00	1.12	1.00	0.70	0.21
Avail Cap(c_a), veh/h	160	0	777	160	0	766	251	0	401	160	433	352
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	27.0	23.4	0.0	26.8	27.9	0.0	38.0	35.3	34.1	29.7
Incr Delay (d2), s/veh	10.2	0.0	47.8	20.3	0.0	134.9	0.7	0.0	81.7	72.2	8.9	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	27.7	2.3	0.0	45.9	1.3	0.0	18.7	4.8	7.6	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	74.8	43.6	0.0	161.7	28.6	0.0	119.7	107.5	43.0	31.1
LnGrp LOS	C	A	F	D	A	F	C	A	F	F	D	C
Approach Vol, veh/h	924			1102			518			535		
Approach Delay, s/veh	70.1			148.6			107.6			60.8		
Approach LOS	E			F			F			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	29.0	10.0	51.0	9.1	29.9	9.7	51.3				
Change Period (Y+Rc), s	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0				
Max Green Setting (Gmax), s	* 5.3	24.0	* 5.3	46.0	* 5.3	24.0	* 5.3	46.0				
Max Q Clear Time (g_c+l1), s	7.3	26.0	5.9	48.0	5.1	17.7	5.3	48.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	102.9											
HCM 6th LOS	F											
Notes												

Queues

16: W Rimrock Way & W Antler Ave

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	77	213	69	255	249	95	428	114	417
v/c Ratio	0.23	0.48	0.20	0.57	0.33	0.21	0.73	0.28	0.57
Control Delay	15.1	21.1	14.8	26.4	3.2	10.4	28.2	10.7	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	21.1	14.8	26.4	3.2	10.4	28.2	10.7	19.5
Queue Length 50th (ft)	19	58	17	88	0	17	137	21	124
Queue Length 95th (ft)	45	120	41	159	35	44	#302	51	234
Internal Link Dist (ft)		1246		2345			1244		2564
Turn Bay Length (ft)	115		115		210	165		250	
Base Capacity (vph)	339	650	347	675	808	443	726	478	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.33	0.20	0.38	0.31	0.21	0.59	0.24	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	129	69	64	237	232	88	343	55	106	318	70
Future Volume (vph)	72	129	69	64	237	232	88	343	55	106	318	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1800	1774		1685	1900	1583	1804	1855		1787	1826	
Flt Permitted	0.44	1.00		0.53	1.00	1.00	0.43	1.00		0.24	1.00	
Satd. Flow (perm)	840	1774		935	1900	1583	809	1855		443	1826	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	77	139	74	69	255	249	95	369	59	114	342	75
RTOR Reduction (vph)	0	29	0	0	0	159	0	8	0	0	11	0
Lane Group Flow (vph)	77	184	0	69	255	90	95	420	0	114	406	0
Confl. Peds. (#/hr)	7		2	2		7	2		1	1		2
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	0%	0%	2%	7%	0%	0%	0%	0%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	16.0	13.2		16.0	13.2	21.0	22.8	18.6		30.0	22.2	
Effective Green, g (s)	16.0	13.2		16.0	13.2	21.0	22.8	18.6		30.0	22.2	
Actuated g/C Ratio	0.27	0.23		0.27	0.23	0.36	0.39	0.32		0.51	0.38	
Clearance Time (s)	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	
Lane Grp Cap (vph)	276	400		292	429	677	387	590		407	694	
v/s Ratio Prot	c0.01	0.10		0.01	c0.13	0.02	0.02	c0.23		c0.04	0.22	
v/s Ratio Perm	0.06			0.05		0.04	0.08			0.11		
v/c Ratio	0.28	0.46		0.24	0.59	0.13	0.25	0.71		0.28	0.59	
Uniform Delay, d1	16.2	19.5		16.1	20.2	12.6	11.6	17.5		8.8	14.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.8		0.4	2.2	0.1	0.3	4.0		0.4	1.3	
Delay (s)	16.7	20.4		16.5	22.4	12.7	11.9	21.6		9.2	15.7	
Level of Service	B	C		B	C	B	B	C		A	B	
Approach Delay (s)		19.4			17.5			19.8			14.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.5		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			58.4		Sum of lost time (s)					16.0		
Intersection Capacity Utilization			57.8%		ICU Level of Service					B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	129	69	64	237	232	88	343	55	106	318	70
Future Volume (veh/h)	72	129	69	64	237	232	88	343	55	106	318	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1870	1796	1900	1900	1900	1900	1900	1885	1885	1900
Adj Flow Rate, veh/h	77	139	74	69	255	249	95	369	59	114	342	75
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	2	7	0	0	0	0	0	1	1	0
Cap, veh/h	374	265	141	407	426	487	382	466	75	381	445	98
Arrive On Green	0.07	0.23	0.23	0.06	0.22	0.22	0.08	0.29	0.29	0.08	0.30	0.30
Sat Flow, veh/h	1810	1160	618	1711	1900	1585	1810	1598	255	1795	1490	327
Grp Volume(v), veh/h	77	0	213	69	255	249	95	0	428	114	0	417
Grp Sat Flow(s),veh/h/ln	1810	0	1777	1711	1900	1585	1810	0	1853	1795	0	1817
Q Serve(g_s), s	1.5	0.0	5.0	1.4	5.7	6.2	1.7	0.0	10.1	2.0	0.0	10.0
Cycle Q Clear(g_c), s	1.5	0.0	5.0	1.4	5.7	6.2	1.7	0.0	10.1	2.0	0.0	10.0
Prop In Lane	1.00		0.35	1.00		1.00	1.00		0.14	1.00		0.18
Lane Grp Cap(c), veh/h	374	0	406	407	426	487	382	0	541	381	0	542
V/C Ratio(X)	0.21	0.00	0.53	0.17	0.60	0.51	0.25	0.00	0.79	0.30	0.00	0.77
Avail Cap(c_a), veh/h	461	0	689	500	741	749	459	0	788	595	0	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	16.1	12.9	16.6	13.6	11.2	0.0	15.6	11.2	0.0	15.2
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.2	1.4	0.8	0.3	0.0	3.4	0.4	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	1.9	0.5	2.3	2.0	0.6	0.0	4.1	0.7	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	0.0	17.2	13.1	17.9	14.5	11.5	0.0	19.0	11.6	0.0	17.6
LnGrp LOS	B	A	B	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h		290			573			523			531	
Approach Delay, s/veh		16.1			15.9			17.6			16.3	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	17.9	7.0	14.9	7.6	18.2	7.2	14.7				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.6	20.3	5.6	18.5	5.6	24.3	5.5	18.6				
Max Q Clear Time (g_c+I1), s	4.0	12.1	3.4	7.0	3.7	12.0	3.5	8.2				
Green Ext Time (p_c), s	0.1	1.7	0.0	0.9	0.0	2.1	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			16.5									
HCM 6th LOS			B									

HCM 6th TWSC
17: SW Canyon Dr & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	263	22	34	454	2	63	22	29	0	2	22
Future Vol, veh/h	7	263	22	34	454	2	63	22	29	0	2	22
Conflicting Peds, #/hr	4	0	1	1	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	8	292	24	38	504	2	70	24	32	0	2	24
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	510	0	0	317	0	0	916	907	305	-	918	510
Stage 1	-	-	-	-	-	-	321	321	-	-	585	-
Stage 2	-	-	-	-	-	-	595	586	-	-	333	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	4	3.3
Pot Cap-1 Maneuver	1065	-	-	1255	-	-	255	278	740	0	274	567
Stage 1	-	-	-	-	-	-	695	655	-	0	501	-
Stage 2	-	-	-	-	-	-	494	500	-	0	647	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1061	-	-	1254	-	-	233	263	739	-	259	564
Mov Cap-2 Maneuver	-	-	-	-	-	-	233	263	-	-	259	-
Stage 1	-	-	-	-	-	-	688	648	-	-	478	-
Stage 2	-	-	-	-	-	-	450	477	-	-	641	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.6			26.7			11.7		
HCM LOS							D			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	290	1061	-	-	1254	-	-	564				
HCM Lane V/C Ratio	0.437	0.007	-	-	0.03	-	-	0.043				
HCM Control Delay (s)	26.7	8.4	0	-	8	0	-	11.7				
HCM Lane LOS	D	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	2.1	0	-	-	0.1	-	-	0.1				

HCM 6th TWSC
18: SW 9th St & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	233	19	6	368	2	58	30	15	7	13	7
Future Vol, veh/h	1	233	19	6	368	2	58	30	15	7	13	7
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	268	22	7	423	2	67	34	17	8	15	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	429	0	0	290	0	0	731	724	280	750	734	428
Stage 1	-	-	-	-	-	-	281	281	-	442	442	-
Stage 2	-	-	-	-	-	-	450	443	-	308	292	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1141	-	-	1283	-	-	337	354	764	330	350	631
Stage 1	-	-	-	-	-	-	726	682	-	598	580	-
Stage 2	-	-	-	-	-	-	589	579	-	706	675	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1137	-	-	1283	-	-	320	350	763	295	346	629
Mov Cap-2 Maneuver	-	-	-	-	-	-	320	350	-	295	346	-
Stage 1	-	-	-	-	-	-	725	681	-	595	574	-
Stage 2	-	-	-	-	-	-	562	573	-	654	674	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			19.9			15.5		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	359	1137	-	-	1283	-	-	373				
HCM Lane V/C Ratio	0.33	0.001	-	-	0.005	-	-	0.083				
HCM Control Delay (s)	19.9	8.2	0	-	7.8	0	-	15.5				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.4	0	-	-	0	-	-	0.3				

HCM 6th TWSC
19: NW 5th St & NW Dogwood Ave

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕				
Traffic Vol, veh/h	19	3	0	0	26	36	24	1197	15	0	0	0
Future Vol, veh/h	19	3	0	0	26	36	24	1197	15	0	0	0
Conflicting Peds, #/hr	2	0	1	1	0	2	9	0	0	0	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	3	0	0	0	0	0	0
Mvmt Flow	20	3	0	0	28	39	26	1287	16	0	0	0
Major/Minor	Minor2		Minor1		Major1							
Conflicting Flow All	721	1364	-	-	1356	654	9	0	0			
Stage 1	9	9	-	-	1347	-	-	-	-			
Stage 2	712	1355	-	-	9	-	-	-	-			
Critical Hdwy	7.5	6.5	-	-	6.5	6.96	4.1	-	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-			
Follow-up Hdwy	3.5	4	-	-	4	3.33	2.2	-	-			
Pot Cap-1 Maneuver	319	149	0	0	151	407	1624	-	-			
Stage 1	-	-	0	0	222	-	-	-	-			
Stage 2	394	220	0	0	-	-	-	-	-			
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	232	139	-	-	141	407	1610	-	-			
Mov Cap-2 Maneuver	232	139	-	-	141	-	-	-	-			
Stage 1	-	-	-	-	209	-	-	-	-			
Stage 2	291	207	-	-	-	-	-	-	-			
Approach	EB		WB		NB							
HCM Control Delay, s	24		27.3		0.3							
HCM LOS	C		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1								
Capacity (veh/h)	1610	-	-	213	227							
HCM Lane V/C Ratio	0.016	-	-	0.111	0.294							
HCM Control Delay (s)	7.3	0.2	-	24	27.3							
HCM Lane LOS	A	A	-	C	D							
HCM 95th %tile Q(veh)	0	-	-	0.4	1.2							

HCM 6th TWSC
20: NW 5th St & W Antler Ave

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕				
Traffic Vol, veh/h	30	39	0	0	44	49	22	1192	32	0	0	0
Future Vol, veh/h	30	39	0	0	44	49	22	1192	32	0	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	33	42	0	0	48	53	24	1296	35	0	0	0
Major/Minor	Minor2		Minor1		Major1							
Conflicting Flow All	721	1379	-	-	1362	667	0	0	0			
Stage 1	0	0	-	-	1362	-	-	-	-			
Stage 2	721	1379	-	-	0	-	-	-	-			
Critical Hdwy	7.5	6.5	-	-	6.5	6.9	4.1	-	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-			
Follow-up Hdwy	3.5	4	-	-	4	3.3	2.2	-	-			
Pot Cap-1 Maneuver	319	146	0	0	149	406	-	-	-			
Stage 1	-	-	0	0	218	-	-	-	-			
Stage 2	389	214	0	0	-	-	-	-	-			
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	208	146	-	-	149	406	-	-	-			
Mov Cap-2 Maneuver	208	146	-	-	149	-	-	-	-			
Stage 1	-	-	-	-	218	-	-	-	-			
Stage 2	264	214	-	-	-	-	-	-	-			
Approach	EB		WB		NB							
HCM Control Delay, s	42.7		33.6									
HCM LOS	E		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1							
Capacity (veh/h)	-	-	-	168	224							
HCM Lane V/C Ratio	-	-	-	0.446	0.451							
HCM Control Delay (s)	-	-	-	42.7	33.6							
HCM Lane LOS	-	-	-	E	D							
HCM 95th %tile Q(veh)	-	-	-	2.1	2.2							

Queues

21: SW 6th St & SW Black Butte Blvd

	→	←	↓
Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	230	224	1053
v/c Ratio	0.50	0.53	0.46
Control Delay	13.9	18.8	6.6
Queue Delay	0.0	0.0	0.0
Total Delay	13.9	18.8	6.6
Queue Length 50th (ft)	37	50	67
Queue Length 95th (ft)	72	86	136
Internal Link Dist (ft)	519	235	258
Turn Bay Length (ft)			
Base Capacity (vph)	754	718	2273
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.31	0.31	0.46
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	102	117	31	181	0	0	0	0	29	848	123
Future Volume (vph)	0	102	117	31	181	0	0	0	0	29	848	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.93			1.00						0.98	
Flt Protected		1.00			0.99						1.00	
Satd. Flow (prot)		1751			1886						3498	
Flt Permitted		1.00			0.92						1.00	
Satd. Flow (perm)		1751			1747						3498	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	107	123	33	191	0	0	0	0	31	893	129
RTOR Reduction (vph)	0	46	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	184	0	0	224	0	0	0	0	0	1037	0
Confl. Peds. (#/hr)	3		1	1		3	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		9.6			9.6						27.4	
Effective Green, g (s)		9.6			9.6						27.4	
Actuated g/C Ratio		0.21			0.21						0.61	
Clearance Time (s)		4.0			4.0						4.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		373			372						2129	
v/s Ratio Prot		0.10										
v/s Ratio Perm					0.13						0.30	
v/c Ratio		0.49			0.60						0.49	
Uniform Delay, d1		15.6			16.0						4.9	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		1.0			2.7						0.8	
Delay (s)		16.6			18.7						5.7	
Level of Service		B			B						A	
Approach Delay (s)		16.6			18.7			0.0			5.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.3			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			45.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			65.5%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩			↩						↩↩	
Traffic Volume (veh/h)	0	102	117	31	181	0	0	0	0	29	848	123
Future Volume (veh/h)	0	102	117	31	181	0	0	0	0	29	848	123
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1885	1900
Adj Flow Rate, veh/h	0	107	123	33	191	0				31	893	129
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0				0	1	0
Cap, veh/h	0	171	196	116	299	0				63	1893	289
Arrive On Green	0.00	0.21	0.21	0.21	0.21	0.00				0.61	0.61	0.61
Sat Flow, veh/h	0	806	926	112	1411	0				104	3101	473
Grp Volume(v), veh/h	0	0	230	224	0	0				563	0	490
Grp Sat Flow(s),veh/h/ln	0	0	1732	1524	0	0				1880	0	1798
Q Serve(g_s), s	0.0	0.0	5.4	1.2	0.0	0.0				7.5	0.0	6.6
Cycle Q Clear(g_c), s	0.0	0.0	5.4	6.7	0.0	0.0				7.5	0.0	6.6
Prop In Lane	0.00		0.53	0.15		0.00				0.06		0.26
Lane Grp Cap(c), veh/h	0	0	367	415	0	0				1148	0	1097
V/C Ratio(X)	0.00	0.00	0.63	0.54	0.00	0.00				0.49	0.00	0.45
Avail Cap(c_a), veh/h	0	0	712	767	0	0				1148	0	1097
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.99	0.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	16.1	16.2	0.0	0.0				4.9	0.0	4.7
Incr Delay (d2), s/veh	0.0	0.0	1.8	1.1	0.0	0.0				1.5	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.0	1.9	0.0	0.0				2.1	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	17.9	17.3	0.0	0.0				6.4	0.0	6.0
LnGrp LOS	A	A	B	B	A	A				A	A	A
Approach Vol, veh/h		230			224						1053	
Approach Delay, s/veh		17.9			17.3						6.2	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				13.5		31.5		13.5				
Change Period (Y+Rc), s				4.0		4.0		4.0				
Max Green Setting (Gmax), s				18.5		18.5		18.5				
Max Q Clear Time (g_c+I1), s				7.4		9.5		8.7				
Green Ext Time (p_c), s				1.0		4.5		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			9.6									
HCM 6th LOS			A									

Queues

22: SW 5th St & SW Black Butte Blvd

	→	←	↑
Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	114	55	1351
v/c Ratio	0.45	0.16	0.53
Control Delay	23.0	14.6	10.3
Queue Delay	0.0	0.0	0.0
Total Delay	23.0	14.6	10.3
Queue Length 50th (ft)	30	11	189
Queue Length 95th (ft)	62	31	255
Internal Link Dist (ft)	235	336	1062
Turn Bay Length (ft)			
Base Capacity (vph)	504	691	2534
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.23	0.08	0.53
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 				
Traffic Volume (vph)	97	14	0	1	44	9	178	1122	10	0	0	0
Future Volume (vph)	97	14	0	1	44	9	178	1122	10	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			1.00			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			1.00				
Flt Protected		0.96			1.00			0.99				
Satd. Flow (prot)		1820			1852			3581				
Flt Permitted		0.71			0.99			0.99				
Satd. Flow (perm)		1355			1844			3581				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	100	14	0	1	45	9	184	1157	10	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	114	0	0	47	0	0	1350	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		8.2			8.2			33.8				
Effective Green, g (s)		8.2			8.2			33.8				
Actuated g/C Ratio		0.16			0.16			0.68				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		222			302			2420				
v/s Ratio Prot												
v/s Ratio Perm		c0.08			0.03			0.38				
v/c Ratio		0.51			0.16			0.56				
Uniform Delay, d1		19.1			17.9			4.2				
Progression Factor		1.00			1.00			1.84				
Incremental Delay, d2		2.0			0.2			0.7				
Delay (s)		21.1			18.2			8.5				
Level of Service		C			B			A				
Approach Delay (s)		21.1			18.2			8.5			0.0	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			50.0		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			55.9%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

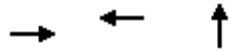
HCM 6th Signalized Intersection Summary

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (veh/h)	97	14	0	1	44	9	178	1122	10	0	0	0
Future Volume (veh/h)	97	14	0	1	44	9	178	1122	10	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	1900	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	100	14	0	1	45	9	184	1157	10			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	281	20	0	75	158	31	361	2393	22			
Arrive On Green	0.10	0.10	0.00	0.10	0.10	0.10	0.24	0.24	0.24			
Sat Flow, veh/h	1410	197	0	15	1526	302	490	3251	29			
Grp Volume(v), veh/h	114	0	0	55	0	0	704	0	647			
Grp Sat Flow(s),veh/h/ln	1607	0	0	1843	0	0	1876	0	1895			
Q Serve(g_s), s	1.9	0.0	0.0	0.0	0.0	0.0	16.2	0.0	14.6			
Cycle Q Clear(g_c), s	3.3	0.0	0.0	1.4	0.0	0.0	16.2	0.0	14.6			
Prop In Lane	0.88		0.00	0.02		0.16	0.26		0.02			
Lane Grp Cap(c), veh/h	302	0	0	265	0	0	1381	0	1395			
V/C Ratio(X)	0.38	0.00	0.00	0.21	0.00	0.00	0.51	0.00	0.46			
Avail Cap(c_a), veh/h	712	0	0	756	0	0	1381	0	1395			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.86	0.00	0.00	1.00	0.00	0.00	0.74	0.00	0.74			
Uniform Delay (d), s/veh	21.5	0.0	0.0	20.7	0.0	0.0	11.1	0.0	10.5			
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.4	0.0	0.0	1.0	0.0	0.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	0.6	0.0	0.0	8.1	0.0	7.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	0.0	21.1	0.0	0.0	12.1	0.0	11.3			
LnGrp LOS	C	A	A	C	A	A	B	A	B			
Approach Vol, veh/h		114			55			1351				
Approach Delay, s/veh		22.2			21.1			11.7				
Approach LOS		C			C			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		40.8		9.2				9.2				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.4		18.6				18.6				
Max Q Clear Time (g_c+I1), s		18.2		5.3				3.4				
Green Ext Time (p_c), s		3.6		0.4				0.2				
Intersection Summary												
HCM 6th Ctrl Delay				12.9								
HCM 6th LOS				B								

