EXHIBIT A to Staff Report, Application and Applicant Narratives

Cornelius Multi-family

Type III Design Review Application

Exhibits – 8.5” x 11”

- Acknowledgement of Risk
- Land Use Application
- Design Review Submittal Checklist
- Written Narrative
  - Section I. Project Description
  - Section II. Approval Criteria
    - Chapter 18.75 Gateway Mixed Use
    - Chapter 18.100 Site Design Review
    - Chapter 18.143 Transportation Facilities
- Neighborhood Meeting Documentation
- Clean Water Services Service Provider Letter (Provisional)
- Sensitive Area Pre-Screening Site Assessment Form
- Preliminary Drainage Report
- Traffic Impact Analysis
- Geotechnical Report and Pavement Analysis
- ODOT Correspondence

THE CALIDA GROUP
Extraordinary Living

April, 1st 2022

City of Cornelius,

Calida Residential, LLC (The Applicant), acknowledges that they are proceeding with a Type III Design Review and Land Partition Application with a provisional Service Provider Letter from Clean Water Services. Should the project change due to any conditions necessary to comply with CWS or DSL, the Applicant acknowledges a new application may be required.

Respectfully Submitted.

Bill Hardt | **Development Partner – Pacific Northwest Division**

THE CALIDA GROUP
10777 W. Twain Ave., Ste. 115| Las Vegas, NV 89135
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Cornelius
Oregon's Family Town

Land Use Application

Community Development

Located at 1300 S. Kodiak Circle, Cornelius, Oregon 97113
www.ci.cornelius.or.us

OFFICIAL USE ONLY

Date Received: 04/29/2022
Date Complete: 05/09/2022
↓ File Number ↓ DR-81-22
Application Fee: $4,639.00
Receipt Number: 00421870

APPLICATION TYPE

Type I – ***administrative review without public notice***

☐ **Design Review I**
☐ **Land Partition—Final Plat**
☐ **Lot Line Adjustment**
☐ **Subdivision—Final Plat**
☐ **Administrative Relief**

☐ **Other** ***please describe:***

Type II – ***administrative review with public notice***

☐ **Design Review II**
☒ **Land Partition—Preliminary Plat**
☐ **Subdivision—Preliminary Plat**

☐ **Other** ***please describe:***

Type III – ***public hearing(s) required with public notice***

☒ **Design Review III**
☐ **Comprehensive Plan Amendment**
☐ **Annexation**
☐ **Conditional Use Permit**
☐ **Zone Map Amendment**
☐ **ROW/Easement Vacation**
☐ **Planned Unit Development**
☐ **Zone Text Amendment**
☐ **Subdivision—Preliminary Plat**

☐ **Other** ***please describe:***

APPLICANT INFORMATION

Name: Calida Residential, LLC
Signature: William Hardt
Mail Address: 10777 W. Twain Ave, Suite 115, Las Vegas, NV 89135
Phone: 702-947-2000
Fax:
E-mail: bhardt@thecalidagroup.com & greg@e2kconsulting.com

PROPERTY OWNER INFORMATION

Name: Tom Moyer Theatres, LLC
Signature: Vanessa Sturgeon
Mail Address: 919 SW Taylor, Suite 700
Phone: 241-1111
Fax:
E-mail: Vanessa@tmtdevelopment.com

SUBJECT SITE INFORMATION

Property Address: 2300 Basline St
Map & Tax Lot Number(s): 1N3 34CD 06700, 1N3 34CD 00100, and 1N3 34CD 00200
Current Zoning: GMU
Total Size of Site: 15.48 Acres
Existing Use: undeveloped land
Proposed Use: 3-story, 13-building residential mixed-use development with associated parking and ameniti

Revised April 2017

Cornelius
Oregon's Family Town

Design Review – Type II or III Submittal Checklist

Community Development
Located at 1300 S. Kodiak Circle, Cornelius, Oregon 97113
www.ci.cornelius.or.us

Written Narrative Requirements

_X_ A. **Checklist.** Please provide one completed copy of this six-page checklist.

_X_ B. **Description of proposal**. Please describe what changes are proposed to the site, structure, landscaping, parking, and land use. Provide findings verifying that the intended use is allowed by the City's *Development Code* (Chapter 18).

_X_ C. **Approval criteria findings**: Please provide findings verifying that the proposal meets the Code's requirements found in *Section 18.100,* Land Use & Zoning Site Design Review, Development Requirements & Standards of the applicable zone, and the off-street parking and loading requirements of *Section 18.145.,* in addition, provide findings for any other applicable Code requirements. Specify conformance or proposed variance request from those requirements.

_X_ D. **Technical and design standards.** Please provide findings specifically addressing each criteria found in *Section 18.100.040* of the City's *Development Code* (Chapter 18).

_X_ E. **Proposed Operations:** Please provide the hours of operation, total number of employees, and maximum number of employees per shift.

_X_ F. **Additional Requirements:** Please be advised that special studies, investigations and reports may be required to ensure that the proposal does not adversely affect the surrounding community, and does not create hazardous conditions for persons or improvements on the site. These studies may include investigations and reports on noise attenuation, air quality, traffic control, soil conditions, flooding of waters and storm water run-off, natural resources, tree preservation, and other concerns.

Written Narrative Requirements (cont.)

X G. **Site Analysis Information:**

1. Existing building area: 0 sq. ft.
   Proposed building addition or subtraction: 355,856 sq. ft.

2. Existing building height: 0 ft.
   Proposed building height: 39 ft.

3. Existing parking area: 0 sq. ft.
   Existing number of parking spaces: 0 # sp.
   Proposed parking addition or subtraction: ______ sq. ft.
   Proposed number of parking spaces: 501 # sp.
   Proposed use: Multifamily
   Parking requirement: 1 bedroom: 1.25/DU; 2 bedroom: 1.5/DU; 3 bedroor
   1.75/DU

4. Existing landscaped area: 0 sq. ft.
   Percentage of site: 0 %
   Proposed landscape addition or subtraction: 178,508 sq. ft.
   Percentage of site: 32 %

X H. **Neighborhood Review Meeting:** information required (*Dev. Code Section 18.10.030.*). (Only required for Type III Reviews)

X 1. A copy of the notice sent to surrounding property owners.
X 2. A copy of the mailing list used to send out meeting notices.
X 3. An affidavit of mailing notice.
X 4. Representative copies of written materials and plans presented at the Neighborhood Review Meeting.
X 5. Notes of the meeting, including the meeting date, time, and location, the names and addresses of those who attended, and oral and written comments received.

X I. **Other Requirements:** Please provide documentation that the requirements from other agencies and/or jurisdictions for your proposal have been permitted OR submit your schedule for application and approval of the required permits. If applicable, include a copy of a signed Sensitive Area Pre-Screening Letter from the City Engineer. Based upon the findings of the Sensitive Area Pre-Screening Letter, a **Clean Water Services Service Provider Letter may be required.**

X J. **Temporary Construction Office.** Please provide information on the site plan showing the location and state the duration of the temporary construction office.

DESIGN REVIEW TYPE II & III

Plan Requirements

All plans, except architectural elevations, shall be presented at a minimum of 1" = 20' engineering scale and on a maximum sheet size of 24" x 36." Please also include one 'unbound' set that is 8 1/2" x 11" in size. Each of the following plans and drawings shall be submitted on separate sheets. Architectural elevations may be presented at an architectural scale. Please include all of the following information.

X A. **Existing Conditions Plan**:

______ 1. North arrow, scale and date of plan.
______ 2. Vicinity map.
______ 3. The entire lot(s), including area and property lines dimensioned.
______ 4. Points of existing access, interior streets, driveways, and parking areas.
______ 5. Location of all existing buildings and structures.
______ 6. Existing right-of-way and improvements.
______ 7. Dimension from centerline to edge of existing right-of-way.
______ 8. Existing topographical information, showing 2 ft. contours.
______ 9. Surrounding development and conditions within 100 ft. of the property; such as zoning, land uses, buildings, driveways, and trees.
______ 10. Location of existing public and private utilities, easements, and 100-year floodplain.
______ 11. Sensitive areas, as defined by the Clean Water Services standards.
______ 12. Wetland boundaries, upland wooded area boundaries, riparian area boundaries, rock out-croppings, and streams. *Wetlands must be professionally delineated.*
______ 13. Existing trees larger than 6" in dbh (diameter at breast height), including genus, species and size. Dbh is measured at 54" above grade.

X B. **Dimensioned Site Plan**:

______ 1. North arrow, scale and date of plan.
______ 2. The entire lot(s), including area, property lines dimensioned and labeled "front," "side," and "rear."
______ 3. Proposed points of access, interior streets, driveways, and parking areas.
______ 4. Proposed location of buildings and structures, including refuse storage locations, pedestrian/bike paths, swimming pools, tennis courts, and tot-lots.
______ 5. Proposed right-of-way, dedications and improvements.
______ 6. Dimension from centerline to edge of proposed right-of-way.
______ 7. Dimensions of all improvements, including setbacks, parking spaces, driveways, and distance between buildings.
______ 8. Location of storm water quality/detention facilities.
______ 9. Boundaries of development phases, if applicable.
______ 10. Sensitive areas, as defined by the Clean Water Services standards.

______ 11. Wetland boundaries, upland wooded area boundaries, riparian area boundaries, rock out-croppings, and streams. *Wetlands must be professionally delineated.*

__X__ C. **Grading Plan**:

______ 1. North arrow, scale and date of plan.

______ 2. The entire lot(s).

______ 3. Points of access, interior streets, driveways, and parking areas.

______ 4. Location of buildings and structures, including refuse storage locations, pedestrian/bike paths, swimming pools, tennis courts, and tot-lots.

______ 5. Proposed rights-of-way, dedications and improvements.

______ 6. Dimension from centerline to edge of proposed right-of-way.

______ 7. Existing and proposed topographical information, showing 2 ft. contours and appropriate spot elevations for features such as walls, retaining walls (top and bottom elevations), catch basins, stairs, sidewalks, and parking areas.

______ 8. Location of 100-year flood plain.

______ 9. Location of storm water quality/detention facilities.

______ 10. Boundaries of development phases, if applicable.

______ 11. Natural Resource Areas, Significant trees, and Historic trees, if applicable.

______ 12. Sensitive areas, as defined by the Clean Water Services standards.

______ 13. Wetland boundaries, upland wooded area boundaries, riparian area boundaries, rock out-croppings, and streams. *Wetlands must be professionally delineated.*

______ 14. Existing trees larger than 6" dbh. Indicate which trees are proposed to be saved and which are proposed to be removed.

__X__ D. **Utility Plan**:

______ 1. North arrow, scale and date of plan.

______ 2. The entire lot(s).

______ 3. Points of access, interior streets, driveways, and parking areas.

______ 4. Location of buildings and structures, including refuse storage locations, pedestrian/bike paths, swimming pools, tennis courts, and tot lots.

______ 5. Proposed right-of-way, dedications and improvements.

______ 6. Proposed topographical information, showing 2 ft. contours.

______ 7. Location of 100-year flood plain.

______ 8. Location of existing and proposed public and private utilities, easements, surface water drainage patterns, and storm water quality/detention facilities.

______ 9. Boundaries of development phases, if applicable.

______ 10. Sensitive areas, as defined by the Clean Water Services standards.

______ 11. Wetland boundaries, upland wooded area boundaries, riparian area boundaries, rock out-croppings, and streams. *Wetlands must be professionally delineated.*

X E. **Landscape Plan**:

______ 1. North arrow, scale and date of plan.

______ 2. The entire lot(s).

______ 3. Points of access, interior streets, driveways, and parking areas.

______ 4. Location of buildings and structures, including refuse storage locations, pedestrian/bike paths, swimming pools, tennis courts, and tot lots.

______ 5. Proposed right-of-way, dedications and improvements.

______ 6. Boundaries of development phases, if applicable.

______ 7. Sensitive areas, as defined by the Clean Water Services standards.

______ 8. Wetland boundaries, upland wooded area boundaries, riparian area boundaries, rock out-croppings, and streams. *Wetlands must be professionally delineated.*

______ 9. Existing trees, larger than 6" dbh, proposed to be saved. Include genus, species, and size.

______ 10. The location and design of proposed landscaped areas, indicating all plant materials, including genus, species, common name, plant sizes, and spacing.