Queues

23: SW 5th St & SW Evergreen Ave



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	202	497	1131
v/c Ratio	0.49	0.80	0.63
Control Delay	16.9	24.7	11.6
Queue Delay	0.0	0.0	0.0
Total Delay	16.9	24.7	11.6
Queue Length 50th (ft)	42	107	125
Queue Length 95th (ft)	89	#235	183
Internal Link Dist (ft)	219	269	451
Turn Bay Length (ft)			
Base Capacity (vph)	466	690	1801
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.43	0.72	0.63

Intersection Summary

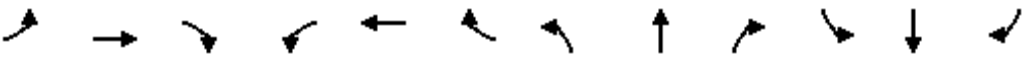
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰↱				
Traffic Volume (vph)	45	143	0	0	197	265	41	979	32	0	0	0
Future Volume (vph)	45	143	0	0	197	265	41	979	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.92			1.00				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1863			1739			3583				
Flt Permitted		0.65			1.00			1.00				
Satd. Flow (perm)		1228			1739			3583				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	154	0	0	212	285	44	1053	34	0	0	0
RTOR Reduction (vph)	0	0	0	0	32	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	202	0	0	465	0	0	1127	0	0	0	0
Confl. Peds. (#/hr)	2		1	1		2			8	8		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			8		5	2				
Permitted Phases	4											
Actuated Green, G (s)		16.9			16.9			25.1				
Effective Green, g (s)		16.9			16.9			25.1				
Actuated g/C Ratio		0.34			0.34			0.50				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		415			587			1798				
v/s Ratio Prot					c0.27			c0.31				
v/s Ratio Perm		0.16										
v/c Ratio		0.49			0.79			0.63				
Uniform Delay, d1		13.1			15.0			9.0				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.9			7.2			0.7				
Delay (s)		14.0			22.2			9.7				
Level of Service		B			C			A				
Approach Delay (s)		14.0			22.2			9.7			0.0	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		13.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		76.1%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (veh/h)	45	143	0	0	197	265	41	979	32	0	0	0
Future Volume (veh/h)	45	143	0	0	197	265	41	979	32	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1885	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	48	154	0	0	212	285	44	1053	34			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	0	1	0	0	0	0	0	0	0			
Cap, veh/h	114	298	0	0	248	333	70	1765	60			
Arrive On Green	0.34	0.34	0.00	0.00	0.34	0.34	0.50	0.50	0.50			
Sat Flow, veh/h	74	883	0	0	734	987	140	3511	119			
Grp Volume(v), veh/h	202	0	0	0	0	497	594	0	537			
Grp Sat Flow(s),veh/h/ln	957	0	0	0	0	1720	1893	0	1877			
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	13.5	11.4	0.0	10.0			
Cycle Q Clear(g_c), s	14.6	0.0	0.0	0.0	0.0	13.5	11.4	0.0	10.0			
Prop In Lane	0.24		0.00	0.00		0.57	0.07		0.06			
Lane Grp Cap(c), veh/h	412	0	0	0	0	580	952	0	944			
V/C Ratio(X)	0.49	0.00	0.00	0.00	0.00	0.86	0.62	0.00	0.57			
Avail Cap(c_a), veh/h	478	0	0	0	0	654	952	0	944			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.76	0.00	0.76			
Uniform Delay (d), s/veh	13.0	0.0	0.0	0.0	0.0	15.4	9.0	0.0	8.7			
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.0	0.0	10.0	1.0	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.0	0.0	6.0	3.7	0.0	3.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	0.0	0.0	0.0	0.0	25.4	10.0	0.0	9.3			
LnGrp LOS	B	A	A	A	A	C	A	A	A			
Approach Vol, veh/h		202			497			1131				
Approach Delay, s/veh		13.9			25.4			9.7				
Approach LOS		B			C			A				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		29.1		20.9				20.9				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.0		19.0				19.0				
Max Q Clear Time (g_c+I1), s		13.4		16.6				15.5				
Green Ext Time (p_c), s		5.0		0.3				1.1				
Intersection Summary												
HCM 6th Ctrl Delay			14.4									
HCM 6th LOS			B									

HCM 6th TWSC

1: NW Northwest Way & NW Upas Ave

Intersection

Int Delay, s/veh 0.6

Movement

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	7	10	211	155	5
Future Vol, veh/h	11	7	10	211	155	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	1	5	0
Mvmt Flow	13	8	12	245	180	6

Major/Minor

	Minor2	Major1	Major2
Conflicting Flow All	452	183	186
Stage 1	183	-	-
Stage 2	269	-	-
Critical Hdwy	6.4	6.2	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.2
Pot Cap-1 Maneuver	569	865	1401
Stage 1	853	-	-
Stage 2	781	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	563	865	1401
Mov Cap-2 Maneuver	563	-	-
Stage 1	844	-	-
Stage 2	781	-	-

Approach

	EB	NB	SB
HCM Control Delay, s	10.7	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt

	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1401	-	651	-	-
HCM Lane V/C Ratio	0.008	-	0.032	-	-
HCM Control Delay (s)	7.6	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

HCM 6th TWSC

2: NW Northwest Way & NW Spruce Ave

Intersection

Int Delay, s/veh 4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	
Traffic Vol, veh/h	4	0	73	65	0	7	112	231	88	18	141	7
Future Vol, veh/h	4	0	73	65	0	7	112	231	88	18	141	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	35	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	1	7	0	5	0
Mvmt Flow	5	0	87	77	0	8	133	275	105	21	168	8

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	812	860	172	799	759	275	176	0	0	380	0	0
Stage 1	214	214	-	541	541	-	-	-	-	-	-	-
Stage 2	598	646	-	258	218	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	300	296	877	306	338	769	1412	-	-	1190	-	-
Stage 1	793	729	-	529	524	-	-	-	-	-	-	-
Stage 2	492	470	-	751	726	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	265	255	877	246	291	769	1412	-	-	1190	-	-
Mov Cap-2 Maneuver	265	255	-	246	291	-	-	-	-	-	-	-
Stage 1	697	714	-	465	461	-	-	-	-	-	-	-
Stage 2	428	413	-	663	711	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.2		25.2		2		0.9	
HCM LOS	B		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1412	-	-	783	263	1190	-
HCM Lane V/C Ratio	0.094	-	-	0.117	0.326	0.018	-
HCM Control Delay (s)	7.8	0	-	10.2	25.2	8.1	0
HCM Lane LOS	A	A	-	B	D	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.4	1.4	0.1	-

HCM 6th TWSC

3: Northwest Way & NW Quince Ave

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	39	53	0	4	65	426	94	7	271	0
Future Vol, veh/h	0	0	39	53	0	4	65	426	94	7	271	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	0	46	63	0	5	77	507	112	8	323	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1059	1112	323	1079	1056	563	323	0	0	619	0	0
Stage 1	339	339	-	717	717	-	-	-	-	-	-	-
Stage 2	720	773	-	362	339	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	204	211	723	198	227	530	1248	-	-	971	-	-
Stage 1	680	643	-	424	437	-	-	-	-	-	-	-
Stage 2	422	412	-	661	643	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	186	189	723	170	203	530	1248	-	-	971	-	-
Mov Cap-2 Maneuver	186	189	-	170	203	-	-	-	-	-	-	-
Stage 1	615	637	-	383	395	-	-	-	-	-	-	-
Stage 2	378	372	-	612	637	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.3		36.9		0.9		0.2					
HCM LOS	B		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1248	-	-	723	179	971	-	-				
HCM Lane V/C Ratio	0.062	-	-	0.064	0.379	0.009	-	-				
HCM Control Delay (s)	8.1	0	-	10.3	36.9	8.7	0	-				
HCM Lane LOS	A	A	-	B	E	A	A	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.2	1.6	0	-	-				

HCM 6th TWSC
4: NW 22nd St & NW Quince Ave

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	19	2	0	32	7	4	5	3	3	2	0
Future Vol, veh/h	0	19	2	0	32	7	4	5	3	3	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	22	2	0	36	8	5	6	3	3	2	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	48	27	2	38	26	8	2	0	0	9	0	0
Stage 1	8	8	-	18	18	-	-	-	-	-	-	-
Stage 2	40	19	-	20	8	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	958	870	1088	972	871	1080	1634	-	-	1624	-	-
Stage 1	1019	893	-	1006	884	-	-	-	-	-	-	-
Stage 2	980	884	-	1004	893	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	917	866	1088	948	867	1080	1634	-	-	1624	-	-
Mov Cap-2 Maneuver	917	866	-	948	867	-	-	-	-	-	-	-
Stage 1	1016	891	-	1003	881	-	-	-	-	-	-	-
Stage 2	930	881	-	976	891	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	9.2		9.2			2.4			4.3			
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1634	-	-	883	899	1624	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.027	0.049	0.002	-	-				
HCM Control Delay (s)	7.2	0	-	9.2	9.2	7.2	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-				

HCM 6th TWSC
5: NW 19th St & NW Quince Ave

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	30	43	103	62	1
Future Vol, veh/h	0	30	43	103	62	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	35	50	120	72	1
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	293	73	73	0	-	0
Stage 1	73	-	-	-	-	-
Stage 2	220	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	702	995	1540	-	-	-
Stage 1	955	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	677	995	1540	-	-	-
Mov Cap-2 Maneuver	677	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.8	2.2		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1540	-	995	-	-	
HCM Lane V/C Ratio	0.032	-	0.035	-	-	
HCM Control Delay (s)	7.4	0	8.8	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	

HCM 6th Roundabout
6: NW Northwest Way & NW Maple Ave

Intersection				
Intersection Delay, s/veh	12.7			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	156	655	253	412
Demand Flow Rate, veh/h	156	655	253	703
Vehicles Circulating, veh/h	754	214	720	230
Vehicles Exiting, veh/h	179	759	190	639
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.7	10.8	10.7	18.5
Approach LOS	A	B	B	C
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	156	655	253	703
Cap Entry Lane, veh/h	640	1109	662	1091
Entry HV Adj Factor	1.000	1.000	1.000	0.586
Flow Entry, veh/h	156	655	253	412
Cap Entry, veh/h	640	1109	662	640
V/C Ratio	0.244	0.590	0.382	0.644
Control Delay, s/veh	8.7	10.8	10.7	18.5
LOS	A	B	B	C
95th %tile Queue, veh	1	4	2	5

HCM 6th TWSC
7: NW 22nd St & NW Maple Ave

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	15	398	1	5	576	32	0	0	3	20	0	5
Future Vol, veh/h	15	398	1	5	576	32	0	0	3	20	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	6	0	0	1	4	0	0	0	0	0	0
Mvmt Flow	16	428	1	5	619	34	0	0	3	22	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	653	0	0	429	0	0	1110	1124	430	1109	1107	636
Stage 1	-	-	-	-	-	-	461	461	-	646	646	-
Stage 2	-	-	-	-	-	-	649	663	-	463	461	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	943	-	-	1141	-	-	188	207	629	189	212	481
Stage 1	-	-	-	-	-	-	584	569	-	464	470	-
Stage 2	-	-	-	-	-	-	462	462	-	583	569	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	943	-	-	1141	-	-	182	201	628	184	206	481
Mov Cap-2 Maneuver	-	-	-	-	-	-	182	201	-	184	206	-
Stage 1	-	-	-	-	-	-	571	556	-	454	467	-
Stage 2	-	-	-	-	-	-	454	459	-	567	556	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.1			10.8			24.6		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	628	943	-	-	1141	-	-	210				
HCM Lane V/C Ratio	0.005	0.017	-	-	0.005	-	-	0.128				
HCM Control Delay (s)	10.8	8.9	0	-	8.2	0	-	24.6				
HCM Lane LOS	B	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.4				

Queues

8: NW 19th St & NW Maple Ave

							
Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	4	471	374	726	173	307	166
v/c Ratio	0.02	0.49	0.93	0.74	0.37	0.42	0.38
Control Delay	6.8	10.2	47.2	15.6	18.9	4.4	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	10.2	47.2	15.6	18.9	4.4	19.2
Queue Length 50th (ft)	1	89	109	167	48	0	46
Queue Length 95th (ft)	4	152	#272	288	96	47	93
Internal Link Dist (ft)		1024		2888	2569		1124
Turn Bay Length (ft)	120		120			100	
Base Capacity (vph)	223	1037	431	1047	473	725	434
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.45	0.87	0.69	0.37	0.42	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

8: NW 19th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	371	71	352	525	157	94	69	289	102	48	6
Future Volume (vph)	4	371	71	352	525	157	94	69	289	102	48	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.97			1.00	0.85		1.00	
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.97	
Satd. Flow (prot)	1805	1827		1787	1834			1847	1615		1831	
Flt Permitted	0.21	1.00		0.41	1.00			0.78	1.00		0.72	
Satd. Flow (perm)	396	1827		767	1834			1480	1615		1353	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	4	395	76	374	559	167	100	73	307	109	51	6
RTOR Reduction (vph)	0	12	0	0	19	0	0	0	209	0	2	0
Lane Group Flow (vph)	4	459	0	374	707	0	0	173	98	0	164	0
Heavy Vehicles (%)	0%	1%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	30.5	30.5		30.5	30.5			18.6	18.6		18.6	
Effective Green, g (s)	30.5	30.5		30.5	30.5			18.6	18.6		18.6	
Actuated g/C Ratio	0.52	0.52		0.52	0.52			0.32	0.32		0.32	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	207	959		402	962			473	517		433	
v/s Ratio Prot		0.25			0.39							
v/s Ratio Perm	0.01			c0.49				0.12	0.06		c0.12	
v/c Ratio	0.02	0.48		0.93	0.74			0.37	0.19		0.38	
Uniform Delay, d1	6.6	8.8		12.8	10.7			15.2	14.3		15.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	0.4		28.0	3.0			2.2	0.8		2.5	
Delay (s)	6.7	9.1		40.8	13.6			17.4	15.1		17.8	
Level of Service	A	A		D	B			B	B		B	
Approach Delay (s)		9.1			22.9			15.9			17.8	
Approach LOS		A			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			58.1			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			69.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

8: NW 19th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	371	71	352	525	157	94	69	289	102	48	6
Future Volume (veh/h)	4	371	71	352	525	157	94	69	289	102	48	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1885	1841	1885	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	4	395	76	374	559	167	100	73	307	109	51	6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	4	1	0	0	0	0	0	0	0	0
Cap, veh/h	312	832	160	507	761	227	356	237	496	291	122	12
Arrive On Green	0.54	0.54	0.54	0.54	0.54	0.54	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	803	1536	296	1009	1405	420	846	768	1610	622	394	38
Grp Volume(v), veh/h	4	0	471	374	0	726	173	0	307	166	0	0
Grp Sat Flow(s),veh/h/ln	803	0	1832	1009	0	1824	1614	0	1610	1055	0	0
Q Serve(g_s), s	0.2	0.0	9.5	21.8	0.0	18.2	0.0	0.0	9.8	5.1	0.0	0.0
Cycle Q Clear(g_c), s	18.4	0.0	9.5	31.3	0.0	18.2	4.9	0.0	9.8	10.0	0.0	0.0
Prop In Lane	1.00		0.16	1.00		0.23	0.58		1.00	0.66		0.04
Lane Grp Cap(c), veh/h	312	0	992	507	0	988	592	0	496	425	0	0
V/C Ratio(X)	0.01	0.00	0.47	0.74	0.00	0.73	0.29	0.00	0.62	0.39	0.00	0.00
Avail Cap(c_a), veh/h	312	0	992	507	0	988	592	0	496	425	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.5	0.0	8.5	18.1	0.0	10.5	15.9	0.0	17.7	18.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.4	5.6	0.0	2.9	1.2	0.0	5.7	2.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.1	5.2	0.0	6.5	1.9	0.0	4.1	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	0.0	8.8	23.8	0.0	13.3	17.2	0.0	23.4	21.2	0.0	0.0
LnGrp LOS	B	A	A	C	A	B	B	A	C	C	A	A
Approach Vol, veh/h		475			1100			480			166	
Approach Delay, s/veh		8.9			16.9			21.2			21.2	
Approach LOS		A			B			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.0		37.0		23.0		37.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.5		32.5		18.5		32.5				
Max Q Clear Time (g_c+I1), s		11.8		20.4		12.0		33.3				
Green Ext Time (p_c), s		1.2		2.4		0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				16.4								
HCM 6th LOS				B								

Queues

9: NW 9th St & NW Maple Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	157	753	15	1064	171	265
v/c Ratio	0.71	0.67	0.04	1.17	0.49	0.57
Control Delay	31.0	15.4	5.9	111.0	28.2	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	15.4	5.9	111.0	28.2	21.4
Queue Length 50th (ft)	27	195	2	~604	64	69
Queue Length 95th (ft)	#119	#488	9	#835	123	144
Internal Link Dist (ft)		2888		909	535	885
Turn Bay Length (ft)	120		120			
Base Capacity (vph)	221	1119	338	908	349	462
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.67	0.04	1.17	0.49	0.57

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

9: NW 9th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	670	38	14	927	73	68	77	16	65	40	144
Future Volume (vph)	148	670	38	14	927	73	68	77	16	65	40	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1787	1880		1805	1859			1836			1719	
Flt Permitted	0.09	1.00		0.23	1.00			0.71			0.88	
Satd. Flow (perm)	169	1880		443	1859			1325			1526	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	157	713	40	15	986	78	72	82	17	69	43	153
RTOR Reduction (vph)	0	2	0	0	3	0	0	5	0	0	67	0
Lane Group Flow (vph)	157	751	0	15	1061	0	0	166	0	0	198	0
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	1%	0%	5%	0%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.1	44.6		41.1	40.1			19.5			19.5	
Effective Green, g (s)	50.1	44.6		41.1	40.1			19.5			19.5	
Actuated g/C Ratio	0.64	0.57		0.52	0.51			0.25			0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	220	1066		248	948			328			378	
v/s Ratio Prot	c0.05	0.40		0.00	c0.57							
v/s Ratio Perm	0.40			0.03				0.13			c0.13	
v/c Ratio	0.71	0.70		0.06	1.12			0.51			0.52	
Uniform Delay, d1	17.1	12.2		10.6	19.2			25.4			25.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	10.4	2.1		0.1	67.6			5.5			5.1	
Delay (s)	27.6	14.4		10.7	86.8			30.9			30.7	
Level of Service	C	B		B	F			C			C	
Approach Delay (s)		16.7			85.8			30.9			30.7	
Approach LOS		B			F			C			C	
Intersection Summary												
HCM 2000 Control Delay			49.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			78.6			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			89.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

9: NW 9th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	670	38	14	927	73	68	77	16	65	40	144
Future Volume (veh/h)	148	670	38	14	927	73	68	77	16	65	40	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1900	1826	1900	1885	1900	1900	1900	1900	1900	1900	1885
Adj Flow Rate, veh/h	157	713	40	15	986	78	72	82	17	69	43	153
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	0	5	0	1	0	0	0	0	0	0	1
Cap, veh/h	215	959	54	310	845	67	212	225	41	146	98	250
Arrive On Green	0.07	0.54	0.54	0.02	0.49	0.49	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1795	1782	100	1810	1721	136	547	859	155	323	375	954
Grp Volume(v), veh/h	157	0	753	15	0	1064	171	0	0	265	0	0
Grp Sat Flow(s),veh/h/ln	1795	0	1882	1810	0	1857	1562	0	0	1653	0	0
Q Serve(g_s), s	3.1	0.0	22.9	0.3	0.0	36.5	0.0	0.0	0.0	3.6	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	22.9	0.3	0.0	36.5	6.5	0.0	0.0	10.1	0.0	0.0
Prop In Lane	1.00		0.05	1.00		0.07	0.42		0.10	0.26		0.58
Lane Grp Cap(c), veh/h	215	0	1013	310	0	911	478	0	0	494	0	0
V/C Ratio(X)	0.73	0.00	0.74	0.05	0.00	1.17	0.36	0.00	0.00	0.54	0.00	0.00
Avail Cap(c_a), veh/h	230	0	1013	401	0	911	478	0	0	494	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.0	0.0	13.2	11.6	0.0	18.9	22.5	0.0	0.0	23.9	0.0	0.0
Incr Delay (d2), s/veh	10.6	0.0	3.0	0.1	0.0	87.2	2.1	0.0	0.0	4.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	9.2	0.1	0.0	35.7	2.6	0.0	0.0	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.6	0.0	16.2	11.7	0.0	106.2	24.5	0.0	0.0	28.0	0.0	0.0
LnGrp LOS	C	A	B	B	A	F	C	A	A	C	A	A
Approach Vol, veh/h	910			1079			171			265		
Approach Delay, s/veh	18.2			104.9			24.5			28.0		
Approach LOS	B			F			C			C		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	24.0		5.8	44.5		24.0	9.4	41.0				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	19.5		5.1	36.9		19.5	5.5	36.5				
Max Q Clear Time (g_c+l1), s	8.5		2.3	24.9		12.1	5.1	38.5				
Green Ext Time (p_c), s	0.7		0.0	4.3		0.9	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	58.3											
HCM 6th LOS	E											

Queues

10: NW 6th St & NW Quince Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	135	234	115	228	262	587	132	152	771
v/c Ratio	0.63	0.45	0.53	0.46	0.61	0.38	0.17	0.35	0.61
Control Delay	32.3	7.3	27.6	8.9	14.8	13.3	3.8	9.3	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	7.3	27.6	8.9	14.8	13.3	3.8	9.3	15.2
Queue Length 50th (ft)	39	9	33	15	35	69	0	19	84
Queue Length 95th (ft)	87	52	74	60	#112	125	29	51	156
Internal Link Dist (ft)		513		592		1751			1332
Turn Bay Length (ft)	100		290		150		350	375	
Base Capacity (vph)	322	685	323	662	430	1564	774	438	1254
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.34	0.36	0.34	0.61	0.38	0.17	0.35	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	32	188	108	55	159	246	552	124	143	489	236
Future Volume (vph)	127	32	188	108	55	159	246	552	124	143	489	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.87		1.00	0.89		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	1656		1805	1652		1805	3610	1615	1752	3378	
Flt Permitted	0.52	1.00		0.51	1.00		0.24	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	967	1656		972	1652		448	3610	1615	794	3378	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	135	34	200	115	59	169	262	587	132	152	520	251
RTOR Reduction (vph)	0	156	0	0	132	0	0	0	76	0	90	0
Lane Group Flow (vph)	135	78	0	115	96	0	262	587	56	152	681	0
Heavy Vehicles (%)	3%	0%	0%	0%	0%	3%	0%	0%	0%	3%	1%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.1	12.1		12.1	12.1		31.1	23.6	23.6	24.1	20.1	
Effective Green, g (s)	12.1	12.1		12.1	12.1		31.1	23.6	23.6	24.1	20.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.56	0.42	0.42	0.43	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5		5.7	5.7	5.7	5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	210	360		211	359		433	1532	685	413	1221	
v/s Ratio Prot		0.05			0.06		c0.08	c0.16		0.03	0.20	
v/s Ratio Perm	c0.14			0.12			c0.26		0.03	0.13		
v/c Ratio	0.64	0.22		0.55	0.27		0.61	0.38	0.08	0.37	0.56	
Uniform Delay, d1	19.8	17.9		19.3	18.1		7.3	11.0	9.5	9.8	14.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.6	0.3		2.9	0.4		2.4	0.7	0.2	0.6	1.8	
Delay (s)	26.4	18.2		22.2	18.5		9.7	11.7	9.8	10.3	16.0	
Level of Service	C	B		C	B		A	B	A	B	B	
Approach Delay (s)		21.2			19.7			10.9			15.1	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.0			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			55.6			Sum of lost time (s)			15.9			
Intersection Capacity Utilization			71.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

10: NW 6th St & NW Quince Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	32	188	108	55	159	246	552	124	143	489	236
Future Volume (veh/h)	127	32	188	108	55	159	246	552	124	143	489	236
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1900	1900	1900	1856	1900	1900	1900	1856	1885	1856
Adj Flow Rate, veh/h	135	34	200	115	59	169	262	587	132	152	520	251
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	0	0	0	3	0	0	0	3	1	3
Cap, veh/h	314	64	374	309	115	331	459	1341	598	469	769	370
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.13	0.37	0.37	0.08	0.33	0.33
Sat Flow, veh/h	1242	239	1407	1264	434	1243	1810	3610	1610	1767	2345	1128
Grp Volume(v), veh/h	135	0	234	115	0	228	262	587	132	152	397	374
Grp Sat Flow(s),veh/h/ln	1242	0	1647	1264	0	1676	1810	1805	1610	1767	1791	1682
Q Serve(g_s), s	5.9	0.0	6.9	4.9	0.0	6.6	5.2	6.9	3.2	3.1	10.9	10.9
Cycle Q Clear(g_c), s	12.4	0.0	6.9	11.8	0.0	6.6	5.2	6.9	3.2	3.1	10.9	10.9
Prop In Lane	1.00		0.85	1.00		0.74	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	314	0	438	309	0	446	459	1341	598	469	587	551
V/C Ratio(X)	0.43	0.00	0.53	0.37	0.00	0.51	0.57	0.44	0.22	0.32	0.68	0.68
Avail Cap(c_a), veh/h	377	0	522	374	0	532	470	1341	598	483	587	551
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	17.8	22.8	0.0	17.7	11.5	13.4	12.2	11.0	16.5	16.5
Incr Delay (d2), s/veh	0.9	0.0	1.0	0.7	0.0	0.9	1.6	1.0	0.9	0.4	6.1	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	2.5	1.4	0.0	2.4	1.9	2.7	1.1	1.1	4.9	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	0.0	18.8	23.6	0.0	18.6	13.1	14.4	13.1	11.4	22.6	23.1
LnGrp LOS	C	A	B	C	A	B	B	B	B	B	C	C
Approach Vol, veh/h	369			343			981			923		
Approach Delay, s/veh	20.7			20.3			13.9			21.0		
Approach LOS	C			C			B			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.4	26.8		19.6	12.9	24.3		19.6				
Change Period (Y+Rc), s	5.7	5.7		4.5	5.7	5.7		4.5				
Max Green Setting (Gmax), s	5.1	21.0		18.0	7.5	18.6		18.0				
Max Q Clear Time (g_c+l1), s	5.1	8.9		14.4	7.2	12.9		13.8				
Green Ext Time (p_c), s	0.0	3.5		0.7	0.0	2.4		0.7				
Intersection Summary												
HCM 6th Ctrl Delay	18.2											
HCM 6th LOS	B											

Queues

11: NW 6th St & NW Maple Ave

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	255	233	359	248	395	432	894	61	841
v/c Ratio	0.85	0.55	0.48	0.63	0.94	0.98	0.63	0.26	0.89
Control Delay	46.3	33.1	11.2	26.1	62.5	59.3	20.2	15.2	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	33.1	11.2	26.1	62.5	59.3	20.2	15.2	35.9
Queue Length 50th (ft)	87	103	68	85	188	164	171	15	169
Queue Length 95th (ft)	#198	174	133	142	#358	#348	236	34	#277
Internal Link Dist (ft)		909			1241		1329		1751
Turn Bay Length (ft)	200		200	105		105		105	
Base Capacity (vph)	299	425	749	393	421	443	1410	238	948
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.55	0.48	0.63	0.94	0.98	0.63	0.26	0.89

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	214	330	228	286	77	397	572	250	56	465	309
Future Volume (vph)	235	214	330	228	286	77	397	572	250	56	465	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1881	1599	1784	1817		1787	3410		1717	3380	
Flt Permitted	0.22	1.00	1.00	0.45	1.00		0.16	1.00		0.30	1.00	
Satd. Flow (perm)	420	1881	1599	849	1817		307	3410		541	3380	
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)	255	233	359	248	311	84	432	622	272	61	505	336
RTOR Reduction (vph)	0	0	73	0	12	0	0	60	0	0	140	0
Lane Group Flow (vph)	255	233	286	248	383	0	432	834	0	61	701	0
Confl. Peds. (#/hr)			5	5					6	6		
Heavy Vehicles (%)	0%	1%	0%	1%	1%	2%	1%	0%	0%	5%	0%	1%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	27.2	18.1	33.9	27.0	18.0		40.3	31.7		24.1	20.0	
Effective Green, g (s)	27.2	18.1	33.9	27.0	18.0		40.3	31.7		24.1	20.0	
Actuated g/C Ratio	0.34	0.22	0.42	0.33	0.22		0.50	0.39		0.30	0.25	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	420	758	387	404		441	1336		220	835	
v/s Ratio Prot	c0.10	0.12	0.07	0.07	c0.21		c0.19	0.24		0.01	0.21	
v/s Ratio Perm	0.19		0.11	0.14			c0.30			0.07		
v/c Ratio	0.86	0.55	0.38	0.64	0.95		0.98	0.62		0.28	0.84	
Uniform Delay, d1	22.1	27.8	16.2	21.0	31.0		21.4	19.8		20.7	28.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.0	1.6	0.3	3.6	31.2		37.0	2.2		0.7	9.9	
Delay (s)	43.1	29.4	16.5	24.6	62.2		58.5	22.0		21.4	38.8	
Level of Service	D	C	B	C	E		E	C		C	D	
Approach Delay (s)		28.1			47.7			33.9			37.7	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			80.9			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			92.5%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

11: NW 6th St & NW Maple Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	214	330	228	286	77	397	572	250	56	465	309
Future Volume (veh/h)	235	214	330	228	286	77	397	572	250	56	465	309
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1885	1900	1885	1885	1870	1885	1900	1900	1826	1900	1885
Adj Flow Rate, veh/h	255	233	359	248	311	84	432	622	272	61	505	336
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
Percent Heavy Veh, %	0	1	0	1	1	2	1	0	0	5	0	1
Cap, veh/h	306	424	678	398	321	87	445	950	415	290	493	327
Arrive On Green	0.11	0.22	0.22	0.11	0.22	0.22	0.20	0.39	0.39	0.05	0.24	0.24
Sat Flow, veh/h	1810	1885	1599	1795	1427	385	1795	2438	1066	1739	2066	1372
Grp Volume(v), veh/h	255	233	359	248	0	395	432	460	434	61	441	400
Grp Sat Flow(s),veh/h/ln	1810	1885	1599	1795	0	1813	1795	1805	1698	1739	1805	1633
Q Serve(g_s), s	8.7	8.7	13.4	8.5	0.0	17.3	15.1	16.7	16.7	2.1	19.1	19.1
Cycle Q Clear(g_c), s	8.7	8.7	13.4	8.5	0.0	17.3	15.1	16.7	16.7	2.1	19.1	19.1
Prop In Lane	1.00		1.00	1.00		0.21	1.00		0.63	1.00		0.84
Lane Grp Cap(c), veh/h	306	424	678	398	0	408	445	704	662	290	431	390
V/C Ratio(X)	0.83	0.55	0.53	0.62	0.00	0.97	0.97	0.65	0.65	0.21	1.02	1.03
Avail Cap(c_a), veh/h	306	424	678	398	0	408	445	704	662	320	431	390
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	27.4	17.2	21.0	0.0	30.7	21.3	20.0	20.0	21.3	30.4	30.5
Incr Delay (d2), s/veh	17.7	1.5	0.8	3.0	0.0	36.2	35.2	4.7	5.0	0.4	49.5	52.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	4.0	4.7	3.7	0.0	11.3	10.2	7.5	7.1	0.8	13.9	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.1	28.9	18.0	23.9	0.0	67.0	56.5	24.7	25.0	21.7	79.9	82.9
LnGrp LOS	D	C	B	C	A	E	E	C	C	C	F	F
Approach Vol, veh/h	847			643			1326			902		
Approach Delay, s/veh	27.6			50.4			35.2			77.3		
Approach LOS	C			D			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	35.7	13.6	22.5	20.3	23.6	13.6	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.1	29.8	9.1	18.0	15.8	19.1	9.1	18.0				
Max Q Clear Time (g_c+l1), s	4.1	18.7	10.5	15.4	17.1	21.1	10.7	19.3				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.8	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	46.3											
HCM 6th LOS	D											

HCM 6th TWSC
12: NW 6th St & NW Kingwood Ave

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	13	22	0	14	17	1241	16	7	878	16
Future Vol, veh/h	6	0	13	22	0	14	17	1241	16	7	878	16
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	7
Mvmt Flow	6	0	14	24	0	15	18	1334	17	8	944	17
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1676	2361	485	1868	2361	677	965	0	0	1352	0	0
Stage 1	973	973	-	1380	1380	-	-	-	-	-	-	-
Stage 2	703	1388	-	488	981	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	63	36	533	46	36	400	722	-	-	516	-	-
Stage 1	275	333	-	155	214	-	-	-	-	-	-	-
Stage 2	399	212	-	535	330	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	59	34	531	43	34	400	719	-	-	516	-	-
Mov Cap-2 Maneuver	59	34	-	43	34	-	-	-	-	-	-	-
Stage 1	267	326	-	151	208	-	-	-	-	-	-	-
Stage 2	374	206	-	513	323	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	32.5		118.3		0.1		0.1					
HCM LOS	D		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	719	-	-	151	66	516	-	-				
HCM Lane V/C Ratio	0.025	-	-	0.135	0.587	0.015	-	-				
HCM Control Delay (s)	10.1	-	-	32.5	118.3	12.1	-	-				
HCM Lane LOS	B	-	-	D	F	B	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.5	2.5	0	-	-				

HCM 6th TWSC
13: NW 27th St & NW Hemlock Ave

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	27	8	91	21	10	14	211	100	10	153	5
Future Vol, veh/h	6	27	8	91	21	10	14	211	100	10	153	5
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	7	33	10	110	25	12	17	254	120	12	184	6
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	579	620	188	581	563	314	191	0	0	374	0	0
Stage 1	212	212	-	348	348	-	-	-	-	-	-	-
Stage 2	367	408	-	233	215	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	429	407	859	428	438	731	1395	-	-	1196	-	-
Stage 1	795	731	-	672	638	-	-	-	-	-	-	-
Stage 2	657	600	-	775	729	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	396	398	858	390	428	731	1394	-	-	1196	-	-
Mov Cap-2 Maneuver	396	398	-	390	428	-	-	-	-	-	-	-
Stage 1	785	723	-	664	630	-	-	-	-	-	-	-
Stage 2	613	593	-	724	721	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	14.1		18.5		0.3		0.5					
HCM LOS	B		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1394	-	-	444	412	1196	-	-				
HCM Lane V/C Ratio	0.012	-	-	0.111	0.357	0.01	-	-				
HCM Control Delay (s)	7.6	-	-	14.1	18.5	8	-	-				
HCM Lane LOS	A	-	-	B	C	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.4	1.6	0	-	-				

HCM 6th AWSC
14: SW 27th St & W Antler Ave

Intersection												
Intersection Delay, s/veh	29.9											
Intersection LOS	D											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	78	53	115	121	65	65	371	96	27	264	6
Future Vol, veh/h	20	78	53	115	121	65	65	371	96	27	264	6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	6	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	84	57	124	130	70	70	399	103	29	284	6
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			2			2			2		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			2			2			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	2			2			2			2		
HCM Control Delay	14			15.2			48.5			19.7		
HCM LOS	B			C			E			C		
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2				
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%				
Vol Thru, %	0%	79%	0%	60%	0%	65%	0%	98%				
Vol Right, %	0%	21%	0%	40%	0%	35%	0%	2%				
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop				
Traffic Vol by Lane	65	467	20	131	115	186	27	270				
LT Vol	65	0	20	0	115	0	27	0				
Through Vol	0	371	0	78	0	121	0	264				
RT Vol	0	96	0	53	0	65	0	6				
Lane Flow Rate	70	502	22	141	124	200	29	290				
Geometry Grp	7	7	7	7	7	7	7	7				
Degree of Util (X)	0.145	0.95	0.053	0.31	0.285	0.419	0.064	0.596				
Departure Headway (Hd)	7.471	6.813	8.841	7.924	8.301	7.534	7.922	7.392				
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes				
Cap	479	532	404	452	432	476	451	488				
Service Time	5.232	4.573	6.624	5.706	6.074	5.306	5.693	5.163				
HCM Lane V/C Ratio	0.146	0.944	0.054	0.312	0.287	0.42	0.064	0.594				
HCM Control Delay	11.5	53.7	12.1	14.3	14.4	15.7	11.2	20.6				
HCM Lane LOS	B	F	B	B	B	C	B	C				
HCM 95th-tile Q	0.5	12.1	0.2	1.3	1.2	2	0.2	3.8				