______ 11. List of plant materials, including genus, species, common name, size, quantity, spacing and condition.

______ 12. Other pertinent landscape features, including walls, retaining walls, berms, fences, and fountains.

______ 13. A note on the plan indicating that an irrigation system will be installed to maintain the landscape materials.

X F. **Lighting Plan**:

______ 1. Location of all exterior lighting, including those mounted on poles, walls, bollards and the ground.

______ 2. Type, style, height, and the number of fixtures per light.

______ 3. Wattage per fixture and lamp type, such as sodium, mercury, and halide.

______ 4. 8 ½" x 11" manufacturer's illustrations and specifications (cut sheets) of all proposed lighting poles and fixtures.

______ 5. For all exterior lighting, indicate the area and pattern of illumination measured at ½-foot candlepower.

X G. **Architectural Renderings and Elevations, or both:** Please provide information that identifies the general character of the buildings and structures; indicate dimensions, materials, colors, and textures proposed for any structures. This includes buildings, retaining walls, refuse storage facilities, play structures, and fences

X H. **Materials Board**: Please provide one 8½" x 11" or 8½" x 14" Materials Board with examples of all building materials, colors, and textures of exterior surfaces.

I have provided the items required in this six-page submittal checklist. I understand that any missing information, omissions or both may deem my project incomplete, which may lengthen the time to process the request.

William Hardt

Signature

1/14/22

Date

Bill Hardt

Print Name

503-709-9011

Telephone Number

Cornelius Multifamily Project Narrative – Type III Design Review

Section I - Project Description

The applicant proposes a 15-building residential mixed-use development with 327 residential apartment units and 22 live-work units for a total of 349 units, as well as retail space, a club house, a dog run, ample open space for residents, and on-site parking. Since the 22 live-work units will be designed as a commercial ground floor space with a living area above, we include these as units for purposes of total residential counts within the development. The applicant also seeks a land division to adjust the boundaries of the existing lots to include a commercial development pad at the southern edge of the site fronting E Baseline Street, which will be separate from the residential mixed-use development. The applicant is not proposing to develop that commercial pad as part of this application. The project will improve N Davis Street and extend this public street through the site. The project also creates two private access ways, a private extension of Davis along the western edge of part of the development and an access way bisecting the commercial development pad from the mixed-use residential project.

Section II - Approval Criteria

The application meets the applicable approval criteria under the Cornelius Development Code as demonstrated below.

CHAPTER 18.75 GATEWAY MIXED USE (GMU)

18.75.010 Purpose.

The gateway mixed use (GMU) zone serves as the eastern anchor for the city's commercial core, with larger-format commercial, office, and residential opportunities in a mixed-use environment. Uses include commercial retail and services, offices and employment opportunities, and multi-family residential uses, connected by open spaces, landscaping, and parks. The district welcomes users arriving by vehicle, bicycle, transit, and on foot by accommodating multiple modes of access and providing cross-circulation within the district through a mix of public and private streets, sidewalks, pathways, and connections. Development and redevelopment of the large lots that comprise this district is coordinated to create a cohesive, integrated form of development. Building presence, facade design, and building entrances are emphasized along the Baseline Street, N 19th/20th Avenue, N 26th Avenue, and future N Davis Street frontages to create a welcoming face for the district, with building height limited around the perimeter and concentrated in the interior of the district to increase compatibility with neighboring development. Landscaping, open space, and graduated height transition along the northern perimeter of the district create a low-impact, welcoming interface with the future Council Creek Regional Trail. The GMU zone standards support development of a mixed-use district that meets city and regional needs for commercial, employment, and residential opportunities.

> <u>Response:</u> **The proposal is for a mixed-use development containing mostly multi-family residential uses as well as commercial uses. The site is located near existing transit and will improve pedestrian access to adjacent uses.**

18.75.020 Permitted uses.

The following uses and their accessory uses are permitted outright:

(A) General retail.

(B) Indoor recreation and entertainment, including but not limited to pool hall, internet and video game center, dance hall or theater, fitness or sports facility, when enclosed in a building.

(C) Service commercial, including but not limited to barbers, banks, laundry, or dry cleaning. Drive-up window, drive-in, or drive-through facilities in conjunction with these uses.

(D) Sales, service or repair of nonmotorized sporting equipment, such as bicycles, skis, snowboards, skates, and general sporting goods, inclusive of electric bicycles and stationary exercise machines that incorporate motors such as treadmills.

(E) Office, business, professional, medical/dental, or veterinarian.

(F) Restaurant, eating and drinking establishments. May include drive-up window, drive-in, or drive-through facilities. May include outdoor seating areas, subject to CMC 18.75.060(G).

(G) Commercial lodging, including hotel or motel.

(H) Multi-family dwelling units, subject to CMC 18.75.065.

(I) Single-family attached dwelling units, subject to CMC 18.75.065.

(J) Theatrical arts or cultural performance center.

(K) Health care and social service offices.

(L) Certified child care center.

(M) Type “A” or Type “B” mobile vendor, as described in Chapter 5.35 CMC.

(N) Outdoor display and storage, subject to CMC 18.75.060

> **Response: The proposal is for a mixed-use residential development with 327 apartment units and 22 live work units that have commercial space on the ground floor. A variety of allowed commercial uses are anticipated within these live-work units, most likely within the office or service commercial categories.**

18.75.045 Applicability of development and design requirements.

(A) New buildings must meet all standards of this chapter.

> **Response: The proposal is for new construction and will meet all standards.**

18.75.050 Development requirements

(A) Lot Size. No minimum lot size is required. All lots must be functional and meet the minimum setback and parking requirements.

> **Response: The proposal includes a land division to adjust the boundaries of the existing lots. The resulting lots will be functional and meet the minimum setback and parking requirements for development as applicable. A separate narrative will address the applicable code requirements.**

(B) Setback Requirements. For purposes of this section, the frontage with the higher street classification shall be deemed the front lot line for any lots with multiple frontages.

> **<u>Response:</u> The site currently has frontage on Davis Street and Baseline Street. With the creation of the new lot lines, the residential mixed-use portion of the site, which is currently proposed for development through this application, will have frontage on Davis Street and private access drives. The newly separated lot to the south, which is not being proposed for development through this application, has frontage on Baseline Street.**

(1) Front Setbacks. The front building setback shall be a minimum of zero and a maximum of 10 feet, unless the setback area is developed as an enhanced setback area consistent with CMC 18.75.060(D). No vehicular parking, storage, access or other use is permitted within the front yard setback, except for a single driveway to access an off-street parking area.

> **<u>Response:</u> The applicable setback standards are found in 18.75.065(G)(4) and are addressed in this section.**

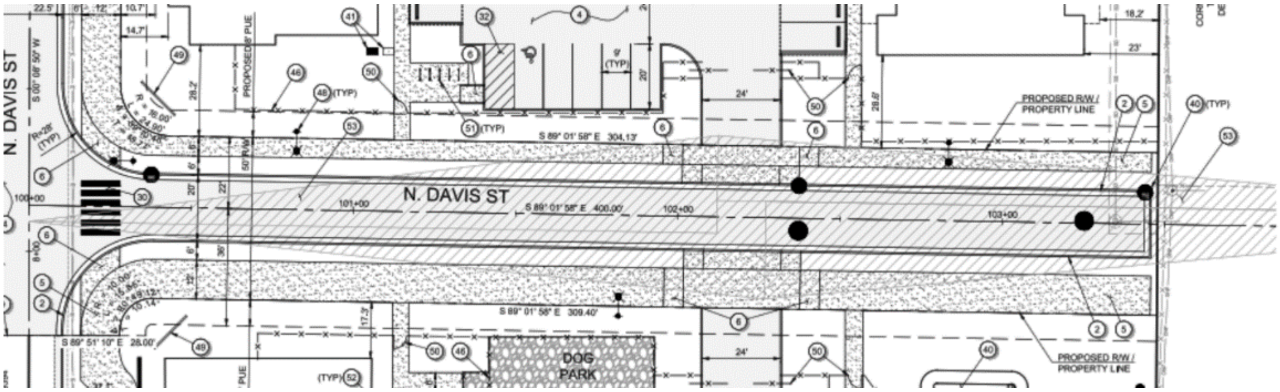
(2) Side Setbacks. The minimum building setback at a side lot line shall be zero. No vehicular parking, storage, access or other use is permitted within the street side yard setback, except for a single driveway to access an off-street parking area.

(3) Rear Setbacks. The minimum building setback at a rear lot line shall be zero.

> **<u>Response:</u> All buildings are setback more than zero feet from the side and rear lot line. Since there is no maximum setback, the buildings have been placed to avoid existing easements, ROW dedications, and the landscaped trail corridor. No parking is proposed within the street side setback. Refer to the Dimensioned Site Improvement Plan, sheets C201-C206 for specific dimensions of each building setback.**

(4) Clear vision areas shall be maintained at all intersections.

> **<u>Response:</u> Clear vision areas are shown on the Dimensioned Site Improvement Plan, sheets C201-C206. An example of the clear vision area denoted on the plans is shown in the graphic below.**



(C) Height of Buildings.

(1) Buildings shall be a maximum of three stories or 45 feet in height, whichever is less.

> **<u>Response:</u> The tallest proposed building height is approximately 39 feet and 3 stories which meets this standard.**

(2) Building height may be increased to a maximum of four stories or 60 feet in height, whichever is less, for buildings or portions of buildings set back at least 30 feet from the eastern, western, and southern perimeters of the district, and set back at least 120 feet from the northern perimeter of the district, if approved as a conditional use consistent with Chapter 18.105 CMC.

> **<u>Response:</u> The Proposal does not seek an increase in building height.**

(D) Lot Coverage. A minimum of 10 percent of each lot, or multiple lots if developed concurrently, shall be landscaped and maintained free of buildings, pavement, or any other form of impermeable cover.

> **<u>Response:</u> Ten percent of the lot area equates to 63,966 square feet. As shown on the Planting Legend, Details & Notes, sheet L101, the overall development includes 159,390 square feet or 32 percent landscaping coverage, which exceeds this standard.**

18.75.060 Design requirements

> **<u>Response:</u> The proposal contains 15 buildings; all but Building 1 contain ground floor residential or contain only accessory non-residential function [*Building 2*] and are therefore subject to Section 18.75.065 and exempt from this Section 18.75.060's requirements.**

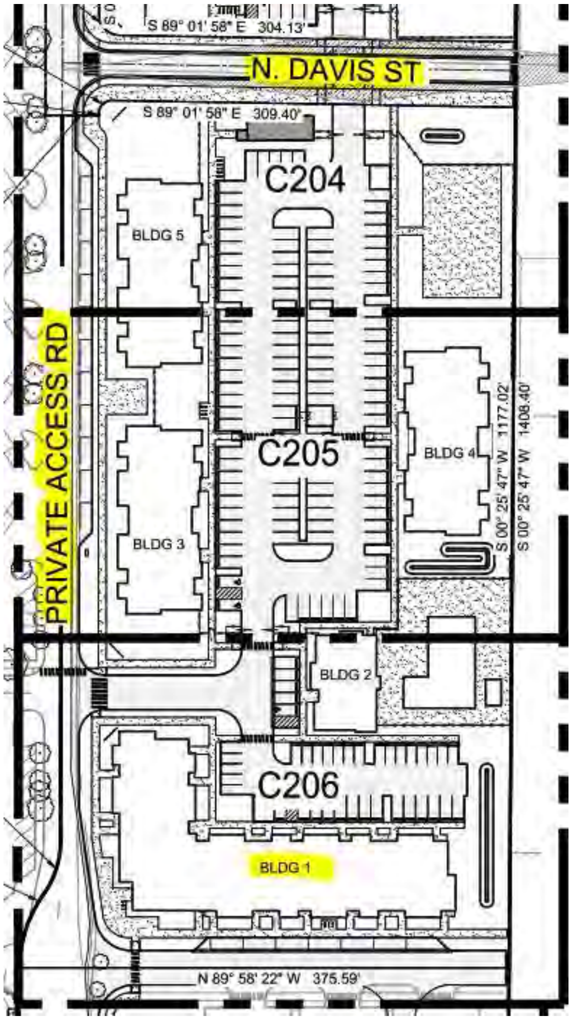
(A) Building Frontage on Major Streets. For lots with frontage on Baseline Street, Davis Street, N 19th/20th Avenue or N 26th Avenue, buildings shall occupy 50 percent of the width of the parcel's frontage on these major streets with a maximum front setback of zero feet. The following exceptions shall apply:

(1) Up to 40 percent of the building frontage may be set back up to 20 feet if the setback area is developed as an enhanced setback area consistent with subsection (D) of this section or outdoor seating area consistent with subsection (G) of this section; and/or

(2) A chamfered corner for a building at the intersection of two streets may be set back from the lot frontage for a maximum width of 20 feet along the lot frontage; and/or

(3) Lots or portions of lots developed as a public park or open space shall be exempt from this standard.