Queues

15: SW 27th St & SW Highland Ave



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	109	871	133	1035	74	469	169	313	76
v/c Ratio	0.69	1.15	0.85	1.37	0.31	1.09	1.07	0.67	0.16
Control Delay	38.2	108.7	59.4	202.2	26.0	106.7	122.6	41.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	108.7	59.4	202.2	26.0	106.7	122.6	41.8	2.2
Queue Length 50th (ft)	31	~656	39	~878	32	~332	~86	183	0
Queue Length 95th (ft)	#103	#894	#145	#1127	64	#530	#203	#287	11
Internal Link Dist (ft)		2552		766		760		2545	
Turn Bay Length (ft)	210		260		110		140		140
Base Capacity (vph)	157	760	157	754	240	429	158	468	472
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	1.15	0.85	1.37	0.31	1.09	1.07	0.67	0.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	775	52	126	764	219	70	329	117	161	297	72
Future Volume (vph)	104	775	52	126	764	219	70	329	117	161	297	72
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1684		1646	1653		1630	1666		1662	1733	1413
Flt Permitted	0.09	1.00		0.09	1.00		0.35	1.00		0.15	1.00	1.00
Satd. Flow (perm)	154	1684		154	1653		608	1666		268	1733	1413
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	109	816	55	133	804	231	74	346	123	169	313	76
RTOR Reduction (vph)	0	2	0	0	10	0	0	13	0	0	0	56
Lane Group Flow (vph)	109	869	0	133	1025	0	74	456	0	169	313	20
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	3%	2%	1%	2%	1%	2%	0%	1%	0%	1%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	50.3	45.0		50.3	45.0		29.2	25.0		31.4	26.1	26.1
Effective Green, g (s)	50.3	45.0		50.3	45.0		29.2	25.0		31.4	26.1	26.1
Actuated g/C Ratio	0.50	0.45		0.50	0.45		0.29	0.25		0.31	0.26	0.26
Clearance Time (s)	4.7	5.0		4.7	5.0		4.7	5.0		4.7	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	156	757		156	743		220	416		158	452	368
v/s Ratio Prot	0.04	0.52		c0.05	c0.62		0.01	0.27		c0.06	0.18	
v/s Ratio Perm	0.31			0.38			0.08			c0.28		0.01
v/c Ratio	0.70	1.15		0.85	1.38		0.34	1.10		1.07	0.69	0.05
Uniform Delay, d1	22.2	27.5		22.5	27.5		26.7	37.5		33.1	33.3	27.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.8	81.5		33.6	178.9		0.9	72.9		91.4	8.5	0.3
Delay (s)	35.0	109.0		56.2	206.4		27.6	110.4		124.4	41.8	28.0
Level of Service	D	F		E	F		C	F		F	D	C
Approach Delay (s)		100.8			189.3			99.1			64.9	
Approach LOS		F			F			F			E	
Intersection Summary												
HCM 2000 Control Delay	126.2			HCM 2000 Level of Service			F					
HCM 2000 Volume to Capacity ratio	1.24											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			19.4					
Intersection Capacity Utilization	116.8%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 15: SW 27th St & SW Highland Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	775	52	126	764	219	70	329	117	161	297	72
Future Volume (veh/h)	104	775	52	126	764	219	70	329	117	161	297	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1736	1709	1723	1736	1723	1736	1723	1750	1736	1750	1736	1709
Adj Flow Rate, veh/h	109	816	55	133	804	231	74	346	123	169	313	76
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	3	2	1	2	1	2	0	1	0	1	3
Cap, veh/h	159	712	48	160	579	166	241	308	109	160	446	362
Arrive On Green	0.05	0.45	0.45	0.05	0.45	0.45	0.05	0.25	0.25	0.05	0.26	0.26
Sat Flow, veh/h	1654	1583	107	1654	1286	370	1641	1231	438	1667	1736	1412
Grp Volume(v), veh/h	109	0	871	133	0	1035	74	0	469	169	313	76
Grp Sat Flow(s),veh/h/ln	1654	0	1690	1654	0	1656	1641	0	1669	1667	1736	1412
Q Serve(g_s), s	3.5	0.0	45.0	4.3	0.0	45.1	3.3	0.0	25.0	5.3	16.3	4.2
Cycle Q Clear(g_c), s	3.5	0.0	45.0	4.3	0.0	45.1	3.3	0.0	25.0	5.3	16.3	4.2
Prop In Lane	1.00		0.06	1.00		0.22	1.00		0.26	1.00		1.00
Lane Grp Cap(c), veh/h	159	0	760	160	0	746	241	0	417	160	446	362
V/C Ratio(X)	0.69	0.00	1.15	0.83	0.00	1.39	0.31	0.00	1.12	1.05	0.70	0.21
Avail Cap(c_a), veh/h	160	0	760	160	0	746	252	0	417	160	446	362
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	27.5	23.6	0.0	27.5	27.3	0.0	37.5	34.8	33.7	29.2
Incr Delay (d2), s/veh	11.5	0.0	80.6	29.8	0.0	182.6	0.7	0.0	82.3	86.1	8.9	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	34.1	2.9	0.0	54.6	1.3	0.0	19.5	5.4	7.9	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	0.0	108.1	53.3	0.0	210.1	28.0	0.0	119.8	120.9	42.7	30.5
LnGrp LOS	C	A	F	D	A	F	C	A	F	F	D	C
Approach Vol, veh/h	980			1168			543			558		
Approach Delay, s/veh	100.0			192.2			107.3			64.7		
Approach LOS	F			F			F			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	30.0	10.0	50.0	9.3	30.7	9.9	50.1				
Change Period (Y+Rc), s	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0	* 4.7	5.0				
Max Green Setting (Gmax), s	* 5.3	25.0	* 5.3	45.0	* 5.3	25.0	* 5.3	45.0				
Max Q Clear Time (g_c+I1), s	7.3	27.0	6.3	47.0	5.3	18.3	5.5	47.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			128.3									
HCM 6th LOS			F									
Notes												

Queues

16: W Rimrock Way & W Antler Ave

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	226	73	270	262	100	457	119	447
v/c Ratio	0.25	0.46	0.20	0.62	0.36	0.25	0.79	0.32	0.62
Control Delay	15.4	20.5	14.8	28.9	3.3	11.3	32.5	11.8	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	20.5	14.8	28.9	3.3	11.3	32.5	11.8	21.5
Queue Length 50th (ft)	21	64	18	95	0	19	153	23	138
Queue Length 95th (ft)	47	127	43	169	35	46	#334	53	255
Internal Link Dist (ft)		1246		2345			1244		2564
Turn Bay Length (ft)	115		115		210	165		250	
Base Capacity (vph)	332	625	361	629	791	398	682	430	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.36	0.20	0.43	0.33	0.25	0.67	0.28	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

16: W Rimrock Way & W Antler Ave

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	77	136	74	68	251	244	93	367	58	111	341	74	
Future Volume (vph)	77	136	74	68	251	244	93	367	58	111	341	74	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	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		
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.97		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1800	1772		1685	1900	1582	1804	1856		1787	1826		
Flt Permitted	0.39	1.00		0.55	1.00	1.00	0.37	1.00		0.20	1.00		
Satd. Flow (perm)	736	1772		970	1900	1582	709	1856		369	1826		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	83	146	80	73	270	262	100	395	62	119	367	80	
RTOR Reduction (vph)	0	28	0	0	0	167	0	8	0	0	11	0	
Lane Group Flow (vph)	83	198	0	73	270	95	100	449	0	119	436	0	
Confl. Peds. (#/hr)	7		2	2		7	2		1	1		2	
Confl. Bikes (#/hr)												1	
Heavy Vehicles (%)	0%	0%	2%	7%	0%	0%	0%	0%	0%	1%	1%	0%	
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		
Protected Phases	7	4		3	8	1	5	2		1	6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	19.5	15.5		17.5	14.5	22.3	23.6	19.5		31.0	23.2		
Effective Green, g (s)	19.5	15.5		17.5	14.5	22.3	23.6	19.5		31.0	23.2		
Actuated g/C Ratio	0.32	0.25		0.28	0.23	0.36	0.38	0.32		0.50	0.38		
Clearance Time (s)	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		
Lane Grp Cap (vph)	301	444		309	445	673	343	585		364	685		
v/s Ratio Prot	c0.02	0.11		0.01	c0.14	0.02	0.02	c0.24		c0.04	0.24		
v/s Ratio Perm	0.07			0.06		0.04	0.09			0.12			
v/c Ratio	0.28	0.44		0.24	0.61	0.14	0.29	0.77		0.33	0.64		
Uniform Delay, d1	15.4	19.5		16.6	21.1	13.3	12.7	19.1		10.1	15.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.5	0.7		0.4	2.3	0.1	0.5	6.0		0.5	2.0		
Delay (s)	15.9	20.2		17.0	23.4	13.4	13.2	25.1		10.6	17.8		
Level of Service	B	C		B	C	B	B	C		B	B		
Approach Delay (s)		19.1			18.3			23.0			16.3		
Approach LOS		B			B			C			B		
Intersection Summary													
HCM 2000 Control Delay			19.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60										
Actuated Cycle Length (s)			61.8									Sum of lost time (s)	16.0
Intersection Capacity Utilization			60.2%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary

16: W Rimrock Way & W Antler Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	136	74	68	251	244	93	367	58	111	341	74
Future Volume (veh/h)	77	136	74	68	251	244	93	367	58	111	341	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1900	1870	1796	1900	1900	1900	1900	1900	1885	1885	1900
Adj Flow Rate, veh/h	83	146	80	73	270	262	100	395	62	119	367	80
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	2	7	0	0	0	0	0	1	1	0
Cap, veh/h	363	266	146	396	432	491	367	487	76	367	462	101
Arrive On Green	0.07	0.23	0.23	0.06	0.23	0.23	0.08	0.30	0.30	0.08	0.31	0.31
Sat Flow, veh/h	1810	1147	629	1711	1900	1585	1810	1602	251	1795	1492	325
Grp Volume(v), veh/h	83	0	226	73	270	262	100	0	457	119	0	447
Grp Sat Flow(s),veh/h/ln	1810	0	1776	1711	1900	1585	1810	0	1854	1795	0	1817
Q Serve(g_s), s	1.7	0.0	5.6	1.6	6.4	6.9	1.8	0.0	11.4	2.2	0.0	11.3
Cycle Q Clear(g_c), s	1.7	0.0	5.6	1.6	6.4	6.9	1.8	0.0	11.4	2.2	0.0	11.3
Prop In Lane	1.00		0.35	1.00		1.00	1.00		0.14	1.00		0.18
Lane Grp Cap(c), veh/h	363	0	412	396	432	491	367	0	563	367	0	562
V/C Ratio(X)	0.23	0.00	0.55	0.18	0.62	0.53	0.27	0.00	0.81	0.32	0.00	0.79
Avail Cap(c_a), veh/h	438	0	656	479	706	719	434	0	752	566	0	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	16.9	13.4	17.4	14.4	11.6	0.0	16.1	11.6	0.0	15.8
Incr Delay (d2), s/veh	0.3	0.0	1.1	0.2	1.5	0.9	0.4	0.0	5.0	0.5	0.0	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	2.1	0.6	2.6	2.2	0.6	0.0	4.9	0.8	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.8	0.0	18.1	13.7	18.9	15.3	12.0	0.0	21.1	12.1	0.0	18.6
LnGrp LOS	B	A	B	B	B	B	B	A	C	B	A	B
Approach Vol, veh/h	309			605			557			566		
Approach Delay, s/veh	16.9			16.7			19.5			17.2		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	19.2	7.2	15.6	7.8	19.5	7.4	15.4				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	9.6	20.3	5.6	18.5	5.6	24.3	5.5	18.6				
Max Q Clear Time (g_c+l1), s	4.2	13.4	3.6	7.6	3.8	13.3	3.7	8.9				
Green Ext Time (p_c), s	0.1	1.6	0.0	0.9	0.0	2.1	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay	17.6											
HCM 6th LOS	B											

HCM 6th TWSC
17: SW Canyon Dr & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↗
Traffic Vol, veh/h	7	277	23	36	479	2	67	23	30	0	2	23
Future Vol, veh/h	7	277	23	36	479	2	67	23	30	0	2	23
Conflicting Peds, #/hr	4	0	1	1	0	4	1	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	8	308	26	40	532	2	74	26	33	0	2	26
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	538	0	0	335	0	0	966	956	322	-	968	538
Stage 1	-	-	-	-	-	-	338	338	-	-	617	-
Stage 2	-	-	-	-	-	-	628	618	-	-	351	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	4	3.3
Pot Cap-1 Maneuver	1040	-	-	1236	-	-	236	260	724	0	256	547
Stage 1	-	-	-	-	-	-	681	644	-	0	484	-
Stage 2	-	-	-	-	-	-	474	484	-	0	636	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1036	-	-	1235	-	-	213	244	723	-	241	544
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	244	-	-	241	-
Stage 1	-	-	-	-	-	-	674	637	-	-	460	-
Stage 2	-	-	-	-	-	-	428	460	-	-	629	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.6			31.4			11.9		
HCM LOS							D			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	266	1036	-	-	1235	-	-	544				
HCM Lane V/C Ratio	0.501	0.008	-	-	0.032	-	-	0.047				
HCM Control Delay (s)	31.4	8.5	0	-	8	0	-	11.9				
HCM Lane LOS	D	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	2.6	0	-	-	0.1	-	-	0.1				

HCM 6th TWSC
18: SW 9th St & SW Black Butte Blvd

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	246	20	6	388	2	61	32	16	7	14	7
Future Vol, veh/h	1	246	20	6	388	2	61	32	16	7	14	7
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	283	23	7	446	2	70	37	18	8	16	8
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	452	0	0	306	0	0	770	763	296	790	773	451
Stage 1	-	-	-	-	-	-	297	297	-	465	465	-
Stage 2	-	-	-	-	-	-	473	466	-	325	308	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1119	-	-	1266	-	-	318	337	748	310	332	613
Stage 1	-	-	-	-	-	-	712	671	-	581	566	-
Stage 2	-	-	-	-	-	-	572	566	-	692	664	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1115	-	-	1266	-	-	300	333	747	274	328	611
Mov Cap-2 Maneuver	-	-	-	-	-	-	300	333	-	274	328	-
Stage 1	-	-	-	-	-	-	711	670	-	578	560	-
Stage 2	-	-	-	-	-	-	544	560	-	637	663	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			21.6			16.3		
HCM LOS							C			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	340	1115	-	-	1266	-	-	351				
HCM Lane V/C Ratio	0.368	0.001	-	-	0.005	-	-	0.092				
HCM Control Delay (s)	21.6	8.2	0	-	7.9	0	-	16.3				
HCM Lane LOS	C	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	1.6	0	-	-	0	-	-	0.3				

HCM 6th TWSC
19: NW 5th St & NW Dogwood Ave

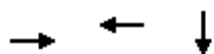
Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕				
Traffic Vol, veh/h	20	4	0	0	28	38	26	1260	16	0	0	0
Future Vol, veh/h	20	4	0	0	28	38	26	1260	16	0	0	0
Conflicting Peds, #/hr	2	0	1	1	0	2	9	0	0	0	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	0	3	0	0	0	0	0	0
Mvmt Flow	22	4	0	0	30	41	28	1355	17	0	0	0
Major/Minor	Minor2		Minor1		Major1							
Conflicting Flow All	760	1437	-	-	1429	688	9	0	0			
Stage 1	9	9	-	-	1420	-	-	-	-			
Stage 2	751	1428	-	-	9	-	-	-	-			
Critical Hdwy	7.5	6.5	-	-	6.5	6.96	4.1	-	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-			
Follow-up Hdwy	3.5	4	-	-	4	3.33	2.2	-	-			
Pot Cap-1 Maneuver	299	135	0	0	136	386	1624	-	-			
Stage 1	-	-	0	0	204	-	-	-	-			
Stage 2	373	203	0	0	-	-	-	-	-			
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	204	124	-	-	125	386	1610	-	-			
Mov Cap-2 Maneuver	204	124	-	-	125	-	-	-	-			
Stage 1	-	-	-	-	189	-	-	-	-			
Stage 2	260	188	-	-	-	-	-	-	-			
Approach	EB		WB		NB							
HCM Control Delay, s	27.7		31.6		0.4							
HCM LOS	D		D									
Minor Lane/Major Mvmt	NBL		NBT		NBR		EBLn1WBLn1					
Capacity (veh/h)	1610		-		-		184		205			
HCM Lane V/C Ratio	0.017		-		-		0.14		0.346			
HCM Control Delay (s)	7.3		0.3		-		27.7		31.6			
HCM Lane LOS	A		A		-		D		D			
HCM 95th %tile Q(veh)	0.1		-		-		0.5		1.5			

HCM 6th TWSC
20: NW 5th St & W Antler Ave

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕				
Traffic Vol, veh/h	31	41	0	0	47	52	23	1257	34	0	0	0
Future Vol, veh/h	31	41	0	0	47	52	23	1257	34	0	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	34	45	0	0	51	57	25	1366	37	0	0	0
Major/Minor	Minor2		Minor1		Major1							
Conflicting Flow All	760	1453	-	-	1435	703	0	0	0			
Stage 1	0	0	-	-	1435	-	-	-	-			
Stage 2	760	1453	-	-	0	-	-	-	-			
Critical Hdwy	7.5	6.5	-	-	6.5	6.9	4.1	-	-			
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-			
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-			
Follow-up Hdwy	3.5	4	-	-	4	3.3	2.2	-	-			
Pot Cap-1 Maneuver	299	132	0	0	135	385	-	-	-			
Stage 1	-	-	0	0	201	-	-	-	-			
Stage 2	369	197	0	0	-	-	-	-	-			
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	180	132	-	-	135	385	-	-	-			
Mov Cap-2 Maneuver	180	132	-	-	135	-	-	-	-			
Stage 1	-	-	-	-	201	-	-	-	-			
Stage 2	235	197	-	-	-	-	-	-	-			
Approach	EB		WB		NB							
HCM Control Delay, s	53.2		40.5									
HCM LOS	F		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1							
Capacity (veh/h)	-	-	-	149	205							
HCM Lane V/C Ratio	-	-	-	0.525	0.525							
HCM Control Delay (s)	-	-	-	53.2	40.5							
HCM Lane LOS	-	-	-	F	E							
HCM 95th %tile Q(veh)	-	-	-	2.6	2.7							

Queues

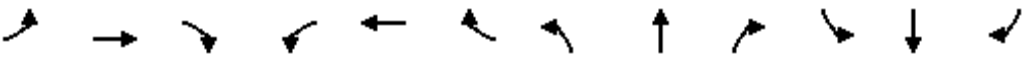
21: SW 6th St & SW Black Butte Blvd



Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	244	236	1115
v/c Ratio	0.52	0.54	0.55
Control Delay	14.8	18.7	7.8
Queue Delay	0.0	0.0	0.0
Total Delay	14.8	18.7	7.8
Queue Length 50th (ft)	42	53	75
Queue Length 95th (ft)	79	89	151
Internal Link Dist (ft)	519	235	258
Turn Bay Length (ft)			
Base Capacity (vph)	749	720	2022
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	0.33	0.55
Intersection Summary			

HCM Signalized Intersection Capacity Analysis

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱						↰↱	
Traffic Volume (vph)	0	109	123	33	191	0	0	0	0	30	898	131
Future Volume (vph)	0	109	123	33	191	0	0	0	0	30	898	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.93			1.00						0.98	
Flt Protected		1.00			0.99						1.00	
Satd. Flow (prot)		1752			1886						3497	
Flt Permitted		1.00			0.92						1.00	
Satd. Flow (perm)		1752			1751						3497	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	115	129	35	201	0	0	0	0	32	945	138
RTOR Reduction (vph)	0	37	0	0	0	0	0	0	0	0	18	0
Lane Group Flow (vph)	0	207	0	0	236	0	0	0	0	0	1097	0
Confl. Peds. (#/hr)	3		1	1		3	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		11.2			11.2						25.8	
Effective Green, g (s)		11.2			11.2						25.8	
Actuated g/C Ratio		0.25			0.25						0.57	
Clearance Time (s)		4.0			4.0						4.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		436			435						2004	
v/s Ratio Prot		0.12										
v/s Ratio Perm					0.13						0.31	
v/c Ratio		0.48			0.54						0.55	
Uniform Delay, d1		14.4			14.7						6.0	
Progression Factor		1.00			1.00						1.00	
Incremental Delay, d2		0.8			1.4						1.1	
Delay (s)		15.2			16.1						7.1	
Level of Service		B			B						A	
Approach Delay (s)		15.2			16.1			0.0			7.1	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.6			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			45.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			68.5%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

21: SW 6th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		EBT			WBT						SBT	
Traffic Volume (veh/h)	0	109	123	33	191	0	0	0	0	30	898	131
Future Volume (veh/h)	0	109	123	33	191	0	0	0	0	30	898	131
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1900	1900	1900	1900	0				1900	1885	1900
Adj Flow Rate, veh/h	0	115	129	35	201	0				32	945	138
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0				0	1	0
Cap, veh/h	0	181	203	117	310	0				61	1860	287
Arrive On Green	0.00	0.22	0.22	0.22	0.22	0.00				0.60	0.60	0.60
Sat Flow, veh/h	0	817	917	111	1398	0				101	3098	478
Grp Volume(v), veh/h	0	0	244	236	0	0				596	0	519
Grp Sat Flow(s), veh/h/ln	0	0	1734	1510	0	0				1880	0	1797
Q Serve(g_s), s	0.0	0.0	5.7	1.3	0.0	0.0				8.3	0.0	7.3
Cycle Q Clear(g_c), s	0.0	0.0	5.7	7.1	0.0	0.0				8.3	0.0	7.3
Prop In Lane	0.00		0.53	0.15		0.00				0.05		0.27
Lane Grp Cap(c), veh/h	0	0	385	427	0	0				1129	0	1079
V/C Ratio(X)	0.00	0.00	0.63	0.55	0.00	0.00				0.53	0.00	0.48
Avail Cap(c_a), veh/h	0	0	713	761	0	0				1129	0	1079
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.99	0.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	15.9	15.9	0.0	0.0				5.3	0.0	5.1
Incr Delay (d2), s/veh	0.0	0.0	1.7	1.1	0.0	0.0				1.8	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.1	2.0	0.0	0.0				2.4	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	17.6	17.0	0.0	0.0				7.0	0.0	6.6
LnGrp LOS	A	A	B	B	A	A				A	A	A
Approach Vol, veh/h		244			236						1115	
Approach Delay, s/veh		17.6			17.0						6.8	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				14.0		31.0		14.0				
Change Period (Y+Rc), s				4.0		4.0		4.0				
Max Green Setting (Gmax), s				18.5		18.5		18.5				
Max Q Clear Time (g_c+I1), s				7.7		10.3		9.1				
Green Ext Time (p_c), s				1.0		4.4		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			10.0									
HCM 6th LOS			A									