> **<u>Response:</u> Building 1 does not have frontage along any Major Streets; therefore, this section does not apply. A private access way extends from Davis Street along the western frontage and is denoted as "Davis Street," on the plans, but the actual public Davis Street curves through the development before reaching Building 1 as shown below.**



(B) Entrances and Orientation. Building entrances shall define the building's orientation toward the street. Buildings shall be oriented with regard to creating visual exposure from both the highway and from within the district and other uses, through consideration of location, design and relationship of entry doors, pedestrian access and vehicular circulation that does not create significant conflicts with pedestrian circulation, and loading docks, etc. Buildings may need to be designed with multiple fronts, much like occurs on corner lots where exposure to the building is from more than one street.

(1) Main Entrances. Buildings shall provide at least one main entrance facing the street. For lots with a frontage along Baseline Street, Davis Street, N 19th/20th Avenue or N 26th Avenue, at least one main entrance shall face these major streets or be oriented to the corner of two streets. Main entrances shall be clearly defined and distinguished from other parts of the building by at least one of the following design elements:

(a) Recessed entry.

(b) Entry surrounds such as arches, columns, insets and design elements above and/or flanking the entrance.

(c) Transom windows above the entrance door.

(d) Weather protection consisting of permanent canopies, awnings, or arcades; canvas or fabric awnings are not considered permanent for the purposes of this standard because of their short life span.

<u>Response:</u> Although Building 1 fronts private drives, the South and West elevations have at least 1 main entrance with weather protection as shown in the graphics below.

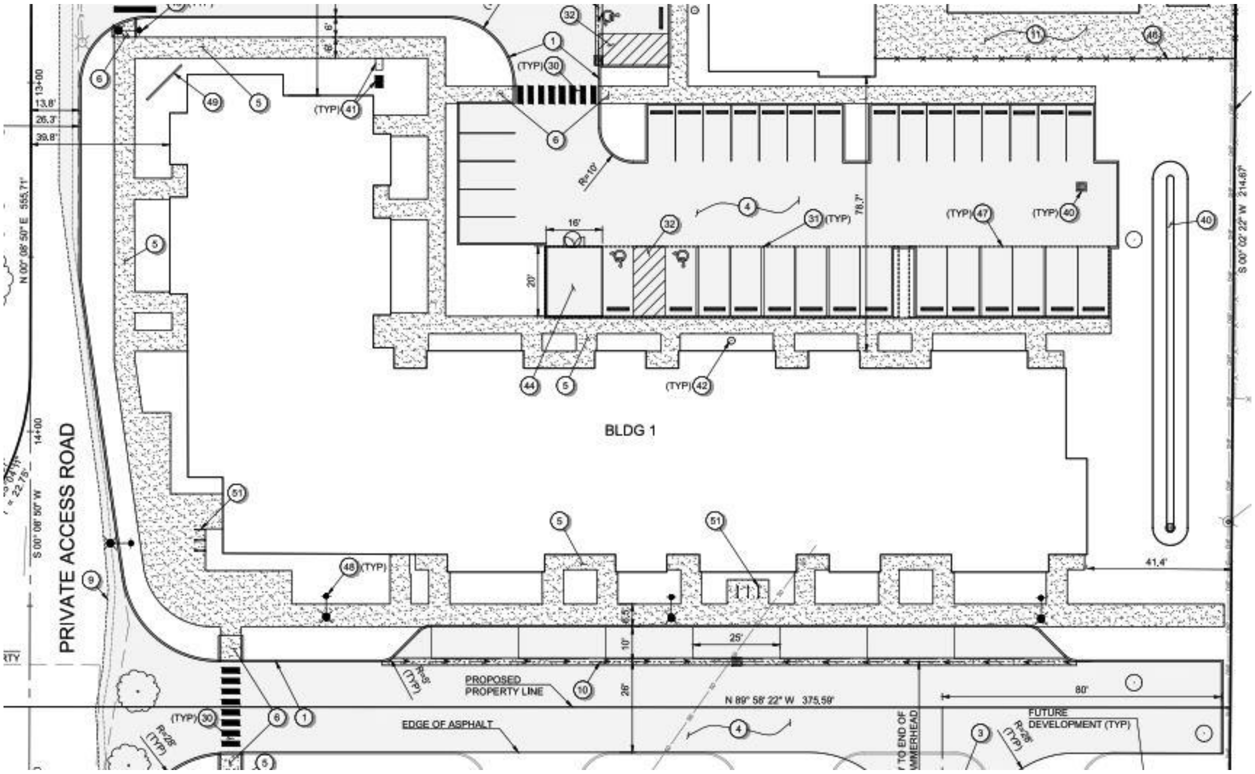
(2) Secondary Entrances. Secondary entrances shall be provided for buildings with multiple fronts, to provide direct and convenient entrances for users arriving via all modes of transportation.

<u>Response:</u> The South and West elevations also have secondary entrances as shown on the graphics under (1)(d).

(3) All entrances shall be served by a direct and convenient pedestrian connection to the street sidewalk and/or internal pathway system.

(4) All entrances must have a light source to illuminate the entrance.

<u>Response:</u> Building 1 fronts private drives and has multiple primary entrances. The corner shell space incorporates a large overhang and extensive glazing to define the entries and abuts a paved plaza with short-term bicycle parking near this corner. These ground floor entries face private drives fronting the building and are recessed and covered to a depth of 5' and will have available illumination. All building entries either open to a paved walk along these private drives or connect with private drives by internal paved site circulation.



PRIVATE ACCESS ROAD
BLDG 1
13+00
14+00
13.8'
26.3'
39.8'
N 00° 08' 50" E 555.71'
S 00° 08' 50" W
= 22.78'
6'
8'
16'
20'
R=10'
78.7'
41.4'
6.5'
10'
25'
26'
80'
R=5' (TYP)
R=28' (TYP)
PROPOSED PROPERTY LINE
EDGE OF ASPHALT
N 89° 58' 22" W 375.59'
TO END OF HAMMERHEAD
FUTURE DEVELOPMENT (TYP)
S 00° 02' 22" W 214.67'
1
3
4
5
6
9
10
11
(TYP) 30
31 (TYP)
32
(TYP) 40
40
(TYP) 41
(TYP) 42
44
46
(TYP) 47
48 (TYP)
49
51

(C) Pedestrian Connectivity. All sites shall provide internal pedestrian connections between individual buildings, through parking areas, and between parking areas and buildings, linking to the nearest street and/or transit stop. Pedestrian connections shall be direct, safe, and separated from vehicular traffic. Pedestrian pathways shall also be coordinated within the district to connect uses and buildings.

> **<u>Response:</u> Pedestrian connections are provided throughout the site, between buildings, parking areas and extending out to the public sidewalks along Davis Street which runs through the development.**

(D) Enhanced Setback Area. All setback areas between buildings and the street allowed under subsection (A)(1) of this section shall be enhanced with the following improvements:

(1) A paved area for use by pedestrians incorporating permanent amenities such as textured paving, planters connected to the earth and planting areas, seat walls and fences a maximum of 42 inches in

height, outdoor lighting, short-term bicycle parking, kiosks, colonnades, drinking fountains, public art, etc.; or

(2) A landscaped area incorporating ground cover and shrubs with a mature height of less than five feet to maintain visibility between buildings and the street, achieving 80 percent plant cover at maturity; or

(3) A combination of the above and/or outdoor seating areas per subsection (G) of this section.

> <u>Response:</u> **Buildings 1 fronts only along private drives and is not subject to these requirements, but has been developed with paved walks, a corner plaza, landscaping, including street trees, foundation plantings and groundcover, and short-term bicycle parking.**

(E) Windows.

(1) Windows, doorways and other openings along the ground-floor facade shall be arranged to prevent a blank length of wall more than 20 linear feet along any facade facing a public street, off-street parking area, open space or public park, or internal pathway system. A blank wall is a wall that contains no openings such as windows or doorways within the ground-floor wall area.

> <u>Response:</u> **The ground floor façade of Buildings 1 and 2 do not contain blank walls of more than 20 feet.**

(2) Glass curtain walls, reflective glass, and painted or darkly tinted glass shall not be used for ground-floor windows.

> <u>Response:</u> **The ground floor façade of Buildings 1 has windows spaced irregularly, that typically have between 3 and 6 feet between openings, and a maximum blank façade of 19' - 10". No glass curtain wall, reflective glass, painted or darkly tinted glass is proposed for ground-floor windows.**

(F) Facade Design.

(1) Building Top. The building top must be distinguished from the building facade by a cornice, wall cap, or eaves provided with a pitched or overhung roof.

(2) Building Base. Buildings of three stories or more shall incorporate features to distinguish the base of the building from the upper stories, including:

(a) A horizontal architectural element such as a masonry string course, ledge, or band that projects or recesses from the building face and extends across the facade.

(b) Use of distinct materials on the ground floor compared to upper stories to create a solid foundation. Ground-floor materials shall be finished concrete, stone, brick, masonry or similar as determined by the community development director as the predominant facade material.

> <u>Response:</u> **Building design for Building 1 incorporates a masonry veneer at the ground floor to contrast with darker fiber cement panels at floors 2 & 3. The upper floors incorporate varying height projecting shed roofs to provide a varying roofline. Greater detail can be found on the Exterior Elevations, sheet A3.08.**

(G) Outdoor Seating Areas. Outdoor seating areas are encouraged to increase pedestrian activity and interest along the street.

(1) Outdoor seating areas, excluding any portion located within the sidewalk, shall be permitted on up to 25 percent of the gross site area.

(2) Outdoor seating areas are permitted anywhere on site, including within the enhanced setback area and the sidewalk fronting the site, as approved by the city engineer, and the Oregon Department of Transportation in cases where the Baseline Street right-of-way is affected. A minimum width of six feet shall be maintained for pedestrian movement along the sidewalk.

(3) Outdoor seating areas shall be approved through a site design review.

Response: The gross site area is 639,663 square feet. The allowed square footage for outdoor seating is 159,915 square feet. Outdoor seating constitutes 14,865 square feet or 9.3% of the gross site area.

BBQ Area (1152 sf):

The BBQ area will be semi-enclosed with shrubs and grasses and a canopy of trees overhead. The surface will be an appropriate durable surface, such as brick or pavers, and in keeping with the materials used on the site. Approximately 200 sf of built in preparation space and two to three grills could be included for the community to use, as well as trash/recycling receptacles to capture any waste. Residents could enjoy their food at the provided tables and chairs, which would most likely be secured in some way to prevent removal. Each table would be able to seat at least four people and it is estimated that at least three tables could be located in this area. The tables will most likely have umbrellas to provide more protection from the sun and additional color to the landscape.

Memorial Area (826 sf):

The memorial area will be paved with an appropriate durable surface, such as brick or pavers, and in keeping with the materials used on the site. Shrubs, grasses and perennials would enclose the area on three sides, the fourth side would be joined to the sidewalk. Trees will provide canopy and buffering to the buildings to the north and south of the plaza. Two to four secured benches of an appropriate and durable style will be included at the perimeter of this area to provide seating and opportunities for people to gather. This area will likely be used by the community in passing, as well as residents.

Parklet (1336 sf):

A parklet at the south end of Building 3 will provide a sunny area for both residents and pedestrians to rest and gather. This will be a less formal space, but still provide a place to stop and rest. The surface might be mown grass or a grass-crete option. Shrubs and grasses will soften the edges on 2-3 sides and offer the area a sense of enclosure. Two secured benches will be provided for seating.

Pool area (10839 sf):

The pool area provides deck chairs and seating at tables to allow for flexible and active use of this space. The furnishings will likely be moveable, as there is controlled access to this area. To maintain a safe and clean pool, the landscape will be seen in planters gathered to provide interest and color. There will be landscape buffering to the exterior of the fence that secures the area. The buffer will be a mixture of shrubs, grasses, and trees. The amount of seating in this area is unknown at this time and will be driven by building safety capacity.

Corner seating area outside of Building 1 (712 sf):

This seating area will be delineated through a change in paving material and through the use of planters to provide appropriate sheltering, while still maintaining visual safety for the vehicular traffic. The change in paving would be in keeping with materials used elsewhere on the site. The seating in this area will most likely be 2-3 secured benches with two café tables for any eateries that could be located in Building 1.

(H) Outdoor Display and Storage.

(1) Outdoor display of merchandise and vendors shall be permitted within the enhanced setback area and the sidewalk, as approved by the city engineer, and the Oregon Department of Transportation in cases where the Baseline Street right-of-way is affected. Such outdoor display shall be limited to plants, gardening/floral products, food, books, newspapers, clothing, bicycles, and similar small items for sale or rental to pedestrians (i.e., non-automobile-oriented), and shall only be displayed during business hours. A minimum width of six feet shall be maintained for pedestrian movement along the sidewalk.

(2) Outdoor storage outside of business hours shall only be located to the side or rear of the lot and shall not be located on the sidewalk or the enhanced setback area. Such storage may only be approved through a site design review, which may include conditions limiting the size and requiring screening of such storage.

(3) Outdoor storage and display, excluding any portion within the sidewalk, shall not exceed 20 percent of the gross site area unless approved as a conditional use.

<u>Response:</u> Outdoor display and storage are not proposed for the development.

(I) Screening. Screening shall be required to buffer commercial, employment and residential uses, including associated parking areas, from exposed outdoor storage areas, aboveground utility yards, and abutting properties zoned for industrial use. Screening shall consist of a 10-foot landscaped buffer at least six feet in height at the time of maturity, with one row of evergreen trees planted 25 feet on center and shrubs every five feet on center, or as otherwise determined appropriate by the design review committee, consistent with the intent of this screening.

<u>Response:</u> A self-storage facility zoned LI is located to the east of the development, therefore a 10' landscape buffer is required along the property line abutting this zone. There is a 15' utility easement in the required buffer area, therefore in lieu of planting evergreen trees, a fence in combination with evergreen shrubs measuring 8' wide by 5' high at maturity is proposed. The buffer is shown on the Planting Plan, Sheet L104.

(J) Landscaping. A minimum of 10 percent of each lot, or multiple lots if developed concurrently, shall be landscaped and maintained free of buildings, pavement, or any other form of impermeable cover.

(1) All landscaped areas shall be planted with at least an 80 percent plant cover at maturity. Large areas of bark dust or other nonliving vegetative ground covers shall be avoided.

(2) The elements of landscaping include all forms of planting and vegetation, all adjustments, refinements, or designed developments in ground forms, rock groupings, or water patterns or features, all construction other than completely enclosed buildings or primarily utilitarian engineering structures such as retaining walls. Particular attention shall be given to providing walkways, patios or plazas that create linkages between buildings, uses and activity areas. These are all elements used to develop and refine space between, around, or within buildings and pedestrian and vehicular circulation elements.

(3) Landscaping should be used to separate and buffer parking areas from pedestrian areas, and to accentuate building design and entrances. Landscaping is intended to provide visual relief, buffering from vehicles for pedestrian and bikeways, and accent or framing of buildings, plazas and other activity areas.

(4) Landscaping should be incorporated into plazas and courtyards to provide common spaces serving the development. Uses and buildings should be clustered around these common spaces whenever possible, with entries oriented to these spaces.

(5) All vegetative landscaping shall be maintained with a functioning irrigation system.

> <u>**Response:**</u> **The proposal provides 32% landscaping coverage for the development. The landscaping will be planted to meet at least 80% plant cover at maturity and large areas of non-vegetated ground cover have been avoided. The development includes multiple buildings with linkages between these and activity areas, including the dog run and club house. Linkages are enhanced by the landscaping program throughout. Parking areas are buffered by landscaping from residential and pedestrian-focused areas. Landscaping is incorporated into open spaces to provide common space for residents. The project's landscaping will be maintained with a permanent irrigation system. Irrigation details can be found on the Irrigation Details, Sheet L110. The Planting Legend and Planting Plans, Sheets L101-L109 provide detail for the proposed landscaping.**

(K) Trail Corridor Landscaping. A 30-foot-wide landscaping buffer is required along the northern property line abutting the ODOT Rail/future Council Creek Regional Trail corridor to soften the transition between development and the trail.

(1) The landscaping buffer area shall meet the requirements of and count towards the minimum percentage required in subsection (J) of this section, except that paved pedestrian and bikeways may be integrated into the buffer area.

(2) Fences within the landscaping buffer area shall not exceed 42 inches in height unless approved as a conditional use consistent with Chapter <u>18.105</u> CMC and the applicant demonstrates that they are necessary for security purposes.

(3) A landscaping buffer is not required between the trail corridor and any public park or common open space; provided, that the park or open space is a minimum of 30 feet wide.

> <u>**Response:**</u> **The Site abuts the trail corridor to the north and will provide the required 30-foot landscaping buffer. As this 30-foot buffer includes mature Oregon white oak, the trees will be**

preserved and protected as feasible. Native grasses will be planted around the base of the oaks and buffer which will create a meadow look under the oaks. No fencing is proposed in this area.

(L) Residential Open Space. Vertical mixed-use developments containing 20 or more residential units shall provide at least 100 square feet of open recreational space per unit provided in common open space. Such space will be considered part of the landscaping required by subsection (J) of this section, but must be designed in a manner that affords residents usable open area. Streets, access drives and parking lots shall not be considered open space. Open space must be a usable open recreational area, and may include a club house or indoor recreation facility. All outdoor area shall be landscaped and maintained by the owner, or a homeowners' association, according to the approved development plans, unless the open space is dedicated to and accepted by the city as a public park.

<u>Response:</u> Building 1 is a vertical mixed-use development containing 22 live-work residential units and ground floor commercial space. 2,200 square feet of recreational open space is required for these units. The project provides approximately 65,600 square feet of common open space available for use by all residents The following site areas are being included in the open space calculation and can be identified on sheets L102-L107, outlined in blue.

BBQ Area: 1,152 sf

Dog Park: 968 sf

Sport Court: 6,120 sf

Memorial Area: 863 sf

Pool: 10,995 sf

Plaza Area: 712 sf

Clubhouse/Amenity Building: 4,000 sf

Parklet: 1,336 sf

Open Landscape Area: 41,654 sf

Total Open Space: 65,600 sf

As noted below, the remainder of the development, which contains ground floor residential use, is subject to the higher 150 square foot per unit open space standard. The development as a whole exceeds the requirements for both standards.

(M) Lighting. Adequate exterior lighting shall be provided to promote public safety, to illuminate pedestrian pathways and parking areas, and shall be designed to avoid unnecessary or undesirable glare into the street or upon other properties, particularly those outside of the district.

<u>Response:</u> The project lighting has been designed to provide safety for the users of the site while incorporating standards for shielding to reduce light trespass on the adjacent properties and open space. All egress and parking lot lighting will be designed meet foot candle requirements. All other lighting for the project will be landscape in nature such as path or

bistro lighting. Lighting locations and details are shown on the Electrical Site Plan Photometrics, Sheets E0.1-E1.1B.

18.75.065 Residential requirements.

In lieu of compliance with CMC 18.75.050, 18.75.060 and 18.75.070, ground-floor residential uses shall comply with the standards of this section. Upper-story residential uses in a vertical mixed-use building shall not be subject to this section.

Response: Buildings 3-15 contain ground floor residential use and are subject to the standards of this Section. As noted above, Building 1 contains live/work commercial uses on the ground floor and standards for that building are addressed under the relevant sections.

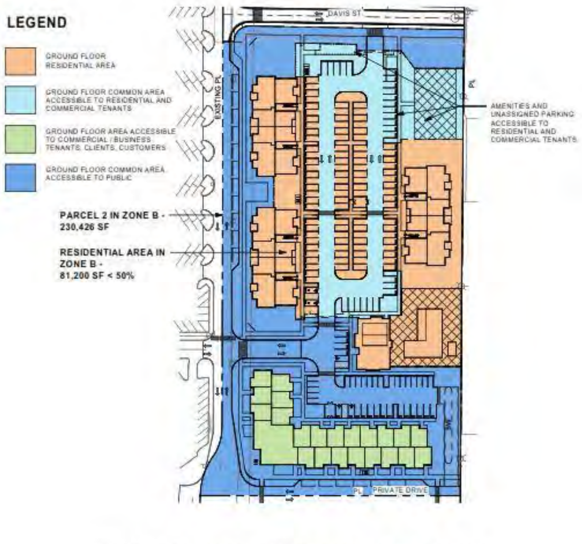
(A) Location of Residential Uses. Ground-floor residential uses are limited to a percentage of the total site area based on the three subdistricts shown in Figure 18.75.065-1.

(1) In subdistrict A, up to 100 percent of a lot or multiple lots if developed concurrently may be developed as ground-floor residential uses, including parking to serve residential uses.

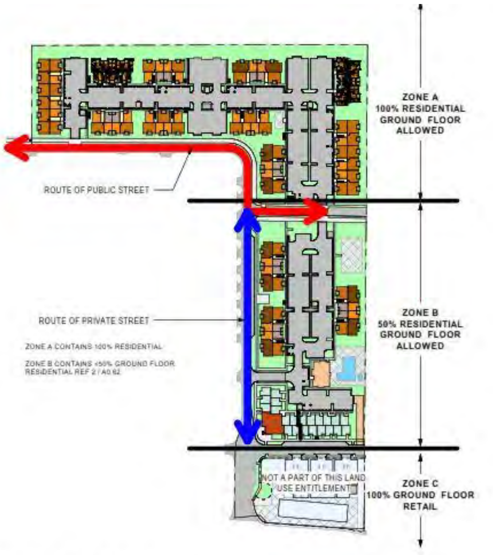
(2) In subdistrict B, up to 50 percent of a lot or multiple lots if developed concurrently may be developed as ground-floor residential uses, including parking to serve residential uses.

(3) In subdistrict C, no ground-floor residential uses are permitted.

Response: The site is within Subdistricts A and B and meets the allowed percentage of ground floor residential development. The demarcation line between the Subdistricts is shown on Sheet A0.10. The total square footage used for the following calculations is 230,426 square feet in Subdistrict B. Ground floor residential is limited to a maximum of 50%. The residential areas equal 81,200 square feet or 35%, while the commercial ground floor areas of the live-work units and the leasing office measure 149,226 square feet or 65%. The future development pad, which is not proposed for development with this application, is within Subdistrict C and will be developed in the future with 100% non-residential ground floor use.