Queues

22: SW 5th St & SW Black Butte Blvd

	→	←	↑
Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	121	58	1424
v/c Ratio	0.47	0.16	0.57
Control Delay	23.1	14.5	10.5
Queue Delay	0.0	0.0	0.0
Total Delay	23.1	14.5	10.5
Queue Length 50th (ft)	32	12	198
Queue Length 95th (ft)	64	32	274
Internal Link Dist (ft)	235	336	1062
Turn Bay Length (ft)			
Base Capacity (vph)	502	692	2517
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.24	0.08	0.57
Intersection Summary			

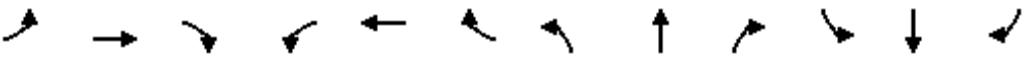
HCM Signalized Intersection Capacity Analysis

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↱			↰↱				
Traffic Volume (vph)	103	15	0	1	47	9	187	1183	11	0	0	0
Future Volume (vph)	103	15	0	1	47	9	187	1183	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			1.00			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			1.00				
Flt Protected		0.96			1.00			0.99				
Satd. Flow (prot)		1820			1855			3581				
Flt Permitted		0.71			0.99			0.99				
Satd. Flow (perm)		1352			1847			3581				
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	106	15	0	1	48	9	193	1220	11	0	0	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	121	0	0	51	0	0	1423	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		4			8			2				
Permitted Phases	4			8			2					
Actuated Green, G (s)		8.5			8.5			33.5				
Effective Green, g (s)		8.5			8.5			33.5				
Actuated g/C Ratio		0.17			0.17			0.67				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		229			313			2399				
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.03			0.40				
v/c Ratio		0.53			0.16			0.59				
Uniform Delay, d1		18.9			17.7			4.5				
Progression Factor		1.00			1.00			1.74				
Incremental Delay, d2		2.2			0.2			0.8				
Delay (s)		21.1			18.0			8.6				
Level of Service		C			B			A				
Approach Delay (s)		21.1			18.0			8.6			0.0	
Approach LOS		C			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		9.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		58.3%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

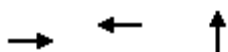
HCM 6th Signalized Intersection Summary

22: SW 5th St & SW Black Butte Blvd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (veh/h)	103	15	0	1	47	9	187	1183	11	0	0	0
Future Volume (veh/h)	103	15	0	1	47	9	187	1183	11	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	1900	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	106	15	0	1	48	9	193	1220	11			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	289	22	0	75	169	31	356	2375	22			
Arrive On Green	0.11	0.11	0.00	0.11	0.11	0.11	0.24	0.24	0.24			
Sat Flow, veh/h	1405	199	0	13	1545	286	487	3252	31			
Grp Volume(v), veh/h	121	0	0	58	0	0	743	0	681			
Grp Sat Flow(s),veh/h/ln	1604	0	0	1845	0	0	1876	0	1894			
Q Serve(g_s), s	2.1	0.0	0.0	0.0	0.0	0.0	17.3	0.0	15.5			
Cycle Q Clear(g_c), s	3.5	0.0	0.0	1.4	0.0	0.0	17.3	0.0	15.5			
Prop In Lane	0.88		0.00	0.02		0.16	0.26		0.02			
Lane Grp Cap(c), veh/h	311	0	0	275	0	0	1370	0	1384			
V/C Ratio(X)	0.39	0.00	0.00	0.21	0.00	0.00	0.54	0.00	0.49			
Avail Cap(c_a), veh/h	711	0	0	757	0	0	1370	0	1384			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33			
Upstream Filter(I)	0.85	0.00	0.00	1.00	0.00	0.00	0.68	0.00	0.68			
Uniform Delay (d), s/veh	21.3	0.0	0.0	20.5	0.0	0.0	11.7	0.0	11.0			
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.4	0.0	0.0	1.1	0.0	0.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	0.6	0.0	0.0	8.6	0.0	7.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	0.0	0.0	20.8	0.0	0.0	12.7	0.0	11.8			
LnGrp LOS	C	A	A	C	A	A	B	A	B			
Approach Vol, veh/h		121			58			1424				
Approach Delay, s/veh		22.0			20.8			12.3				
Approach LOS		C			C			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		40.5		9.5				9.5				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.4		18.6				18.6				
Max Q Clear Time (g_c+I1), s		19.3		5.5				3.4				
Green Ext Time (p_c), s		3.1		0.4				0.2				
Intersection Summary												
HCM 6th Ctrl Delay				13.3								
HCM 6th LOS				B								

Queues

23: SW 5th St & SW Evergreen Ave



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	214	526	1194
v/c Ratio	0.54	0.84	0.67
Control Delay	18.2	27.6	12.5
Queue Delay	0.0	0.0	0.0
Total Delay	18.2	27.6	12.5
Queue Length 50th (ft)	46	119	136
Queue Length 95th (ft)	97	#261	198
Internal Link Dist (ft)	219	269	451
Turn Bay Length (ft)			
Base Capacity (vph)	437	686	1770
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.49	0.77	0.67

Intersection Summary

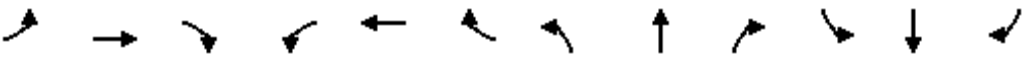
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	152	0	0	209	280	43	1033	34	0	0	0
Future Volume (vph)	47	152	0	0	209	280	43	1033	34	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.92			1.00				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1863			1739			3583				
Flt Permitted		0.61			1.00			1.00				
Satd. Flow (perm)		1150			1739			3583				
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	51	163	0	0	225	301	46	1111	37	0	0	0
RTOR Reduction (vph)	0	0	0	0	26	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	214	0	0	500	0	0	1190	0	0	0	0
Confl. Peds. (#/hr)	2		1	1		2			8	8		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA			NA		Prot	NA				
Protected Phases		4			8		5	2				
Permitted Phases	4											
Actuated Green, G (s)		17.3			17.3			24.7				
Effective Green, g (s)		17.3			17.3			24.7				
Actuated g/C Ratio		0.35			0.35			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		397			601			1770				
v/s Ratio Prot					c0.29			c0.33				
v/s Ratio Perm		0.19										
v/c Ratio		0.54			0.83			0.67				
Uniform Delay, d1		13.1			15.0			9.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		1.4			9.6			1.0				
Delay (s)		14.6			24.6			10.6				
Level of Service		B			C			B				
Approach Delay (s)		14.6			24.6			10.6			0.0	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM 2000 Control Delay		14.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		50.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		79.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM 6th Signalized Intersection Summary 23: SW 5th St & SW Evergreen Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰↱				
Traffic Volume (veh/h)	47	152	0	0	209	280	43	1033	34	0	0	0
Future Volume (veh/h)	47	152	0	0	209	280	43	1033	34	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1885	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	51	163	0	0	225	301	46	1111	37			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	0	1	0	0	0	0	0	0	0			
Cap, veh/h	115	302	0	0	261	349	67	1703	59			
Arrive On Green	0.35	0.35	0.00	0.00	0.35	0.35	0.49	0.49	0.49			
Sat Flow, veh/h	73	851	0	0	736	985	139	3508	123			
Grp Volume(v), veh/h	214	0	0	0	0	526	628	0	566			
Grp Sat Flow(s),veh/h/ln	924	0	0	0	0	1721	1893	0	1877			
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	14.2	12.8	0.0	11.1			
Cycle Q Clear(g_c), s	15.6	0.0	0.0	0.0	0.0	14.2	12.8	0.0	11.1			
Prop In Lane	0.24		0.00	0.00		0.57	0.07		0.07			
Lane Grp Cap(c), veh/h	417	0	0	0	0	610	919	0	911			
V/C Ratio(X)	0.51	0.00	0.00	0.00	0.00	0.86	0.68	0.00	0.62			
Avail Cap(c_a), veh/h	456	0	0	0	0	654	919	0	911			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	0.76	0.00	0.76			
Uniform Delay (d), s/veh	12.6	0.0	0.0	0.0	0.0	15.0	9.9	0.0	9.5			
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.0	0.0	10.9	1.6	0.0	1.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	0.0	0.0	6.4	4.4	0.0	3.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.5	0.0	0.0	0.0	0.0	25.8	11.5	0.0	10.5			
LnGrp LOS	B	A	A	A	A	C	B	A	B			
Approach Vol, veh/h		214			526			1194				
Approach Delay, s/veh		13.5			25.8			11.0				
Approach LOS		B			C			B				
Timer - Assigned Phs		2		4				8				
Phs Duration (G+Y+Rc), s		28.3		21.7				21.7				
Change Period (Y+Rc), s		4.0		4.0				4.0				
Max Green Setting (Gmax), s		23.0		19.0				19.0				
Max Q Clear Time (g_c+I1), s		14.8		17.6				16.2				
Green Ext Time (p_c), s		4.7		0.2				1.0				
Intersection Summary												
HCM 6th Ctrl Delay				15.3								
HCM 6th LOS				B								



Project #: 1361
 Project Name: Hayden Homes Northwest Redmond
 Analyst: JWW
 Date: 4/20/2023
 North-South Street: NW 19th Street
 East-West Street: NW Maple Avenue
 Intersection: NW 19th Street/NW Maple Avenue
 Scenario: Existing 2023 Traffic Conditions

Volume-Based Warrant Summary			
Warrant No.	Description	Warrant Factor	Met?
Warrant 1:	Eight-Hour Vehicular Volume	70%	Yes
Warrant 2:	Four-Hour Vehicular Volume	70%	Yes
Warrant 3:	Peak Hour	70%	Yes

Volume Adjustment Factor: 1.0
 North-South Approach: Minor
 East-West Approach: Major
 Major Street No. Thru Lanes: 1
 Minor Street No. Thru Lanes: 1
 Speed Factor (Speed >40mph): Yes
 Population Factor (Population <10,000): No
 Warrant Factor: 70%
 Peak Hour/Daily Count: Peak Hour

Major Road	Minor Road
Rural Interstate	Rural Interstate
Rural Principal Arterial	Rural Principal Arterial
Rural Minor Arterial	Rural Minor Arterial
Rural Major Collector	Rural Major Collector
Rural Minor Collector	Rural Minor Collector
Urban Interstate	Urban Interstate
Urban Other Frwy & Expwy	Urban Other Frwy & Expwy
Urban Principal Arterial	Urban Principal Arterial
Urban Minor Arterial	Urban Minor Arterial

Case: 9 Case: 9

Peak Hour Traffic Volumes			
Major Street		Minor Street	
EB	WB	NB	SB
216	593	150	97

Planning Growth Factors		
EB	1.00	1.00
WB	1.00	
NB	1.00	
SB	1.00	

Traffic Volumes		Traffic Volume Profile				Hourly Profiles (NCHRP 03-110)	
		Major Street		Minor Street		Major Street Profile	Minor Street Profile
		EB	WB	NB	SB		
12:00 AM	Highest Hour	216	593	150	97	1.00	1.00
1	Highest Hour	204	561	142	92	0.95	0.95
2	Highest Hour	202	553	140	91	0.93	0.93
3	Highest Hour	193	530	134	87	0.89	0.89
4	Highest Hour	190	522	132	85	0.88	0.88
5	Highest Hour	190	522	132	85	0.88	0.88
6	Highest Hour	181	498	126	81	0.84	0.84
7	Highest Hour	179	490	124	80	0.83	0.83
8	Highest Hour	173	474	120	78	0.80	0.80
9	Highest Hour	161	443	112	72	0.75	0.75
10	Highest Hour	156	427	108	70	0.72	0.72
11	Highest Hour	153	419	106	69	0.71	0.71
12	Highest Hour	147	403	102	66	0.68	0.68
13	Highest Hour	127	348	88	57	0.59	0.59
14	Highest Hour	101	277	70	45	0.47	0.47
15	Highest Hour	95	261	66	43	0.44	0.44
16	Highest Hour	66	182	46	30	0.31	0.31
17	Highest Hour	55	150	38	25	0.25	0.25
18	Highest Hour	29	79	20	13	0.13	0.13
19	Highest Hour	20	55	14	9	0.09	0.09
20	Highest Hour	17	47	12	8	0.08	0.08
21	Highest Hour	12	32	8	5	0.05	0.05
22	Highest Hour	6	16	4	3	0.03	0.03
23	Highest Hour	6	16	4	3	0.03	0.03
24	Highest Hour	6	16	4	3	0.03	0.03



Project #: 1361
 Project Name: Hayden Homes Northwest Redmond
 Analyst: JWW
 Date: 4/20/2023
 North-South Street: NW 19th Street
 East-West Street: NW Maple Avenue
 Intersection: NW 19th Street/NW Maple Avenue
 Scenario: Existing 2023 Traffic Conditions

Volume-Based Warrant Summary			
Warrant No.	Description	Warrant Factor	Met?
Warrant 1:	Eight-Hour Vehicular Volume	100%	Yes
Warrant 2:	Four-Hour Vehicular Volume	100%	No
Warrant 3:	Peak Hour	100%	No

Volume Adjustment Factor: 1.0
 North-South Approach: Minor
 East-West Approach: Major
 Major Street No. Thru Lanes: 1
 Minor Street No. Thru Lanes: 1
 Speed Factor (Speed >40mph): No
 Population Factor (Population <10,000): No
 Warrant Factor: 100%
 Peak Hour/Daily Count: Peak Hour

Major Road	Minor Road
Rural Interstate	Rural Interstate
Rural Principal Arterial	Rural Principal Arterial
Rural Minor Arterial	Rural Minor Arterial
Rural Major Collector	Rural Major Collector
Rural Minor Collector	Rural Minor Collector
Urban Interstate	Urban Interstate
Urban Other Frwy & Expwy	Urban Other Frwy & Expwy
Urban Principal Arterial	Urban Principal Arterial
Urban Minor Arterial	Urban Minor Arterial
Case: 9	Case: 9

Peak Hour Traffic Volumes			
Major Street		Minor Street	
EB	WB	NB	SB
216	593	150	97

Planning Growth Factors		
EB	1.00	1.00
WB	1.00	
NB	1.00	
SB	1.00	

Traffic Volumes		Traffic Volume Profile				Hourly Profiles (NCHRP 03-110)	
		Major Street		Minor Street		Major Street Profile	Minor Street Profile
		EB	WB	NB	SB		
12:00 AM	Highest Hour	216	593	150	97	1.00	1.00
1	Highest Hour	204	561	142	92	0.95	0.95
2	Highest Hour	202	553	140	91	0.93	0.93
3	Highest Hour	193	530	134	87	0.89	0.89
4	Highest Hour	190	522	132	85	0.88	0.88
5	Highest Hour	190	522	132	85	0.88	0.88
6	Highest Hour	181	498	126	81	0.84	0.84
7	Highest Hour	179	490	124	80	0.83	0.83
8	Highest Hour	173	474	120	78	0.80	0.80
9	Highest Hour	161	443	112	72	0.75	0.75
10	Highest Hour	156	427	108	70	0.72	0.72
11	Highest Hour	153	419	106	69	0.71	0.71
12	Highest Hour	147	403	102	66	0.68	0.68
13	Highest Hour	127	348	88	57	0.59	0.59
14	Highest Hour	101	277	70	45	0.47	0.47
15	Highest Hour	95	261	66	43	0.44	0.44
16	Highest Hour	66	182	46	30	0.31	0.31
17	Highest Hour	55	150	38	25	0.25	0.25
18	Highest Hour	29	79	20	13	0.13	0.13
19	Highest Hour	20	55	14	9	0.09	0.09
20	Highest Hour	17	47	12	8	0.08	0.08
21	Highest Hour	12	32	8	5	0.05	0.05
22	Highest Hour	6	16	4	3	0.03	0.03
23	Highest Hour	6	16	4	3	0.03	0.03
24	Highest Hour	6	16	4	3	0.03	0.03



Project #:	1361
Project Name:	Hayden Homes Northwest Redmond
Analyst:	JWW
Date:	6/29/2023
North-South Street:	SW 27th Street
East-West Street:	NW Antler Avenue
Intersection:	SW 27th Street/NW Antler Avenue
Scenario:	Existing 2023 Traffic Conditions

Volume-Based Warrant Summary			
Warrant No.	Description	Warrant Factor	Met?
Warrant 1:	Eight-Hour Vehicular Volume	100%	No
Warrant 2:	Four-Hour Vehicular Volume	100%	No
Warrant 3:	Peak Hour	100%	No

Volume Adjustment Factor:	1.0
North-South Approach:	Major
East-West Approach:	Minor
Major Street No. Thru Lanes:	1
Minor Street No. Thru Lanes:	1
Speed Factor (Speed >40mph):	No
Population Factor (Population <10,000):	No
Warrant Factor:	100%
Peak Hour/Daily Count:	Peak Hour

Major Road	Minor Road
Rural Interstate	Rural Interstate
Rural Principal Arterial	Rural Principal Arterial
Rural Minor Arterial	Rural Minor Arterial
Rural Major Collector	Rural Major Collector
Rural Minor Collector	Rural Minor Collector
Urban Interstate	Urban Interstate
Urban Other Frwy & Expwy	Urban Other Frwy & Expwy
Urban Principal Arterial	Urban Principal Arterial
Urban Minor Arterial	Urban Minor Arterial
Case: 9	Case: 9

Peak Hour Traffic Volumes			
Major Street		Minor Street	
NB	SB	EB	WB
127	240	285	121

Planning Growth Factors		
NB	1.00	1.00
SB	1.00	
EB	1.00	
WB	1.00	

Traffic Volumes		Traffic Volume Profile				Hourly Profiles (NCHRP 03-110)	
		Major Street		Minor Street		Major Street Profile	Minor Street Profile
		NB	SB	EB	WB		
12:00 AM	Highest Hour	127	240	285	121	1.00	1.00
2	Highest Hour	120	227	270	115	0.95	0.95
3	Highest Hour	119	224	266	113	0.93	0.93
4	Highest Hour	113	214	255	108	0.89	0.89
5	Highest Hour	112	211	251	106	0.88	0.88
6	Highest Hour	112	211	251	106	0.88	0.88
7	Highest Hour	107	202	239	102	0.84	0.84
8	Highest Hour	105	198	236	100	0.83	0.83
9	Highest Hour	102	192	228	97	0.80	0.80
10	Highest Hour	95	179	213	90	0.75	0.75
11	Highest Hour	91	173	205	87	0.72	0.72
12	Highest Hour	90	170	201	86	0.71	0.71
13	Highest Hour	86	163	194	82	0.68	0.68
14	Highest Hour	75	141	167	71	0.59	0.59
15	Highest Hour	59	112	133	56	0.47	0.47
16	Highest Hour	56	106	125	53	0.44	0.44
17	Highest Hour	39	74	87	37	0.31	0.31
18	Highest Hour	32	61	72	31	0.25	0.25
19	Highest Hour	17	32	38	16	0.13	0.13
20	Highest Hour	12	22	27	11	0.09	0.09
21	Highest Hour	10	19	23	10	0.08	0.08
22	Highest Hour	7	13	15	6	0.05	0.05
23	Highest Hour	3	6	8	3	0.03	0.03
24	Highest Hour	3	6	8	3	0.03	0.03



Project #:	1361
Project Name:	Hayden Homes Northwest Redmond
Analyst:	JWW
Date:	6/29/2023
North-South Street:	SW 27th Street
East-West Street:	NW Antler Avenue
Intersection:	SW 27th Street/NW Antler Avenue
Scenario:	Future 2030 With Project Build-out