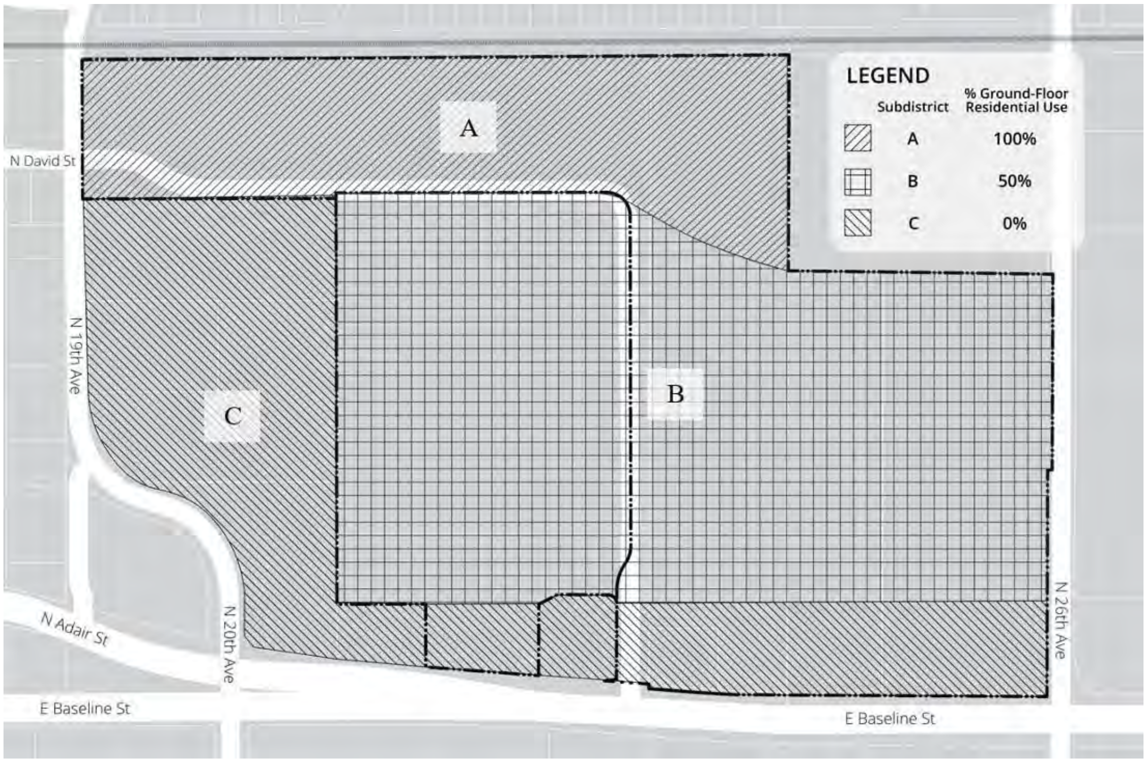


② ZONE B RESIDENTIAL V NON-RESIDENTIAL DIAGRAM
1" = 80'-0" @ FULL SIZE



① RETAIL ZONE PLAN
1" = 160'-0" @ FULL SIZE

Figure 18.75.065-1: GMU Subdistricts



(B) Location of Single-Family Attached Residential Uses. Single-family attached residential uses (townhouses) shall only be permitted within subdistrict A. In subdistrict A, up to 50 percent of a lot or multiple lots if developed concurrently may be developed as single-family attached residential uses, including parking, infrastructure, and open space to serve those uses.

<u>Response:</u> Townhouses are not proposed, so this standard does not apply.

(C) Minimum density for ground-floor residential uses is 18 units per net acre. There is no maximum density.

<u>Response:</u> Net acreage is 572,968 square feet or 13.1 acres as calculated per the following definition, *"Acreage, net" means the proposed size of the site expressed in acreage minus any unbuildable area. The following areas are deemed unbuildable for the purposes of calculating net acreage:*

(a) Street dedications and those areas used for private streets and common driveways; and

(b) Environmentally constrained lands, such as open water areas, floodplains, water quality facilities, wetlands, natural resource areas, and other preservation areas set aside in separate tracts or dedicated to a public entity; and

(c) Land set aside in separate tracts or dedicated to a public entity for schools, parks, or open space purposes.

There are 327 dwelling units which results in 25 Units/Acre. The 22 live/work units are excluded from this calculation as they are not considered ground-floor residential.

(D) Open Space. Within residential developments containing 20 or more lots or units there shall be at least 150 square feet of open recreational space per unit provided in common open space. Such space will be considered part of the required landscaping, but must be designed in a manner that affords residents usable open area. Streets, access drives and parking lots shall not be considered open space. Open space must be a usable open recreational area, and may include a club house or indoor recreation facility. All outdoor area shall be landscaped and maintained by the owner, or a homeowners' association, according to the approved development plans, unless the open space is dedicated to and accepted by the city as a public park.

<u>Response:</u> The development will contain 327 residential units. As noted above Building 1 contains 22 live-work units that are subject to the 100 square feet of recreational open space per unit requirement. 327 residential units results in a requirement of 49,050 square of recreational open space Approximately 65,600 SF of open space is provided through outdoor and indoor recreation facilities, which exceeds the requirement, even when adding the open space requirement of 2,200 SF for the live-work units.

The following site areas are being included in the open space calculation and can be identified on sheets L102-L107, outlined in blue.

BBQ Area: 1,152 sf

Dog Park: 968 sf

Sport Court: 6,120 sf

Memorial Area: 863 sf

Pool: 10,995 sf

Plaza Area: 712 sf

Clubhouse/Amenity Building: 4,000 sf

Parklet: 1,336 sf

Open Landscape Area: 41,654 sf

Total Open Space: 65,600sf

(E) Landscaping. A minimum of 15 percent of each lot, or multiple lots if developed concurrently, shall be landscaped and maintained free of buildings, pavement, or any other form of impermeable cover. Open space designed to meet the requirements of subsection (D) of this section may be counted towards the required landscaping.

(1) All landscaped areas shall be planted with at least an 80 percent plant cover at maturity. Large areas of bark dust or other nonliving vegetative ground covers shall be avoided.

(2) The elements of landscaping include all forms of planting and vegetation, all adjustments, refinements, or designed developments in ground forms, rock groupings, or water patterns or features, all construction other than completely enclosed buildings or primarily utilitarian engineering structures such as retaining walls. Particular attention shall be given to providing walkways, patios or plazas that

create linkages between buildings, uses and activity areas. These are all elements used to develop and refine space between, around, or within buildings and pedestrian and vehicular circulation elements.

(3) Landscaping should be used to separate and buffer parking areas from pedestrian areas, and to accentuate building design and entrances. Landscaping is intended to provide visual relief, buffering from vehicles for pedestrian and bikeways, and accent or framing of buildings, plazas and other activity areas.

(4) Landscaping should be incorporated into plazas and courtyards to provide common spaces serving the development. Uses and buildings should be clustered around these common spaces whenever possible, with entries oriented to these spaces.

(5) All vegetative landscaping shall be maintained with a functioning irrigation system.

> **Response: The proposal provides 32% landscaping coverage for the development. The landscaping will be planted to meet at least 80% plant cover at maturity and large areas of non-vegetated ground cover have been avoided. The development includes multiple buildings with linkages between these and activity areas, including the dog run and club house. Linkages are enhanced by the landscaping program throughout. Parking areas are buffered by landscaping from residential and pedestrian-focused areas. Landscaping is incorporated into open spaces to provide common space for residents. The project's landscaping will be maintained with a permanent irrigation system. Irrigation details can be found on the Irrigation Details, Sheet L110. The Planting Legend and Planting Plans, Sheets L101-L109 provide detail for the proposed landscaping.**

(F) Trail Corridor Landscaping. A 30-foot-wide landscaping buffer is required along the northern property line abutting the future Council Creek Regional Trail corridor to soften the transition between development and the trail.

(1) The landscaping buffer area shall meet the requirements of and count towards the minimum percentage required in CMC 18.75.060(J), except that paved pedestrian and bikeways may be integrated into the buffer area.

(2) The landscaping buffer may incorporate both common open space and private yard space associated with individual residential lots. Private yard space may not exceed 15 feet wide out of the 30-foot-wide required buffer.

(3) Fences within the landscaping buffer area shall not exceed 42 inches in height unless approved as a conditional use consistent with Chapter 18.105 CMC and the applicant demonstrates that they are necessary for security purposes.

> **Response: There are no fences proposed within the 30-foot landscape buffer. The buffer will be planted with a mix of native grasses, shrubs, and trees to provide a relaxing open space for the residents.**

(4) A landscaping buffer is not required between the trail corridor and any public park or common open space; provided, that the park or open space is a minimum of 30 feet wide.

> **<u>Response:</u> There is a 30-foot-wide area that contains stormwater swales, native grasses and Oregon White oak. Between the 30-foot buffer and the parking lot, there is an additional 8 foot (approximate) landscape area that buffers the parking lot.**

(G) Multi-family development shall comply with the following dimensional standards:

(1) The minimum lot size shall be 10,000 square feet.

> **<u>Response</u>: The lot size is 639,663 square feet.**

(2) The minimum lot width shall be 30 feet.

> **<u>Response:</u> The lot width is greater than 30 feet as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.**

(3) The maximum height shall be three stories or 45 feet in height, whichever is less. Building height may be increased to a maximum of four stories or 60 feet in height, whichever is less, for buildings or portions of buildings set back at least 30 feet from the eastern, western, and southern perimeters of the district, and set back at least 120 feet from the northern perimeter of the district, if approved as a conditional use consistent with Chapter 18.105 CMC.

> **<u>Response:</u> The tallest proposed building height is approximately 39 feet and 3 stories as shown on the Exterior Elevations, sheets A3.01-A3.09.**

(4) Front Yard. The front, as measured from the foundation of the structure, including porch or deck, shall not be less than five feet. Accessory structures, garages or carports shall not be less than 20 feet.

> **<u>Response:</u> The front yard is greater than five feet as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.**

(5) Rear Yard. No rear yard shall be less than 10 feet in depth as measured from the foundation of the structure.

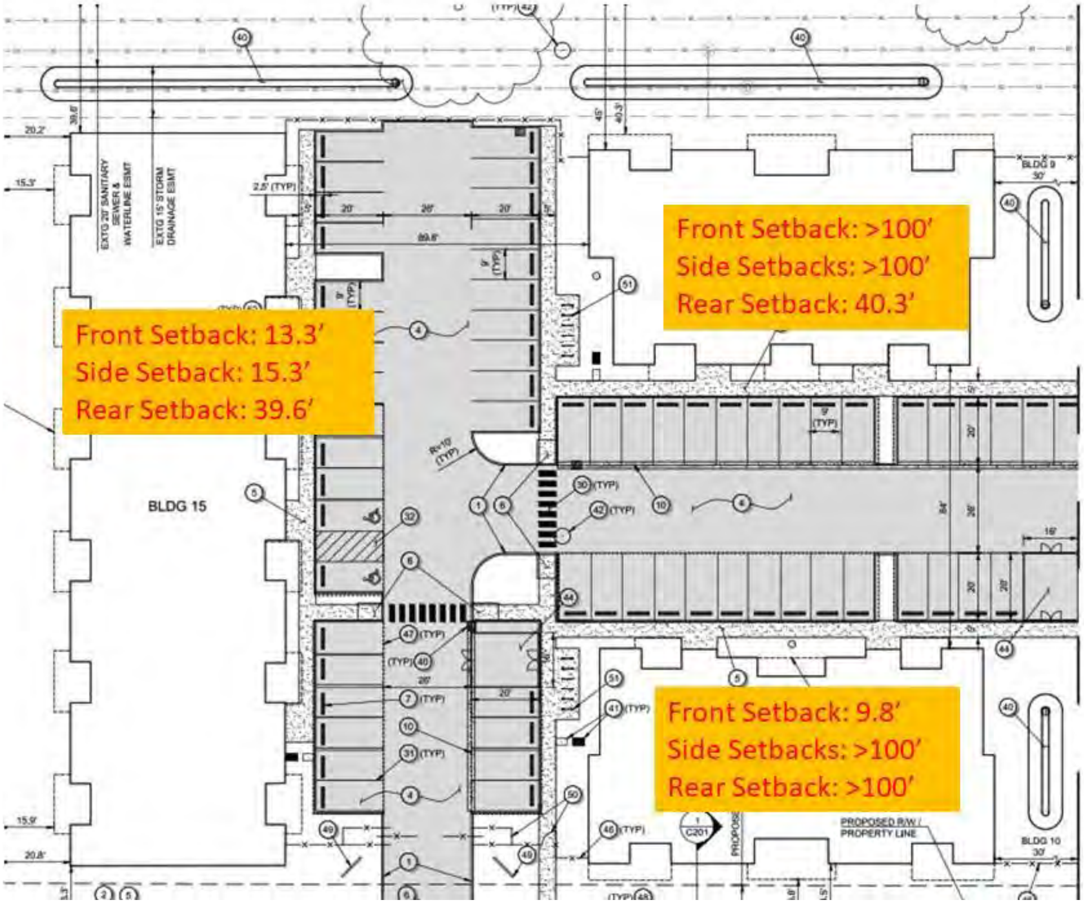
> **<u>Response:</u> The rear yard is greater than ten feet as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.**

(6) Side Yard. The minimum width of side yards shall be not less than five feet in width as measured from the foundation of the structure.