Volume-Based Warrant Summary			
Warrant No.	Description	Warrant Factor	Met?
Warrant 1:	Eight-Hour Vehicular Volume	100%	Yes
Warrant 2:	Four-Hour Vehicular Volume	100%	Yes
Warrant 3:	Peak Hour	100%	Yes

Volume Adjustment Factor:	1.0
North-South Approach:	Major
East-West Approach:	Minor
Major Street No. Thru Lanes:	1
Minor Street No. Thru Lanes:	1
Speed Factor (Speed >40mph):	No
Population Factor (Population <10,000):	No
Warrant Factor:	100%
Peak Hour/Daily Count:	Peak Hour

Major Road	Minor Road
Rural Interstate	Rural Interstate
Rural Principal Arterial	Rural Principal Arterial
Rural Minor Arterial	Rural Minor Arterial
Rural Major Collector	Rural Major Collector
Rural Minor Collector	Rural Minor Collector
Urban Interstate	Urban Interstate
Urban Other Frwy & Expwy	Urban Other Frwy & Expwy
Urban Principal Arterial	Urban Principal Arterial
Urban Minor Arterial	Urban Minor Arterial
Case: 9	Case: 9

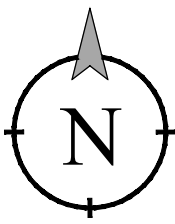
Peak Hour Traffic Volumes			
Major Street		Minor Street	
NB	SB	EB	WB
S14	289	142	285

Planning Growth Factors		
NB	1.00	1.00
SB	1.00	
EB	1.00	
WB	1.00	

Traffic Volumes		Traffic Volume Profile				Hourly Profiles (NCHRP 03-110)	
		Major Street		Minor Street		Major Street Profile	Minor Street Profile
		NB	SB	EB	WB		
12:00 AM	Highest Hour	514	289	142	285	1.00	1.00
2	Highest Hour	487	274	134	270	0.95	0.95
3	Highest Hour	480	270	133	266	0.93	0.93
4	Highest Hour	459	258	127	255	0.89	0.89
5	Highest Hour	452	254	125	251	0.88	0.88
6	Highest Hour	452	254	125	251	0.88	0.88
7	Highest Hour	432	243	119	239	0.84	0.84
8	Highest Hour	425	239	117	236	0.83	0.83
9	Highest Hour	411	231	114	228	0.80	0.80
10	Highest Hour	384	216	106	213	0.75	0.75
11	Highest Hour	370	208	102	205	0.72	0.72
12	Highest Hour	363	204	100	201	0.71	0.71
13	Highest Hour	350	197	97	194	0.68	0.68
14	Highest Hour	302	170	83	167	0.59	0.59
15	Highest Hour	240	135	66	133	0.47	0.47
16	Highest Hour	226	127	62	125	0.44	0.44
17	Highest Hour	158	89	44	87	0.31	0.31
18	Highest Hour	130	73	36	72	0.25	0.25
19	Highest Hour	69	39	19	38	0.13	0.13
20	Highest Hour	48	27	13	27	0.09	0.09
21	Highest Hour	41	23	11	23	0.08	0.08
22	Highest Hour	27	15	8	15	0.05	0.05
23	Highest Hour	14	8	4	8	0.03	0.03
24	Highest Hour	14	8	4	8	0.03	0.03

Spruce Northwest
Transportation Plan
Overview

Redmond, OR



LEGEND:

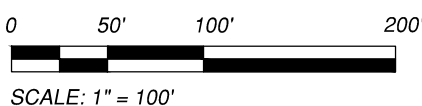
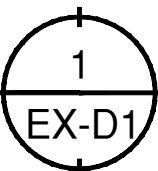
- EXISTING (E) URBAN GROWTH BOUNDARY (UGB)
- (E) CITY OF REDMOND LIMITS
- MASTER PLAN BOUNDARY
- PROPOSED (P) ZONE LINE
- (P) R.O.W. LINE
- (P) R.O.W. CENTERLINE
- (P) LOT LINE
- (P) PED. ACCESS EASEMENT
- (P) MULTI-USE TRAIL
- (P) SIDEWALK
- ARTERIAL ROAD (100-FT R.O.W., 50-FT ROAD WIDTH)
- COLLECTOR ROAD (80-FT R.O.W., 36-FT ROAD WIDTH)
- LOCAL RESIDENTIAL GRID ROADS (60-FT R.O.W., 36-FT ROAD WIDTH)
- LOCAL RESIDENTIAL NON-GRID ROADS (60-FT R.O.W., 28-FT/36-FT ROAD WIDTH)
- PRIVATE ROADS (ALLEYS, PARKING FIELD/CIRCULATION)

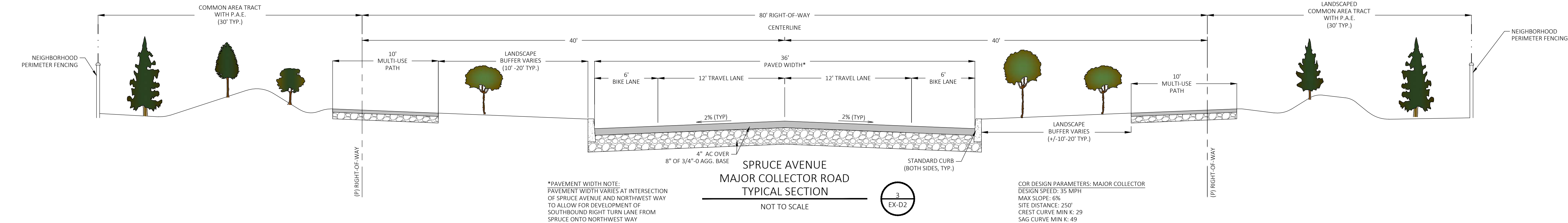
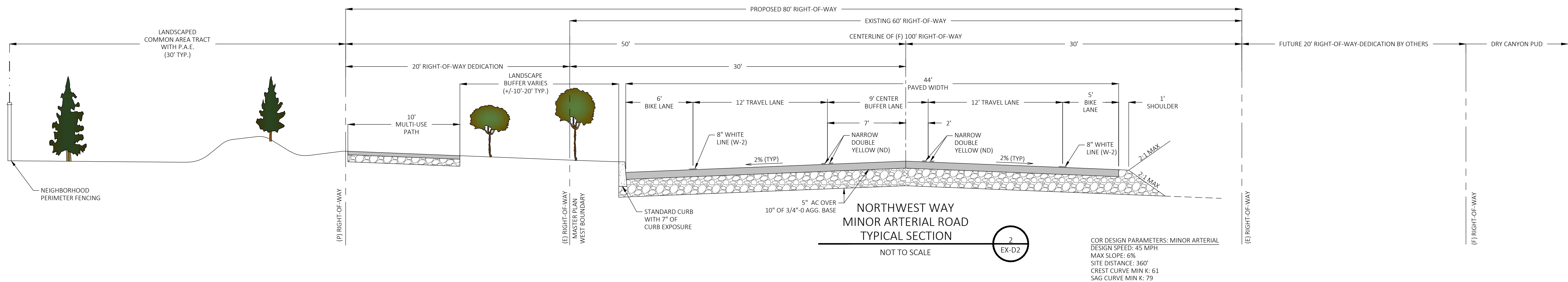
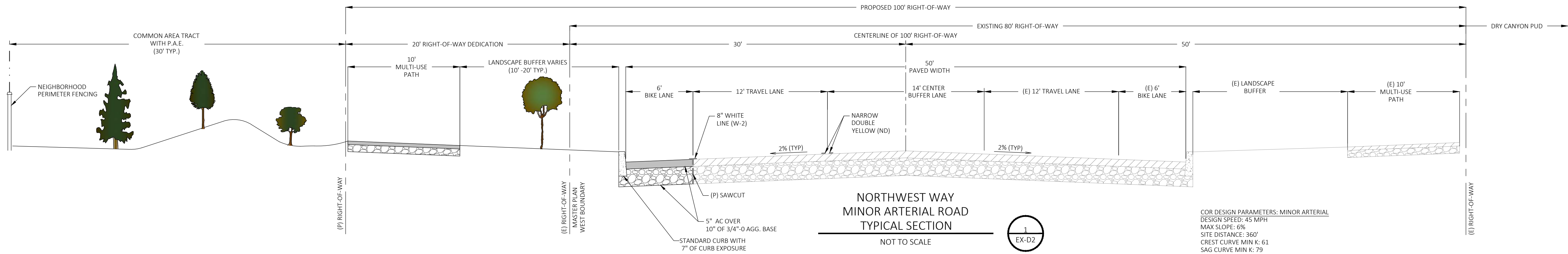
KEY NOTES:

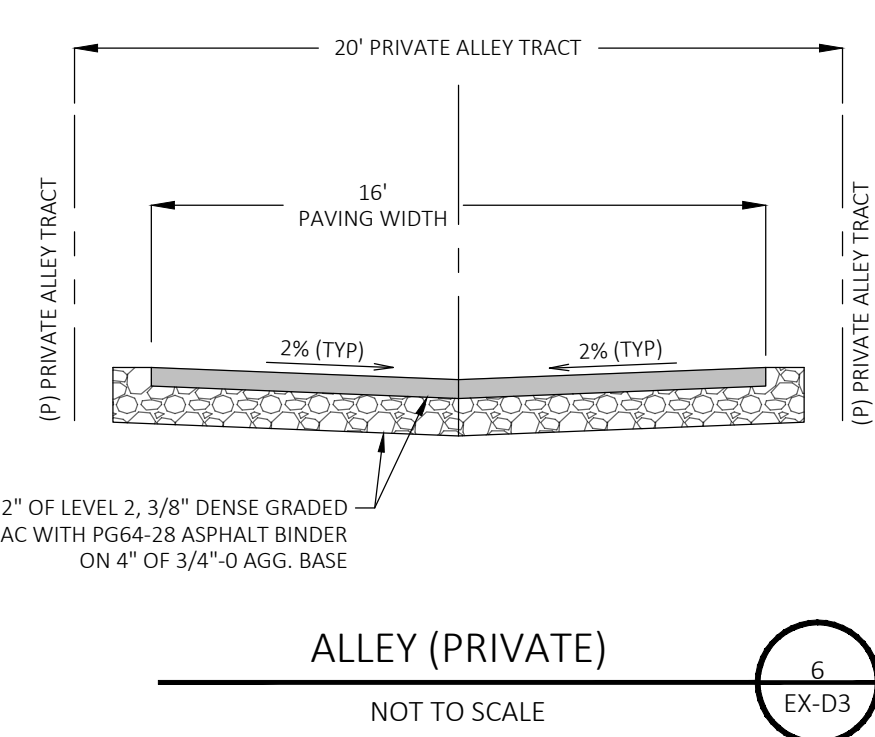
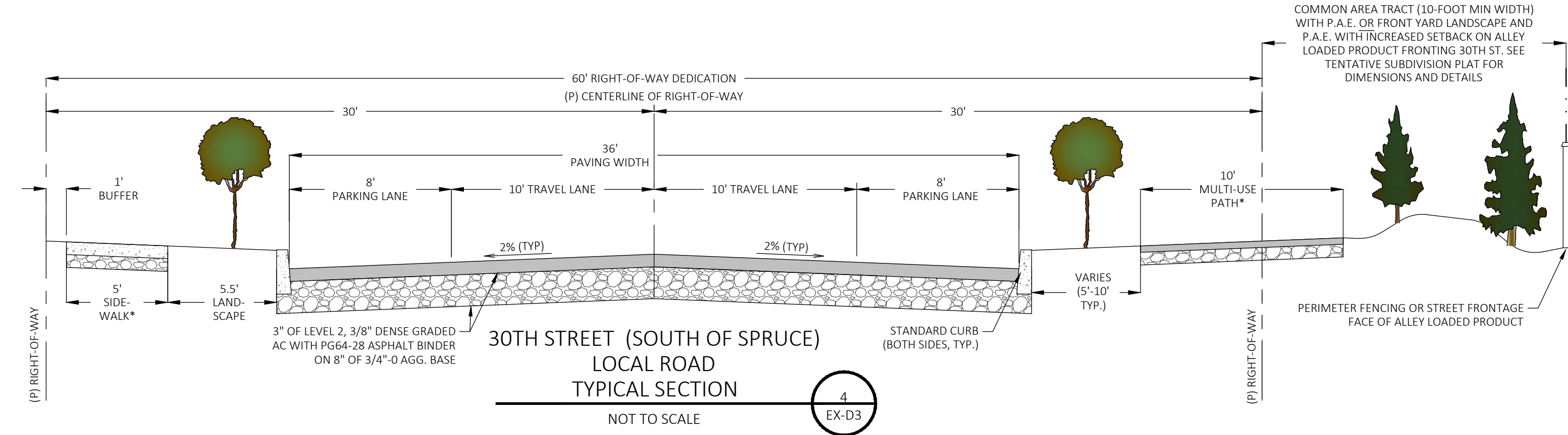
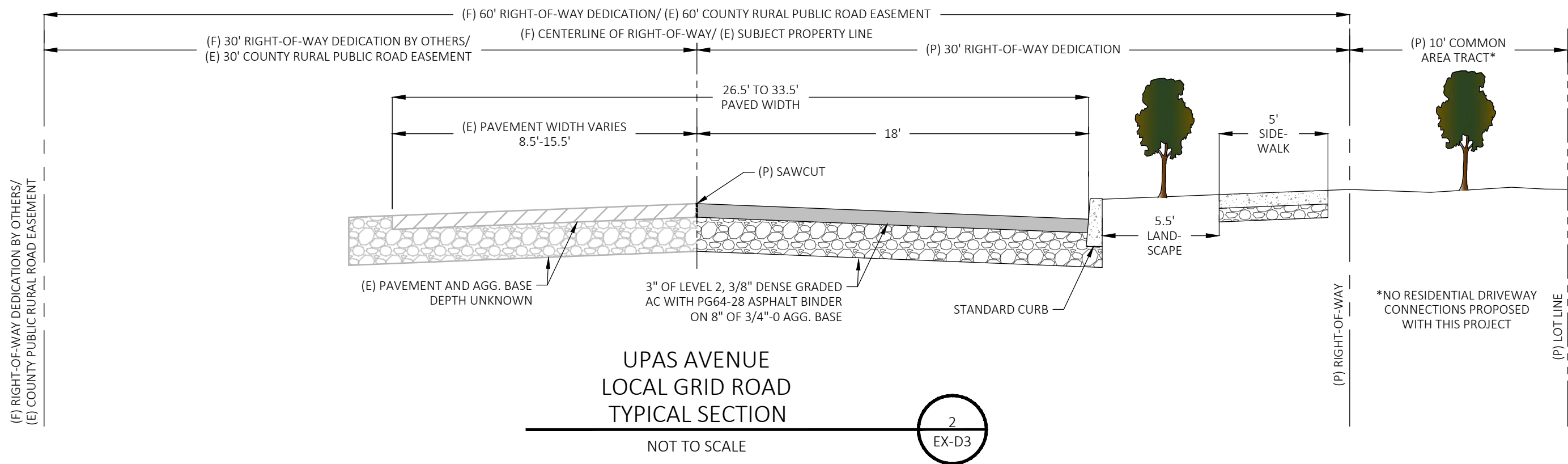
- PROPOSED NORTHWEST WAY ARTERIAL ROADWAY FRONTAGE IMPROVEMENTS (NORTH OF SPRUCE). SEE TYPICAL SECTION #1, EX-D2
- PROPOSED NORTHWEST WAY ARTERIAL ROADWAY FRONTAGE IMPROVEMENTS (SOUTH OF SPRUCE). SEE TYPICAL SECTION #2, EX-D2
- PROPOSED SPRUCE AVENUE COLLECTOR ROADWAY IMPROVEMENTS (ALIGN WITH INTERSECTION CONSTRUCTED WITH DRY CANYON, TRAIL BOTH SIDES). SEE TYPICAL SECTION #3, EX-D2
- PROPOSED QUINCE AVENUE LOCAL GRID ROADWAY IMPROVEMENTS (R.O.W. CENTERED ALONG SOUTHERN SUBJECT PROPERTY BOUNDARY WITH ADDITIONAL RIGHT OF WAY DEDICATION FROM TAXLOT 15-13-05-00-00902). SEE TYPICAL SECTION #1, EX-D3
- PROPOSED NW 30TH STREET LOCAL GRID ROADWAY IMPROVEMENTS (WITH MEANDERING MULTI-USE TRAIL LOCATED WITHIN RIGHT OF WAY, COMMON AREA, OR PED. ACCESS EASEMENT). SEE TYPICAL SECTION #4, EX-D3
- PROPOSED LOCAL GRID ROADWAY IMPROVEMENTS SEE TYPICAL SECTION #5, EX-D3
- PROPOSED LOCAL NON-GRID ROADWAY IMPROVEMENTS SEE TYPICAL SECTION #6, EX-D3
- PROPOSED PRIVATE ALLEY IMPROVEMENTS SEE TYPICAL SECTION #6, EX-D3
- CONCEPTUAL PRIVATE DRIVE, TBD WITH FUTURE DEVELOPMENT TRACT SITE PLAN APPROVAL
- PROPOSED FEE IN LIEU OF CONSTRUCTION FOR NW UPAS STREET IMPROVEMENTS (UGB LIMIT ALONG CENTERLINE AND LACK OF RIGHT OF WAY) SEE TYPICAL SECTION #2, EX-D3
- PROPOSED RIGHT TURN LANE FOR SOUTHBOUND TRAFFIC FROM SPRUCE AVENUE TO NORTHWEST WAY.
- PROPOSED 10-FOOT WIDE MEANDERING MULTI-USE TRAIL IN ACCORDANCE WITH CITY OF REDMOND STANDARDS (LOCATED WITHIN RIGHT OF WAY, COMMON AREA, OR PED. ACCESS EASEMENT).
- PROPOSED LOCAL (NON-GRID) ROAD "EYEBROW" CORNER PER CITY OF REDMOND STANDARDS.
- PROPOSED EMERGENCY ACCESS GATE TO PROHIBIT DIRECT VEHICULAR ACCESS FROM DEVELOPMENT TO UPAS AVE.

MASTER DEVELOPMENT
TRANSPORTATION PLAN

SCALE: 1" = 100'

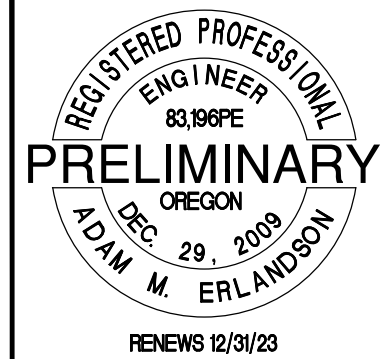






COR DESIGN PARAMETERS: LOCAL ROAD
DESIGN SPEED: 25 MPH
MAX SLOPE: 10%
SITE DISTANCE: 155'
CREST CURVE MIN K: 12
SAG CURVE MIN K: 26

COR DESIGN PARAMETERS: ALLEY
DESIGN SPEED: 15 MPH
MAX SLOPE: 10%
SITE DISTANCE: 80'
CREST CURVE MIN K: 3
SAG CURVE MIN K: 10



SPRUCE NORTHWEST
MASTER DEVELOPMENT PLAN
HAYDEN HOMES LLC

TYPICAL SECTIONS

**KNOW
LEDGE** ENGINEERING, LLC
ENGINEERING | CONSULTING
901 HW Corbin Ave, Suite 3 | Bend, OR 97702
541.728.6347 | adam@k-le-engineering.com

 N 1" = 10'-0" 1" = 10'-0"		REVISIONS: NO. DESCRIPTION 1.	BY: _____ DATE: _____
DATE: 6/28/2023 PROJECT NO: XXXX-XX DRAWN: be CHECKED: ae		SHEET NO: EX-D3	

After Recording Return To:
 City of Redmond
 411 SW 9th Street
 Redmond, OR 97756

Deschutes County Official Records	2022-43193
D-ANXCON	
Stn=4 SRB	12/13/2022 01:28 PM
\$35.00 \$11.00 \$10.00 \$61.00 \$6.00	\$123.00
I, Steve Dennison, County Clerk for Deschutes County, Oregon, certify that the instrument identified herein was recorded in the Official Records. Steve Dennison - County Clerk	

ANNEXATION AGREEMENT

This Annexation Agreement is made and entered into this 2nd day of December, 2022, by and between the City of Redmond, Oregon, an Oregon municipal corporation (hereinafter "City") and HLM Inc., Northwest Way Land JV, LLC, and Te Amo Despacio, LLC (hereinafter "Owner").