> **<u>Response:</u> The side yards are greater than five feet as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.**

(7) Building Separation. Buildings within a complex shall be separated by at least six feet, subject to Oregon Residential Specialty Code and/or Oregon Structural Specialty Code requirements.

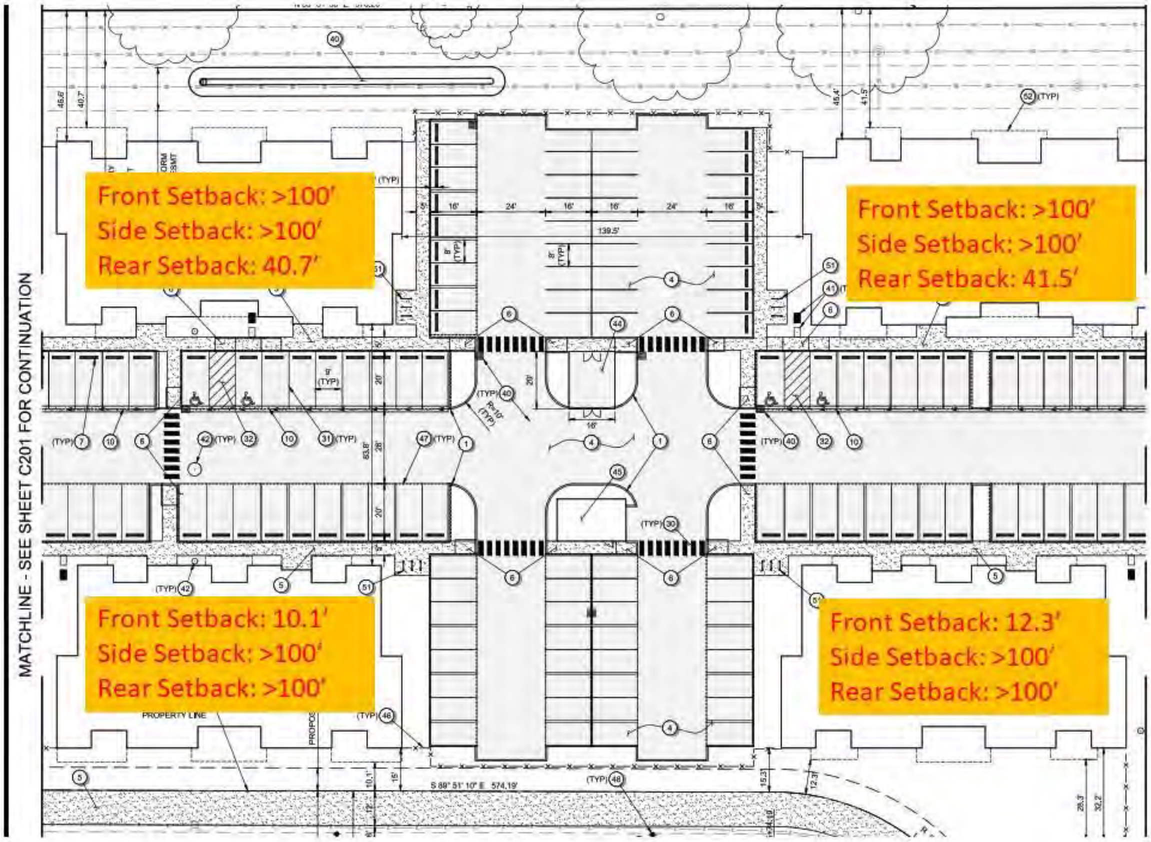
> **<u>Response:</u> All buildings within the development are separated by more than the 6-foot minimum requirement as shown on Dimensioned Site Improvement Plan, Sheets C201-C206.**



Front Setback: 13.3'
Side Setback: 15.3'
Rear Setback: 39.6'

Front Setback: >100'
Side Setbacks: >100'
Rear Setback: 40.3'

Front Setback: 9.8'
Side Setbacks: >100'
Rear Setback: >100'

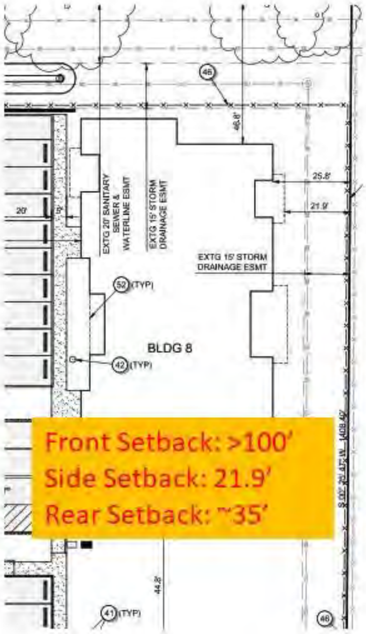


Front Setback: >100'
Side Setback: >100'
Rear Setback: 40.7'

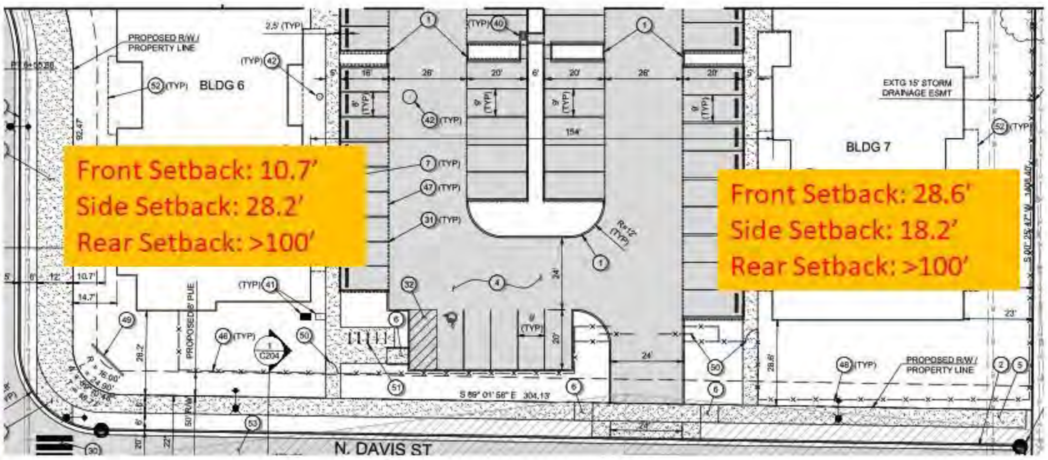
Front Setback: >100'
Side Setback: >100'
Rear Setback: 41.5'

Front Setback: 10.1'
Side Setback: >100'
Rear Setback: >100'

Front Setback: 12.3'
Side Setback: >100'
Rear Setback: >100'

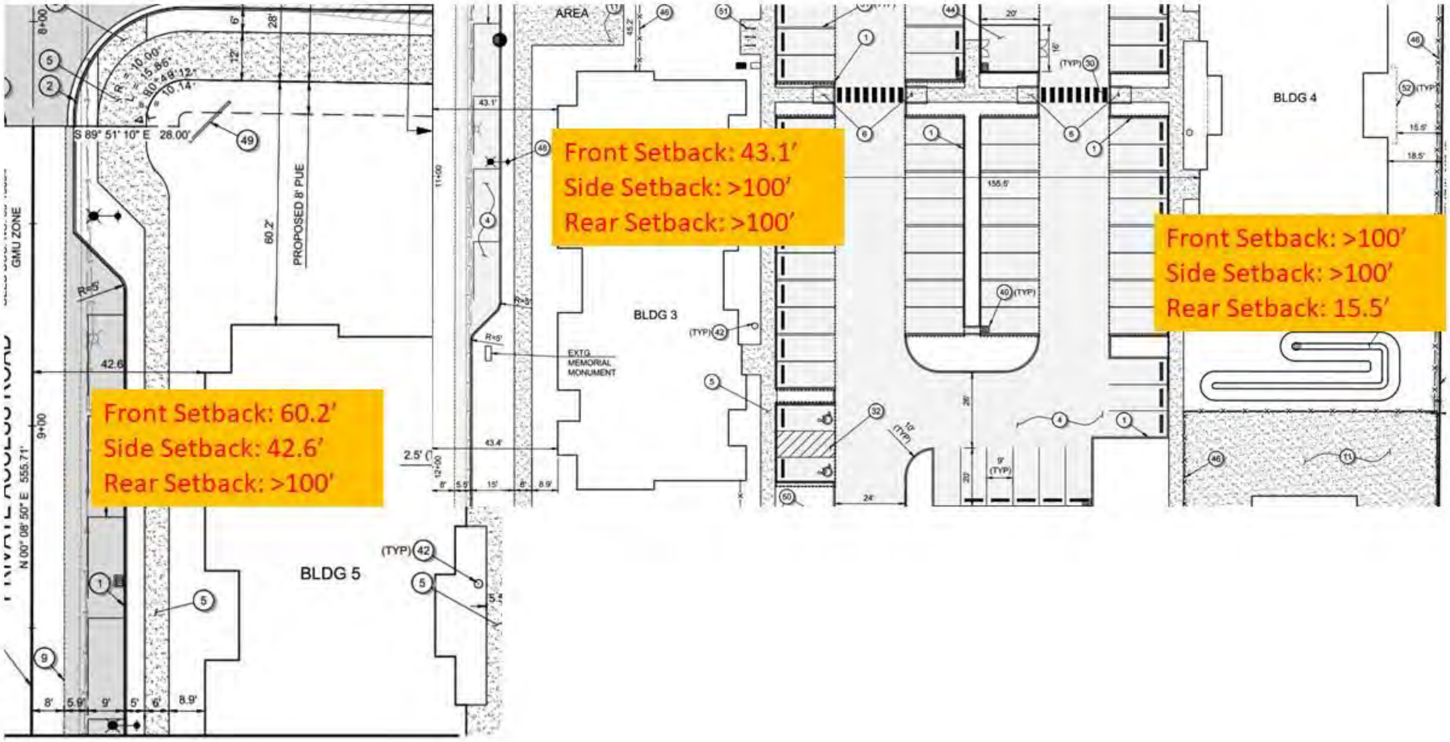


Front Setback: >100'
Side Setback: 21.9'
Rear Setback: ~35'



Front Setback: 10.7'
Side Setback: 28.2'
Rear Setback: >100'

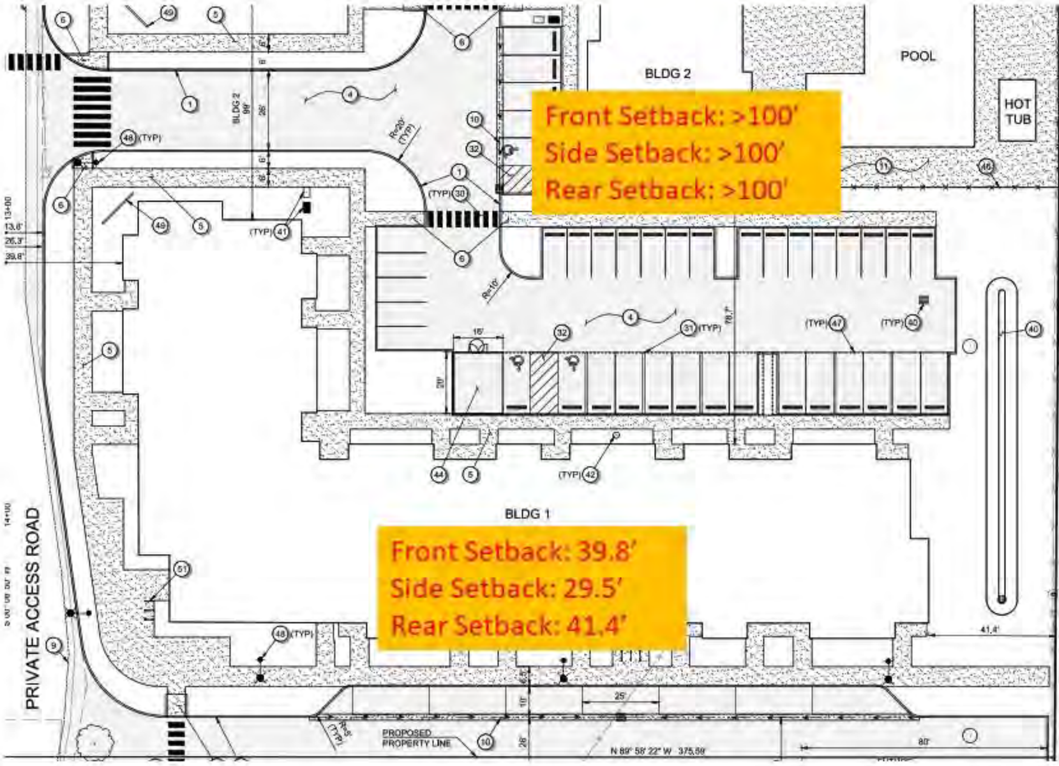
Front Setback: 28.6'
Side Setback: 18.2'
Rear Setback: >100'



Front Setback: 43.1'
Side Setback: >100'
Rear Setback: >100'

Front Setback: >100'
Side Setback: >100'
Rear Setback: 15.5'

Front Setback: 60.2'
Side Setback: 42.6'
Rear Setback: >100'



Front Setback: >100'
Side Setback: >100'
Rear Setback: >100'

Front Setback: 39.8'
Side Setback: 29.5'
Rear Setback: 41.4'

(H) Single-family attached dwellings on individual lots shall comply with the following dimensional standards:

(1) The minimum lot size shall be 2,000 square feet.