RECITALS

WHEREAS, Owner is the record owner of the property legally described on Exhibit A attached hereto and incorporated herein (hereinafter referred to as the "Property"); and

WHEREAS, the Property is within the City's Urban Growth Boundary and is proposed to be annexed to the City; and

WHEREAS, Owner desires to have the Property annexed to the City; and

WHEREAS, Owner has submitted a petition for annexation and provided the City with all required consents for annexation; and

WHEREAS, the City is willing to annex the Property on the terms and conditions, and subject to the provisions, of this Agreement; and

WHEREAS, the City will initiate zoning upon the successful annexation of said property by resolution to the City, and

AGREEMENT

NOW, THEREFORE, in consideration of the representations, promises and mutual covenants contained herein, the City and Owner agree as follows:

1. **RECITALS**: The foregoing recitals are incorporated herein as is fully set forth in this Section.
2. **ANNEXATION**:
 - a. City agrees it will initiate a resolution annexing the Property into the City once all required consents and a signed Annexation Agreement have been received by the City, and an approved master plan with proposed zone amendments has been achieved, and all City requirements have been met. This agreement is void if the Property is not annexed to the City within 12 months after the effective date of this Agreement.
 - b. Owner may terminate this Agreement by serving written notice to the City. The notice must be received by the City at least 60 days prior to the public hearings for council consideration of the annexation. If the City receives such notice, this Agreement terminates as of the effective date of the notice. After the annexation resolution is adopted by the City, this Agreement may only be terminated or amended by written consent of Owner and City.

3. **COMPREHENSIVE PLAN/ZONING:** Prior to development, the Owner is required to receive master plan approval for the property in compliance with the Redmond Comprehensive Plan 2040, Redmond Development Code, and Engineering Department requirements. The master plan will identify Comprehensive Plan and Zoning designations, subject to City Council review and approval. Upon adoption of the master plan, successful annexation, and a Comprehensive Plan Map/Zone Map adoption, the City will apply the Comprehensive Plan and Zoning designations identified in the Master Plan.
4. **DEVELOPMENT:** Owner agrees as follows:
 - a. Owner shall waive and shall not assert any claim against the City that may now exist or that may accrue through the date of annexation of the Property arising out of any land use regulation or under Measure 37 (ORS 197.352), Measure 49, and Measure 56 (ORS 227.186).
 - b. Owner agrees any development of the property will comply with the applicable approved Northwest Area Plan and master plan for the property, except as modified consistent with City requirements.
 - c. Owner agrees to incorporate and apply the City's Great Neighborhood Principles as found in the Redmond Comprehensive Plan 2040 and Redmond Development Code, and City Engineering requirements and Engineering Department infrastructure and street frontage requirements. The City shall determine the applicability of the Great Neighborhood Principles to the subject property as necessary. All development must comply with federal, state and city regulations.
 - d. Owner agrees that it will, without any cost to the City, dedicate the necessary rights-of-way or easements for all Planned Improvements identified in the City's Public Facilities Plan.
 - e. Owner shall supply draft CCR/HOA documents to City for review, modification, and preliminary approval prior to the land use hearing for the master plan. The CCR/HOA documents shall include, but not limited to, standards or requirements regarding on street parking and a prohibition on using residential units as short term or vacation rentals.
 - f. Owner shall provide a meandering 10-foot multi-use pedestrian sidewalk along Northwest Way and on any other double-frontage lot area. This area along shall be no less than 30 feet in width and designed and landscaped similar to the tract along 35th Street for Owner's development known as Obsidian Trails.
 - g. Owner shall provide a trail system through the development that meets City requirements and does not solely rely on the sidewalk system.
 - h. Owner shall provide no more than 60% detached single-family housing and no less than 40% attached multi-family housing Middle Housing unit types (i.e., duplexes, triplexes, quadplexes, cottages clusters, and townhomes) or multi-family units. Subsequent Master Plan approval shall address opportunities for additional Accessory Dwelling Units in conjunction with detached single-family homes.
 - i. Owner shall remove all additional Central Oregon Irrigation District (COID) irrigation water rights from Property, unless use is otherwise approved by the Redmond City Council and COID.
 - j. Owner shall remove all ground water rights from Property unless partial use is otherwise approved by the Redmond City Council. If required, Owner is directed to remove water rights via sale or transfer to the City. Removal shall occur prior to the platting of the first phase of development.

- k. Owner agrees to not remonstrate against the formation of a local improvement district or reimbursement district created for funding public improvements that will serve the Property. This waiver applies to the Property until all utility service and all required infrastructure that will service or benefit the Property is completed and accepted by City. If the property is developed in phases, the waiver may be removed on a phase-by-phase basis if all utility service and all required infrastructure that will service or benefit the Property is completed and accepted by City.
- l. Owner agrees to donate funds to the Redmond Committee for Art in Public Places or install an artistic feature. Public art fee of \$100 per housing unit will be charged and paid in lump sum at the time of any plat approval for the property. Installation of an artistic feature is required to provide focal points, preferably at the gateways to neighborhoods, in and around the center of neighborhoods, or trailheads.
- 5. **AMENDMENT**: This Agreement and any exhibits attached hereto may be amended only by the mutual written consent of both parties.
- 6. **SEVERABILITY**: If any provision, covenant or portion of this Agreement or its application to any person, entity, property or portion of property is held invalid, or if any ordinance or resolution adopted pursuant to this Agreement or its application to any person, entity, property or portion of property is held invalid, such invalidity shall not affect the application or validity of any other provisions, covenants or portions of this Agreement or other ordinances or resolutions passed pursuant hereto, and to that end, all provisions, covenants, and portions of this Agreement and of the ordinances and resolutions adopted pursuant hereto are declared to be severable.
- 7. **NO WAIVER OF RIGHT TO ENFORCE AGREEMENT**: Failure of any party to this Agreement to insist upon the strict and prompt performance of the terms, covenants, agreements and conditions herein contained, or any of them, upon any other party imposed, shall not constitute or be construed as a waiver or relinquishment of any party's right thereafter to enforce any such term, covenant, agreement or condition, but the same shall continue in full force and effect.
- 8. **ENTIRE AGREEMENT**: This Agreement supersedes all prior agreements, negotiations and exhibits and is a full integration of the entire agreement of the parties relating to the subject matter hereof. The parties shall have no obligations other than specifically stated in this Agreement except those of general applicability.
- 9. **SURVIVAL**: The provisions contained in this Agreement shall survive the annexation of the property and shall not be merged or expunged by the annexation of the property or any part thereof to the City.
- 10. **SUCCESSORS AND ASSIGNS**: This Agreement shall run with the land described on Exhibit A and inure to the benefit of, and be binding upon, the successors in title of the Owners and their respective successors, grantees, lessees, and assigns, and upon successor corporate authorities of the City and successor municipalities.
- 11. **TERM OF AGREEMENT**: This Agreement shall be binding upon the parties and their respective successors and assigns for twenty (20) years, commencing as of the date of this Agreement
- 12. **ENFORCEMENT**: Owner agrees that if it fails to perform as required under this Agreement, the City Council may, at the Council's option, de-annex and that Owner will not object or oppose such de-annexation in any manner or any forum.

13. **ATTORNEY FEES:** In any proceeding to enforce, apply or interpret this Agreement, each party shall bear its own attorneys' fees and costs.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the date first above written.

CITY



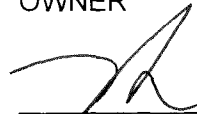
Keith Witcosky, City Manager

ATTEST:

for 

Kelly Morse, City Recorder

OWNER



HLM Inc.



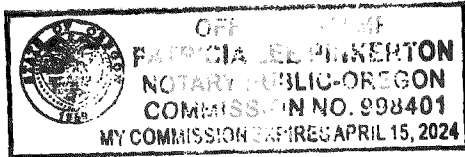
Northwest Way Land JV, LLC



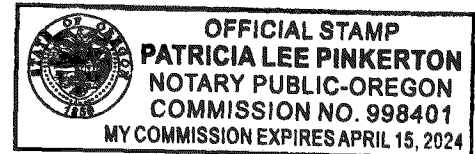
Te Amo Despacio, LLC

STATE OF OREGON)
) ss.
County of Deschutes)

Keith Witcosky, City Manager, on behalf of the City of Redmond, who acknowledged that he had authority to sign on behalf of the City of Redmond and this instrument to be the City's voluntary act and deed, acknowledged this instrument before me this 2nd day of December 2022.

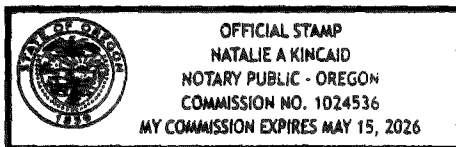


Patricia Lee Pinkerton
Notary Public for Oregon



STATE OF OREGON)
) ss.
County of Deschutes)

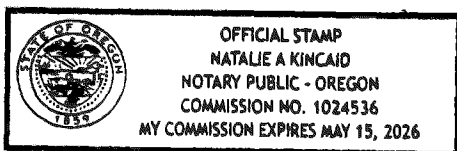
This instrument was acknowledged before me this 28th day of November 2022, by HLM, Inc., by Hayden Watson, its owner, who acknowledged this instrument to be his/her voluntary act and deed.



Natalie Kincaid
Notary Public for Oregon

STATE OF OREGON)
) ss.
County of Deschutes)

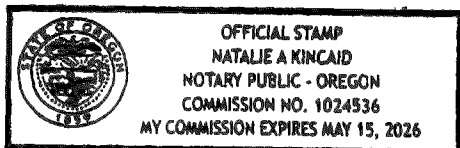
This instrument was acknowledged before me this 28th day of November 2022, by Northwest Way Land JV, LLC, by Hayden Watson, its owner, who acknowledged this instrument to be his/her voluntary act and deed.



Natalie Kincaid
Notary Public for Oregon

STATE OF OREGON)
) ss.
County of Deschutes)

This instrument was acknowledged before me this 28th day of November 2022,
by Te Amo Despacio, LLC, LLC, by Haidee Watson, its owner,
who acknowledged this instrument to be his/her voluntary act and deed.



Natalie Kincaid
Notary Public for Oregon

Exhibit "A"

TAX LOT 15-13-05-00-00600

LOT THREE (3), BEING THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER (NE1/4NW1/4) OF SECTION FIVE (5), TOWNSHIP FIFTEEN (15) SOUTH, RANGE THIRTEEN (13), EAST OF THE WILLAMETTE MERIDIAN, DESCHUTES COUNTY, OREGON, EXCEPTING THAT PORTION THEREOF LYING AND BEING EASTERLY FROM LATERAL C, AND NORTHERLY FROM SUB-LATERAL C-11, OF CENTRAL OREGON IRRIGATION DISTRICT, AS NOW LOCATED, SAID EXCEPTED PORTION BEING AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID LOT 3 AND RUNNING THENCE SOUTH ALONG THE EAST LINE THEREOF A DISTANCE OF 330 FEET, MORE OR LESS, TO THE NORTHERLY LINE OF THE RIGHT OF WAY OF SUB-LATERAL C-11; THENCE SOUTHWESTERLY ALONG SAID NORTHERLY LINE OF SAID RIGHT OF WAY A DISTANCE OF 322 FEET, MORE OR LESS, TO THE INTERSECTION THEREOF WITH THE WESTERLY LINE OF THE RIGHT OF WAY OF SAID LATERAL C; THENCE NORTHWESTERLY ALONG SAID WESTERLY LINE OF SAID RIGHT OF WAY OF SAID LATERAL C A DISTANCE OF 612 FEET, MORE OR LESS, TO THE INTERSECTION THEREOF WITH THE NORTH LINE OF SAID LOT 3 AT A POINT 611 FEET, MORE OR LESS, WEST OF THE POINT OF BEGINNING; THENCE EAST ALONG SAID NORTH LINE 611 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

TAX LOT 15-13-05-00-00800

A PARCEL OF LAND SITUATED IN A PORTION OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER (SE1/4NW1/4) OF SECTION FIVE (5), TOWNSHIP FIFTEEN (15) SOUTH, RANGE THIRTEEN (13), EAST OF THE WILLAMETTE MERIDIAN, DESCHUTES COUNTY, OREGON, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT A BRASS CAP MONUMENTING THE NORTH QUARTER CORNER OF SECTION 5, THE INITIAL POINT, THENCE SOUTH 00°40'24" WEST ALONG THE EAST LINE OF THE NW1/4 OF SAID SECTION 5, 1,337.43 FEET TO THE CENTER NORTH 1/16TH CORNER AND THE TRUE POINT OF BEGINNING, THENCE SOUTH 00°40'24" WEST ALONG SAID EAST LINE, 1,319.28 FEET TO THE SOUTH LINE OF SAID NW1/4, THENCE NORTH 89°53'57" WEST ALONG SAID SOUTH LINE, 680.30 FEET TO A 1/2 INCH PIPE, THENCE NORTH 02°26'51" EAST, 1,322.50 FEET TO THE NORTH LINE OF THE SE1/4NW1/4, A POINT WITNESSED BY A 1/2 INCH PIPE WHICH BEARS SOUTH 02°26'51" WEST, 60.04 FEET; THENCE SOUTH 89°42'16" EAST ALONG SAID NORTH LINE, 639.34 FEET TO THE POINT OF BEGINNING.

TAX LOT 15-13-05-00-00804

BEGINNING AT A 1/2" IRON PIPE ON THE SOUTH LINE OF AND NORTH 89°53'57" WEST, 680 FEET FROM THE SOUTHEAST CORNER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 15 SOUTH, RANGE 13, EAST OF THE WILLAMETTE MERIDIAN, DESCHUTES COUNTY, OREGON; RUNNING THENCE NORTH 02°26'51" EAST, 1262.46 FEET TO A 1/2" IRON PIPE ON THE SOUTH LINE OF SAID NORTHWEST SPRUCE AVE., THENCE NORTH 89°42'16" WEST ON THE SOUTH LINE OF SAID NORTHWEST SPRUCE AVENUE, 756.95 FEET; THENCE DUE SOUTH, 1,263.98 FEET TO THE SOUTH LINE OF SAID NORTHWEST QUARTER; THENCE SOUTH 89°53'57" EAST, 703.03 FEET TO THE POINT OF BEGINNING.

After recording, return to:
City of Redmond
411 SW 9th Street
Redmond, OR 97756

Deschutes County Official Records	2023-30096
D-ANXCON	
Stn=2 AS	12/07/2023 08:35 AM
\$50.00 \$11.00 \$10.00 \$61.00 \$6.00	\$138.00
I, Steve Dennison, County Clerk for Deschutes County, Oregon, certify that the instrument identified herein was recorded in the Official Records.	
Steve Dennison - County Clerk	

AMENDMENT TO SPRUCE NORTHWEST ANNEXATION AGREEMENT

This Amendment to Spruce Northwest Annexation Agreement ("Amendment") is made this 7th day of December, 2023 between the City of Redmond ("City") and HLM Inc., Northwest Way Land JV, LLC, Te Amo Despacio, LLC, and Stephen & Amanda Klingman Trust ("Owner").

RECITALS

1. On December 13, 2022, the Annexation Agreement was recorded in the real property records of Deschutes County, Oregon at Document No. 2022-43193.
2. Pursuant to Section 2.a. of the Annexation Agreement, the agreement is void if the property is not annexed to the City within 12 months after the effective date of the agreement.
3. The Owner has submitted a land use application for a Master Development Plan. Approval of a Master Development Plan is a requirement to annex the property to the City.
4. To obtain Master Development Plan approval will require additional time beyond December 2023 and therefore requires a time extension to the Annexation Agreement.
5. Exhibit A to the Annexation Agreement contains the legal descriptions of the properties to be annexed to the City.
6. For the sole purpose of dedicating full right-of-way for the planned extension of NW Quince Avenue, which will provide access to the proposed Spruce Northwest development, inclusion of a portion of an abutting property will be required and is further supported by Redmond Comprehensive Plan Policy 14-1-10 and Section 8.0270(3)(A)(2) of the Redmond Development Code.

AGREEMENT

Based upon the Recitals, which are incorporated as part of this Amendment, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the parties, the parties agree as follows:

1. **Time Extension:** This amendment amends Section 2.a. of the Annexation Agreement to 24 months. Thus, the Annexation Agreement is void if the property is not

annexed to the City within 24 months after the effective date of the Annexation Agreement (i.e., December 2, 2024).

2. **Amendment to Exhibit A:** This amendment amends Exhibit A of the Annexation Agreement to include the northern 30 feet of Taxlot 1513050000902, abutting Taxlots 1513050000800 and 1513050000804, for the purpose of allowing a full 60 feet of right-of-way dedication for the planned extension of NW Quince Avenue. Amended Exhibit A is attached hereto.

3. **Effect of Amendment:** Except as specifically modified in this Amendment, all terms, covenants, and conditions of the Annexation Agreement remain unmodified and in full force and effect. By executing this Amendment, the parties agree and covenant that the Annexation Agreement remains in full force and that no default exists under the Annexation Agreement.

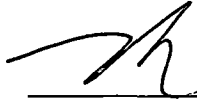
4. **Invalidity.** If any provision of this Amendment is deemed unenforceable or invalid, such enforceability or invalidity will not affect the enforceability or validity of any other provision of this Amendment.

5. **State Law.** The validity, meaning, enforceability and effect of this Amendment and the rights and liabilities of the parties shall be determined in accordance with the laws of the State of Oregon.

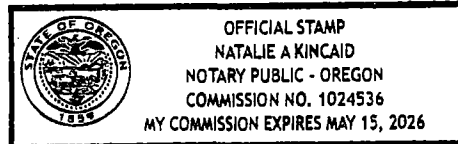
6. **Effective Date.** This Amendment will become effective upon authorized signatures by all parties.

IN WITNESS WHEREOF, the parties have executed this Amendment as of the date first written above.

OWNER:

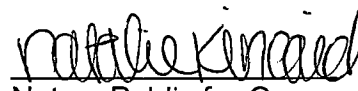


Hayden Watson
HLM Inc.



State of Oregon)
)
County of Deschutes)

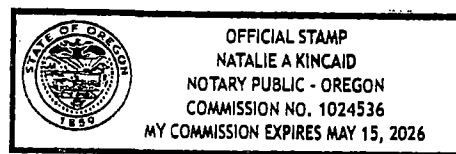
This instrument was acknowledged before me on December 04, 2023, by Hayden Watson.



Natalie A. Kincaid
Notary Public for Oregon

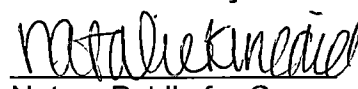


Hayden Watson
Northwest Way Land JV, LLC



State of Oregon)
)
County of Deschutes)

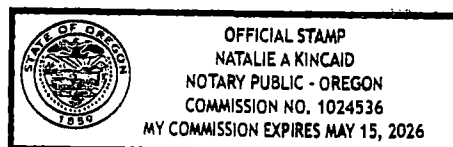
This instrument was acknowledged before me on December 04, 2023, by Hayden Watson.



Natalie A. Kincaid
Notary Public for Oregon



Hayden Watson
Te Amo Despacio, LLC

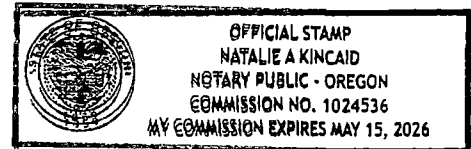


State of Oregon)
)
County of Deschutes)

This instrument was acknowledged before me on December 04, 2023, by Hayden Watson.

Natalie Kincaid
Notary Public for Oregon

[Signature]
Stephen & Amanda Klingman Trust



State of Oregon)
)
County of Deschutes)

This instrument was acknowledged before me on December 04, 2023, by Stephen Klingman.

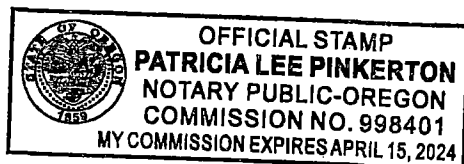
Natalie Kincaid
Notary Public for Oregon

CITY OF REDMOND

[Signature]
Keith Witcosky, City Manager

STATE OF OREGON)
)
County of Deschutes)

This instrument was acknowledged before me on December 7, 2023, by Keith Witcosky as City Manager of the City of Redmond.



[Signature]
Notary Public for Oregon

S&F Land Services

901 NW Carlon Ave, Suite 3 | Bend, OR 97703
(541) 797-0954 – www.sflands.com

2021-337-01
NOVEMBER 15, 2023
BRR

LEGAL DESCRIPTION

A PORTION OF GOVERNMENT LOT 3, LOCATED IN THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER (NE1/4NW1/4) OF SECTION 5, TOWNSHIP 15 SOUTH, RANGE 13 EAST, WILLAMETTE MERIDIAN, DESCHUTES COUNTY, OREGON, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 3, MARKED BY A 2 INCH ALUMINUM CAP STAMPED "S&F LAND SERVICES"; THENCE ALONG THE NORTH LINE OF SAID LOT 3, SOUTH 89°32'18" EAST, 674.58 FEET TO THE EAST RIGHT-OF-WAY LINE OF THE CENTRAL OREGON IRRIGATION DISTRICT LATERAL "C"; THENCE LEAVING SAID NORTH LINE, ALONG SAID LATERAL "C" EAST RIGHT-OF-WAY LINE, THE FOLLOWING NINE CALLS:

SOUTH 29°19'08" EAST, 3.07 FEET;
SOUTH 23°40'34" EAST, 187.45 FEET;
SOUTH 29°10'00" EAST, 32.87 FEET;
SOUTH 39°43'57" EAST, 21.40 FEET;
SOUTH 15°22'24" EAST, 20.05 FEET;
SOUTH 30°18'37" EAST, 90.70 FEET;
SOUTH 42°34'41" EAST, 65.06 FEET;
SOUTH 52°28'58" EAST, 123.47 FEET;
SOUTH 41°21'09" EAST, 83.15 FEET

TO THE NORTH RIGHT-OF-WAY LINE OF CENTRAL OREGON IRRIGATION DISTRICT LATERAL "C-11"; THENCE LEAVING SAID EAST LINE, ALONG SAID LATERAL "C-11" NORTH RIGHT-OF-WAY LINE, NORTH 60°30'35" EAST, 196.49 FEET; THENCE CONTINUING ON SAID NORTH RIGHT-OF-WAY LINE, NORTH 58°31'37" EAST, 100.89 FEET TO THE WEST RIGHT-OF-WAY LINE OF NORTHWEST WAY (HAVING A 30.00 FOOT HALF-WIDTH); THENCE LEAVING SAID NORTH LINE, ALONG SAID WEST RIGHT-OF-WAY LINE OF NORTHWEST WAY, SOUTH 00°40'15" WEST, 989.27 FEET TO THE SOUTH LINE OF SAID LOT 3; THENCE LEAVING SAID WEST LINE ALONG SAID SOUTH LINE OF LOT 3, NORTH 89°41'35" WEST, 1287.55 FEET TO THE SOUTHWEST CORNER OF SAID LOT 3; THENCE LEAVING SAID SOUTH LINE, ALONG THE WEST LINE OF SAID LOT 3, NORTH 00°33'39" EAST, 1341.05 FEET TO THE POINT OF BEGINNING.

TOGETHER WITH, TWO PARCELS OF LAND LOCATED IN THE NORTHWEST QUARTER (NW1/4) OF SAID SECTION 5, BEING PARCEL 1 OF MINOR PARTITION NO. 85-12 FILED AS COUNTY SURVEY NUMBER 00944 (CS00944), DESCHUTES COUNTY SURVEYOR'S OFFICE AND PARCEL 1 OF MINOR PARTITION NO. 84-5 FILED AS COUNTY SURVEY NUMBER 00945 (CS00945), SAID DESCHUTES COUNTY SURVEYOR'S OFFICE, THE EXTERIOR BOUNDARY OF SAID PARCELS BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID PARCEL 1, MINOR PARTITION NO. 85-12, MARKED BY A 1/2 INCH IRON PIPE WITH YELLOW PLASTIC CAP MARKED "LS 431"; THENCE ALONG THE NORTH LINE OF SAID PARCEL 1, MINOR PARTITION NO. 85-12 AND THE NORTH LINE OF SAID PARCEL 1, MINOR PARTITION NO. 84-5, BEING THE SOUTH RIGHT-OF-WAY LINE OF SPRUCE AVENUE, SOUTH 89°41'35" EAST, 1368.42 FEET TO THE WEST RIGHT-OF-WAY LINE OF NORTHWEST WAY (HAVING A 30.00 FOOT HALF-WIDTH); THENCE LEAVING SAID NORTH LINE, ALONG SAID WEST RIGHT-OF-WAY LINE, SOUTH 00°40'15" WEST, 1259.24 FEET TO THE SOUTHEAST CORNER OF SAID PARCEL 1, MINOR PARTITION NO. 84-5; THENCE LEAVING SAID WEST RIGHT-OF-WAY LINE, ALONG THE SOUTH LINE SAID PARCEL 1, MINOR PARTITION NO. 84-5 AND THE SOUTH LINE SAID PARCEL 1, MINOR PARTITION NO. 85-12, NORTH 89°53'13" WEST, 1353.69 FEET TO THE SOUTHWEST CORNER OF SAID PARCEL 1, MINOR PARTITION NO. 85-12; THENCE LEAVING SAID SOUTH LINE, ALONG THE WEST LINE OF SAID PARCEL 1, MINOR PARTITION NO. 85-12, NORTH 00°00'04" EAST, 1263.82 FEET TO THE POINT OF BEGINNING.

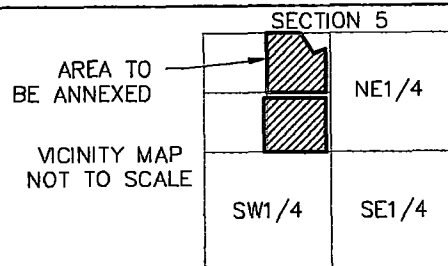
SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.

BEARINGS BASED UPON COUNTY SURVEY NUMBER 20668 (CS20668) FILED NOVEMBER 23, 2021 IN THE DESCHUTES COUNTY SURVEYOR'S OFFICE.



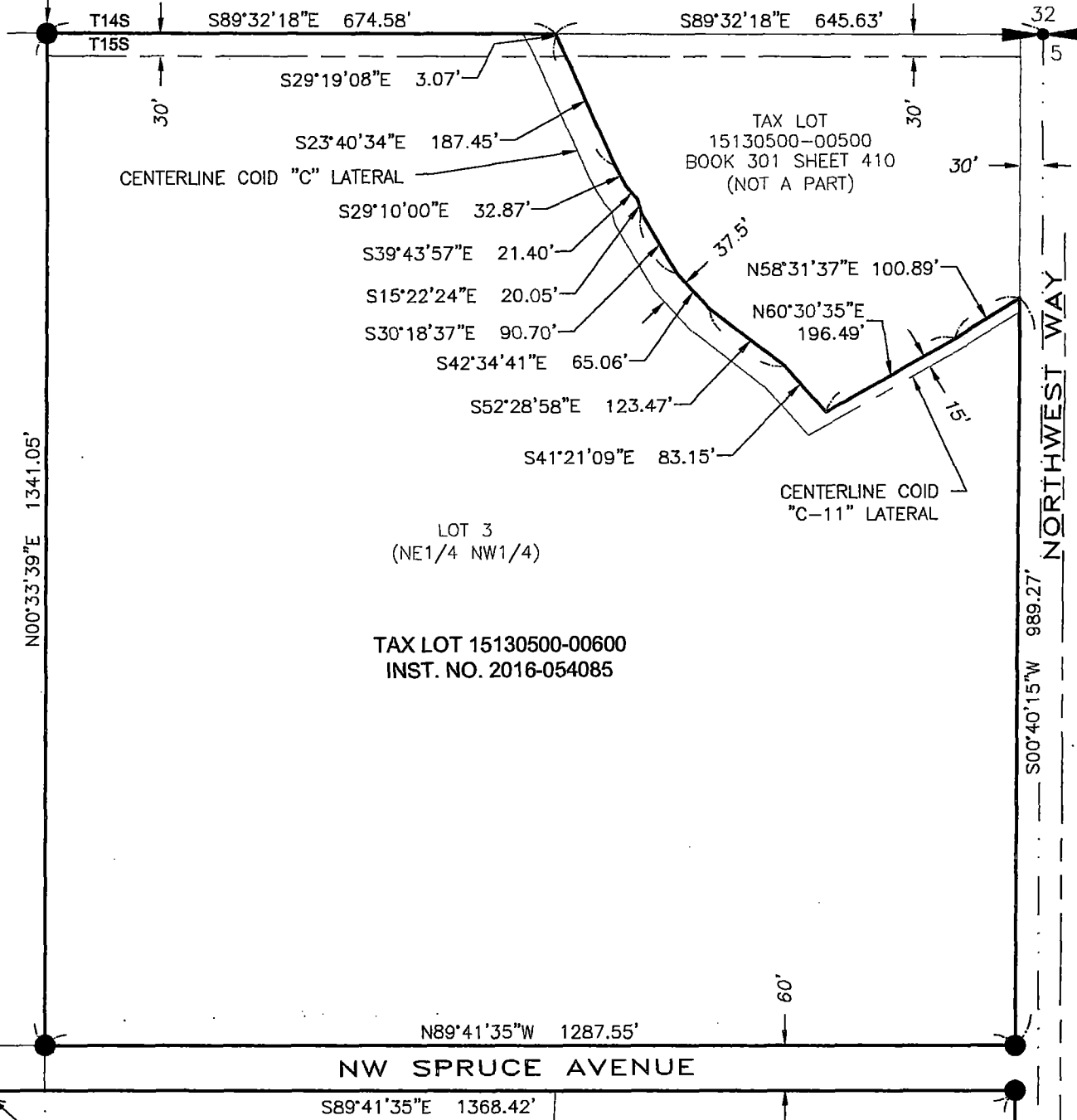
RENEWES: 12/31/2024

EXHIBIT MAP

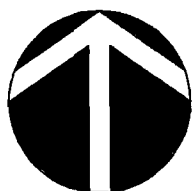


POINT OF BEGINNING,
NW CORNER
LOT 3

NW UPAS AVENUE



SEE SHEET 2



200' 0 100' 200' 400'



REGISTERED
PROFESSIONAL
LAND SURVEYOR

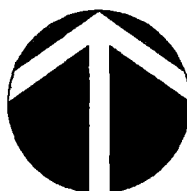
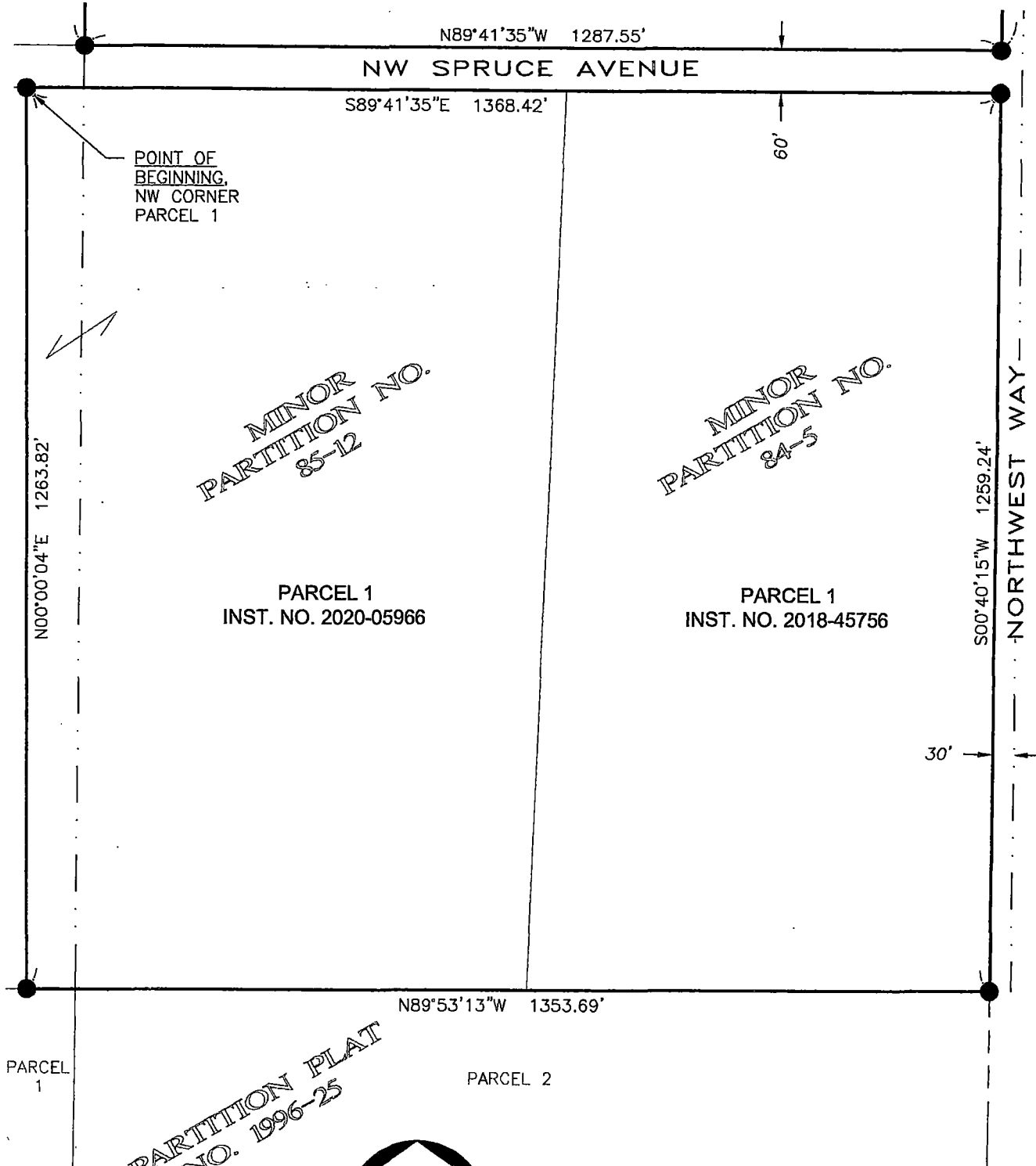
B. R. R. H.

OREGON

MAY 11, 2021

EXHIBIT MAP

SEE SHEET 1



200' 0 100' 200' 400'



REGISTERED
PROFESSIONAL
LAND SURVEYOR

B. R. R. W.

OREGON

LEGAL DESCRIPTION

A STRIP OF LAND BEING A PORTION OF PARCEL 2, PARTITION PLAT NO. 1996-25 RECORDED JUNE 4, 1996 IN BOOK 1, PAGE 502, DESCHUTES COUNTY OFFICIAL RECORDS, LOCATED IN THE SOUTHWEST QUARTER (SW1/4) OF SECTION 5, TOWNSHIP 15 SOUTH, RANGE 13 EAST, WILLAMETTE MERIDIAN, DESCHUTES COUNTY, OREGON, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

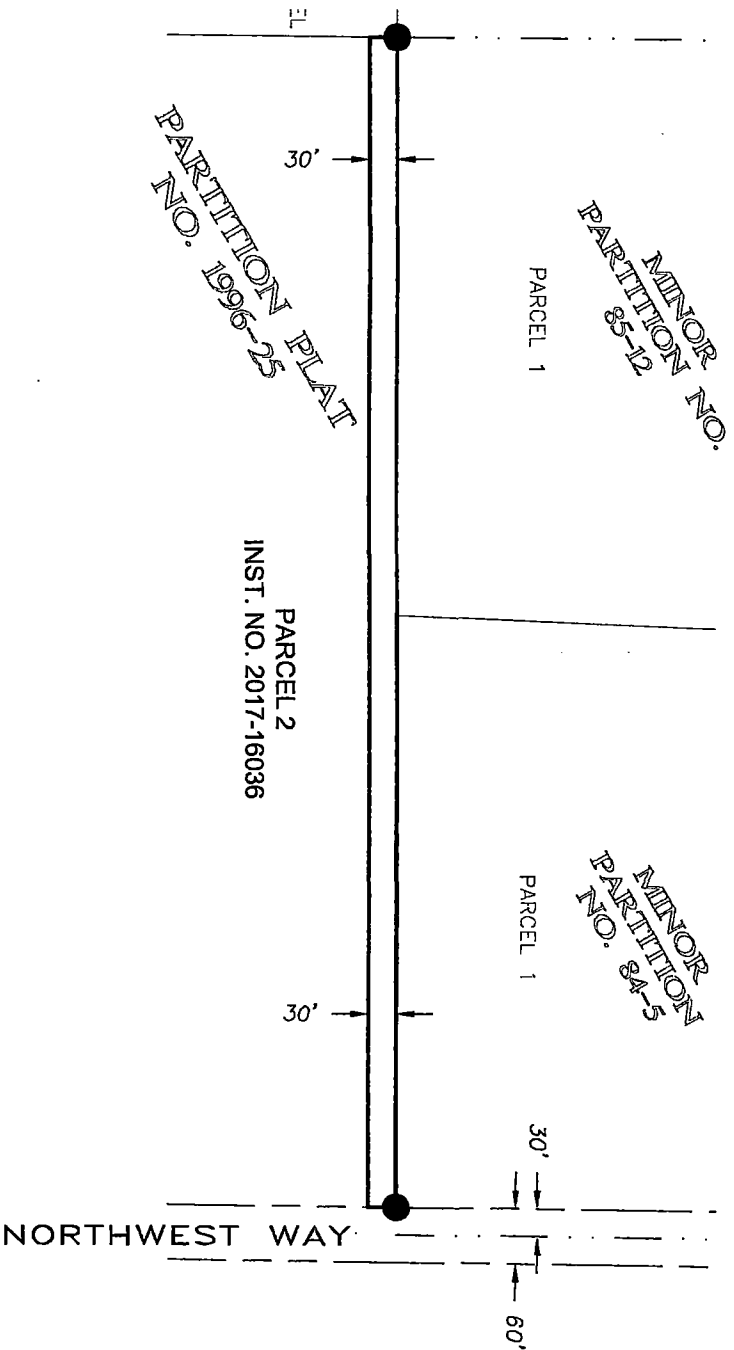
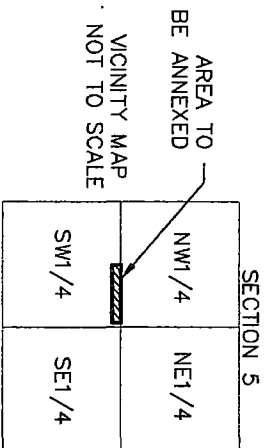
THE NORTH 30.00 FEET OF SAID PARCEL 2.

SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.



RENEWS: 12/31/2024

EXHIBIT MAP



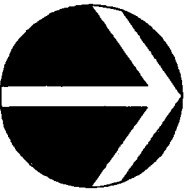
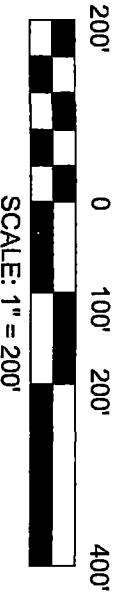
NT PER COUNTY SURVEY 20668

ROAD RIGHT OF WAY

ANNEXATION BOUNDARY

TAX LOT LINE

SECTION LINE



REGISTERED
PROFESSIONAL
LAND SURVEYOR

Brad R. Rhoades

OREGON
MAY 11, 2021
BRAD R. RHOADES
91917PLS

RENEWS: 12/31/2024

S&F Land Services

Date: 11/15/2023
Proj No: 2133701

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info@sflands.com