(2) The minimum lot width shall be 20 feet.

(3) The maximum height shall be 35 feet.

(4) Front Yard. The front, as measured from the foundation of the structure, including porch or deck, shall not be less than five feet. Accessory structures, garages or carports shall not be less than 20 feet.

(5) Rear Yard. No rear yard shall be less than 10 feet in depth as measured from the foundation of the structure.

(6) Side Yard. The minimum width of side yards shall be not less than five feet in width as measured from the foundation of the structure, except that no side yard is required on side(s) where structures are attached.

Response: This section is not applicable as no single family attached units are proposed.

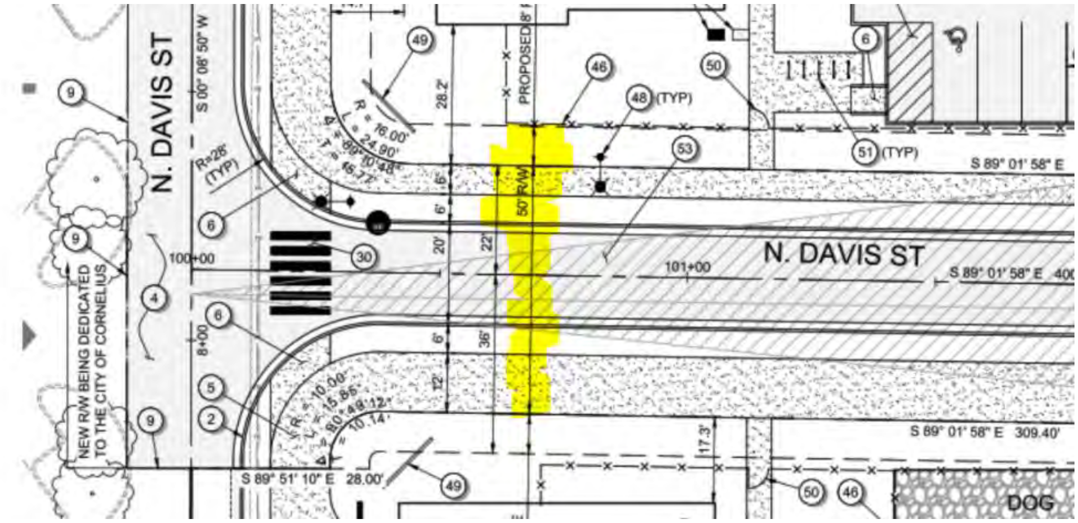
(I) Vehicular Access, Internal Circulation and Clear Vision Areas.

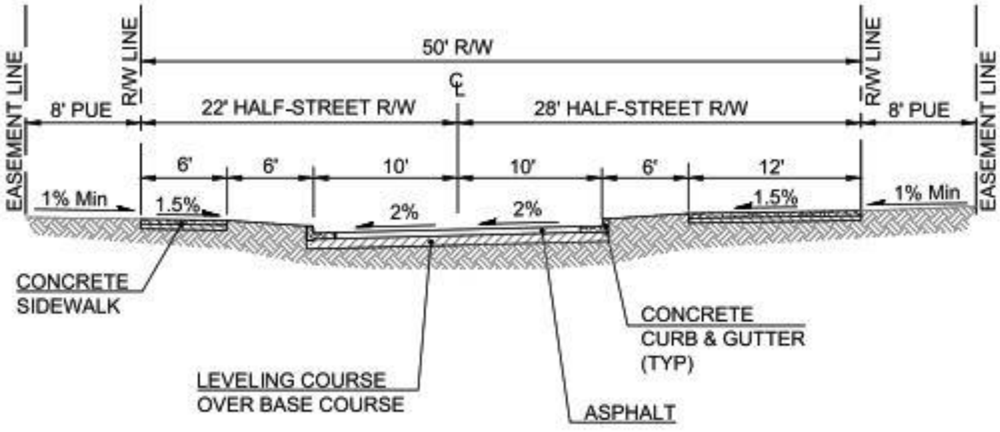
(1) Where possible, vehicular access to residential subdivisions shall be from abutting arterial or collector streets. Access to individual lots shall be primarily from local streets or alleyways when the alleyway is developed to current public works standards. Direct lot access to arterials or collector streets shall not be permitted, unless there is no alternative as determined by the city engineer.

> **<u>Response:</u> The proposed project is not a residential subdivision and therefore the access standard of (I)(1) does not apply.**

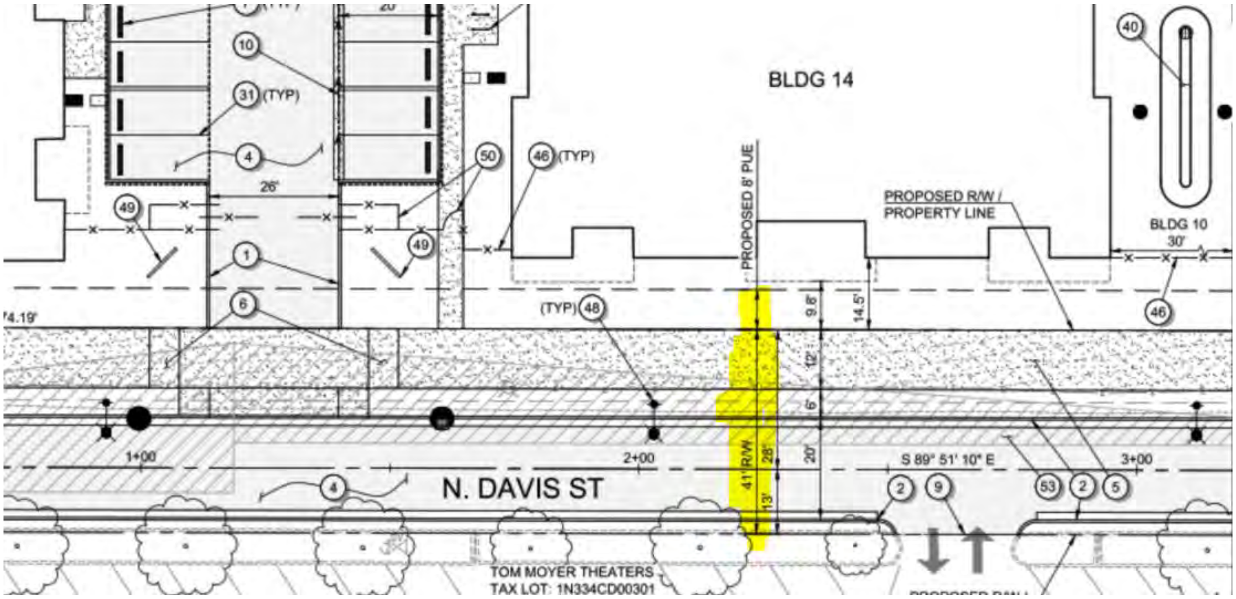
(2) The minimum public street width shall comply with the standards and design identified in CMC [18.143.040](), Street design cross-sections per transportation system plan.

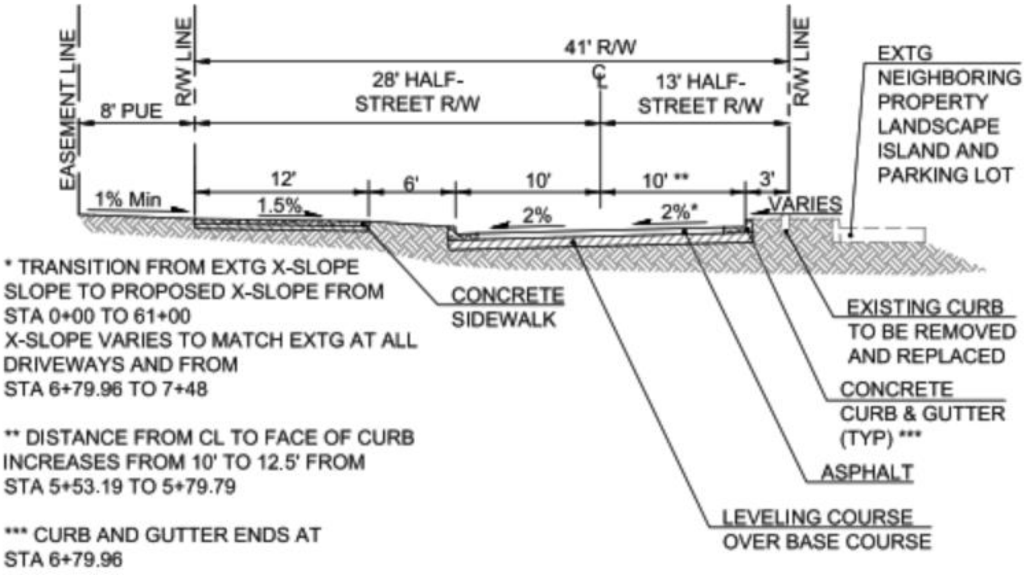
> **<u>Response:</u> The width of the extension of Davis Street is proposed as 41' and 50' as shown in the graphics below, taken from the Dimensioned Site Improvement Plan, Sheet C201, and reviewed and approved by City of Cornelius Engineering.**





1
C204
N DAVIS STREET (PUBLIC) SECTION
STA 100+38 TO 103+45
Scale: 1"=10'





1 C201 N DAVIS STREET (PUBLIC) SECTION
STA 0+00 TO 7+48 Scale: 1"=10'

(3) Internal Access. All internal roadways and drives shall be paved and maintained by the owner in accordance with city standards. No entrance or exit shall be located closer than 100 feet to any intersection of a public street, unless there is no reasonable alternative as determined by the city engineer. They shall have the following minimum unobstructed pavement width:

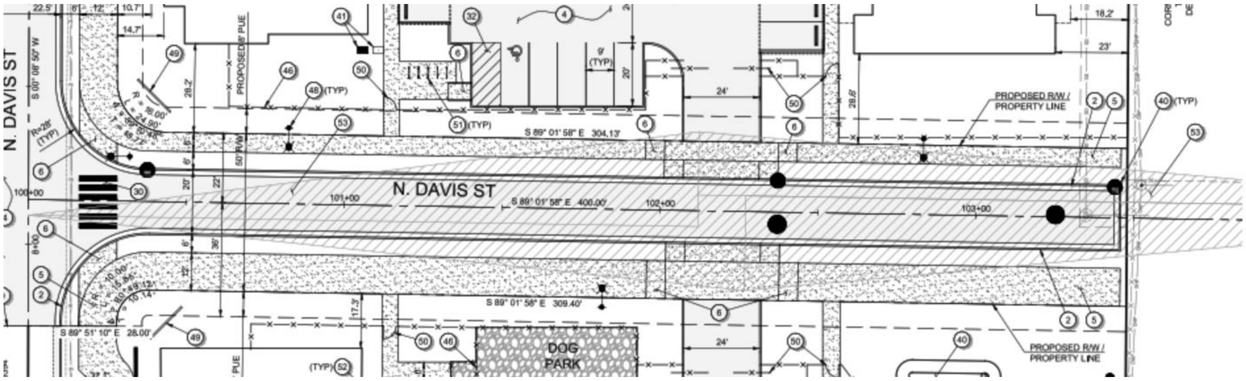
(a) Two-way traffic: 24 feet;

(b) One-way traffic: 15 feet.

(4) Internal sidewalks or pathways shall be provided to ensure safe and convenient pedestrian circulation throughout the development.

(5) Clear vision areas shall be provided at all roadway and driveway intersections in accordance with the vision clearance standards set forth in CMC 18.150.070.

> **<u>Response:</u> There are three access points to the development from the public Davis Street extension and one access points is proposed from the private drive. All access points are greater than 100' from the intersection of Davis Street and Baseline Street (Hwy 8). All internal circulation is designed for two-way traffic and is a minimum of 24'. Internal sidewalks are proposed throughout the site for safe pedestrian circulation. An example of the clear vision areas is shown in the below graphic, taken from the Dimensioned Site Improvement Plan.**



(J) Access Streets, Sidewalks, and Drainage.

(1) All streets shall be designed in accordance with standards set forth in Chapter 18.143 CMC, Transportation Facilities, and the subdivision code.

> **<u>Response:</u> As noted under 18.75.065(I)(2) above, the proposed streets serving the development comply with the standards of 18.143 by following the design standards outlined in the TSP and guidance from City Engineering.**

(2) All driveways for new construction shall have minimum pavement width of 12 feet and shall not be more than 25 feet in width at the curb. Each driveway shall have a concrete curb apron designed to comply with public works standards, and not more than two residential lots may be served by one shared driveway.

> **<u>Response:</u> All driveways are designed to be 25 feet in width at the curb. There are no proposed residential lots with shared driveways.**

(3) For all new construction, curbs, gutters, and a sidewalk subject to public works standards, offset from the curb, shall be provided along the entire lot frontage and shall meet ADA accessibility standards. In the case of remodels or garage additions to an existing use, no sidewalk shall be required if one does not exist, but the driveway apron and paved driveway shall be required. However, a curb tight sidewalk may be approved by the city engineer when it is impractical to provide the offset.

> **Response: The driveway standard for new construction requiring pavement width at the curb between 12 and 25 feet is not applicable because the development is not a residential subdivision. Access is addressed in more detail under the responses to Chapter 18.100. Public improvements, including street improvements and stormwater management. These elements are designed to meet public works standards and ADA accessibility.**

(4) Storm drainage shall meet current public works standards and shall comply with Clean Water Services (CWS) standards for water quality and quantity.

> **Response: The Preliminary Drainage Report prepared by PBS and submitted with this application demonstrates conformance with the requirements of the Clean Water Services Design and Construction Standards.**

(K) Lighting Streets. Streets and walkways shall be lighted during the hours of darkness in accordance with public works standards.

> **Response: The Electrical Site Plan Photometrics, Sheets E0.1-E1.1B, shows proposed lighting for the development and the Street Lighting Plan, sheets LT101-LT106 shows the proposed lighting for public streets; use of lighting will comply with this standard.**

(L) Mailboxes. Single-family attached and multi-family developments with five or more units shall provide clustered mailboxes, consistent with the locational criteria set by the postmaster. They shall be of uniform style.

> **Response: Mailboxes will be housed either in building #2 in a mailroom, or distributed in clustered mailboxes of uniform style, or some combination of the two, pending confirmation by the USPS growth manager for the region.**

(M) Screening. Multi-family developments with five or more units shall provide the following types of screening:

(1) Sight-obscuring screening shall be provided for all garbage and trash collection areas, approved outdoor storage, and parking lots abutting a low density residential development. Such screening shall be six feet in height, and shall consist of a wall of brick, stone, or other substantial material, or a densely planted evergreen hedge and chain link fence.

(2) The review body may require non-sight-obscuring screening and/or fencing of parking lots abutting property lines, front yards abutting a public street, or other yards abutting a low density residential development.

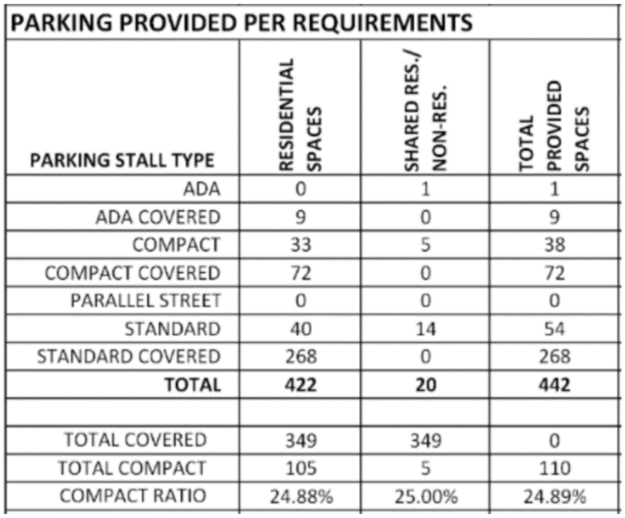
> **Response: Garbage areas are screened by a masonry veneer enclosure of at least 6 feet in height. The development does not contain outdoor storage and does not abut low density residential development. The development does not contain parking lots that abut a property line. Front yards will contain landscaping as shown on the Planting Plan, Sheets L101-L109.**

(N) Off-Street Parking Requirements. Off-street parking shall be provided in accordance with the standards in Chapter 18.145 CMC, as adjusted by the following provisions:

(1) Off-Street Parking.

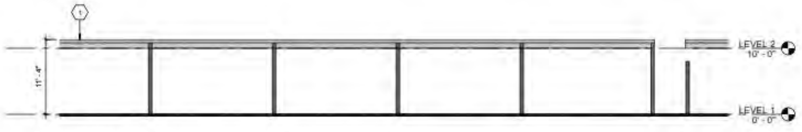
(a) Resident. One covered parking space shall be provided for each dwelling unit either on the individual lot or in an off-street parking bay within 100 feet from the lot being served.

<u>Response:</u> There are 349 dwelling units resulting in 349 covered spaces required. 349 parking spaces are provided as noted in the table below. Carport details are provided on Sheet A3.14 and shown below.

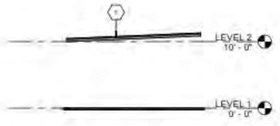


PARKING PROVIDED PER REQUIREMENTS

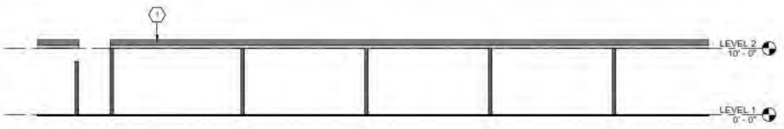
PARKING STALL TYPE	RESIDENTIAL SPACES	SHARED RES./ NON-RES.	TOTAL PROVIDED SPACES
ADA	0	1	1
ADA COVERED	9	0	9
COMPACT	33	5	38
COMPACT COVERED	72	0	72
PARALLEL STREET	0	0	0
STANDARD	40	14	54
STANDARD COVERED	268	0	268
TOTAL	**422**	**20**	**442**
TOTAL COVERED	349	349	0
TOTAL COMPACT	105	5	110
COMPACT RATIO	24.88%	25.00%	24.89%



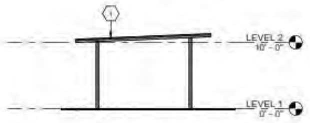
5 TYP CARPORT - DRIVE AISLE SIDE
1/8" = 1'-0" @ FULL SIZE



6 TYP CARPORT - SIDE
1/8" = 1'-0" @ FULL SIZE



7 TYP CARPORT - SIDEWALK SIDE
1/8" = 1'-0" @ FULL SIZE



8 TYP CARPORT - SIDE
1/8" = 1'-0" @ FULL SIZE

(b) Storage of Recreational Vehicles. Recreational vehicles, such as camping trailers, boats, campers, motor homes, and other such vehicles shall only be parked or stored within an area fully on private property, and shall not be located in the public right-of-way.

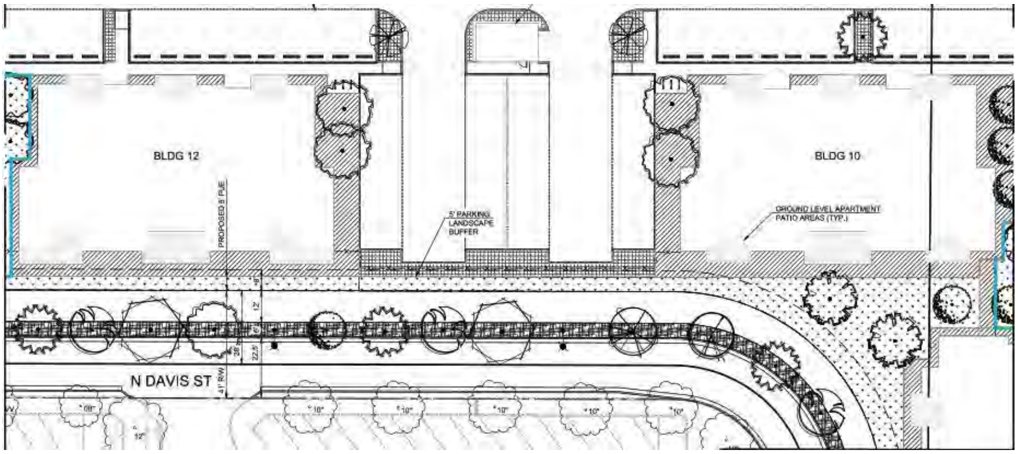
<u>Response:</u> No recreational vehicle parking is proposed on the site.

(2) Paving and Design. Off-street parking and maneuvering areas shall be paved with asphalt or concrete and designed in accordance with the standards of the off-street parking regulations of Chapter 18.145 CMC.

<u>Response:</u> Parking areas will be paved with asphalt.

(3) Parking Lot Landscaping. For multi-family developments with five or more units, and all commercial development, there shall be a five-foot landscaped buffer at the perimeter of all parking lot areas. Parking lots shall be designed and landscaped so as to break up large paved areas with landscaped islands, such as every 10 spaces. See CMC 18.14F5.050.

<u>Response:</u> All parking areas will have a five-foot landscaped buffer at the perimeter as well as landscape islands to break up large parking areas as shown on the Planting Plan, Sheets L102-L107.

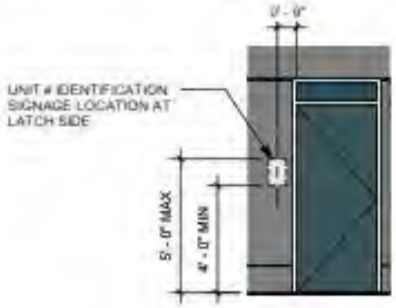


(4) Parking Lot Location. For multi-family developments with five or more units, off-street parking areas shall be located to the side or rear of individual lots and/or buildings. No parking areas shall be located between the front of a building and a public street or primary access road

<u>Response:</u> The parking is located behind or beside the buildings and is not located between a building and the street.

(O) On each home site, or on each individual dwelling within a complex, an address number of the home shall be provided in a manner that is clearly visible from the street, as approved by the fire department.

<u>Response:</u> Buildings and units will be numbered in accordance with fire department regulations and the applicant will coordinate with the Fire Department to ensure these standards are met. An example of unit numbering is shown in the graphic below and can also be found on the Site Details, Sheet A1.02B.



6 RESIDENTIAL UNIT IDENTIFICATION
1/4" = 1'-0" @ FULL SIZE

5 BUILDING TYPE D - TYP ADDRESS & SIGNAGE LOCATION
1/4" = 1'-0" @ FULL SIZE

18.75.070 Parking and access.

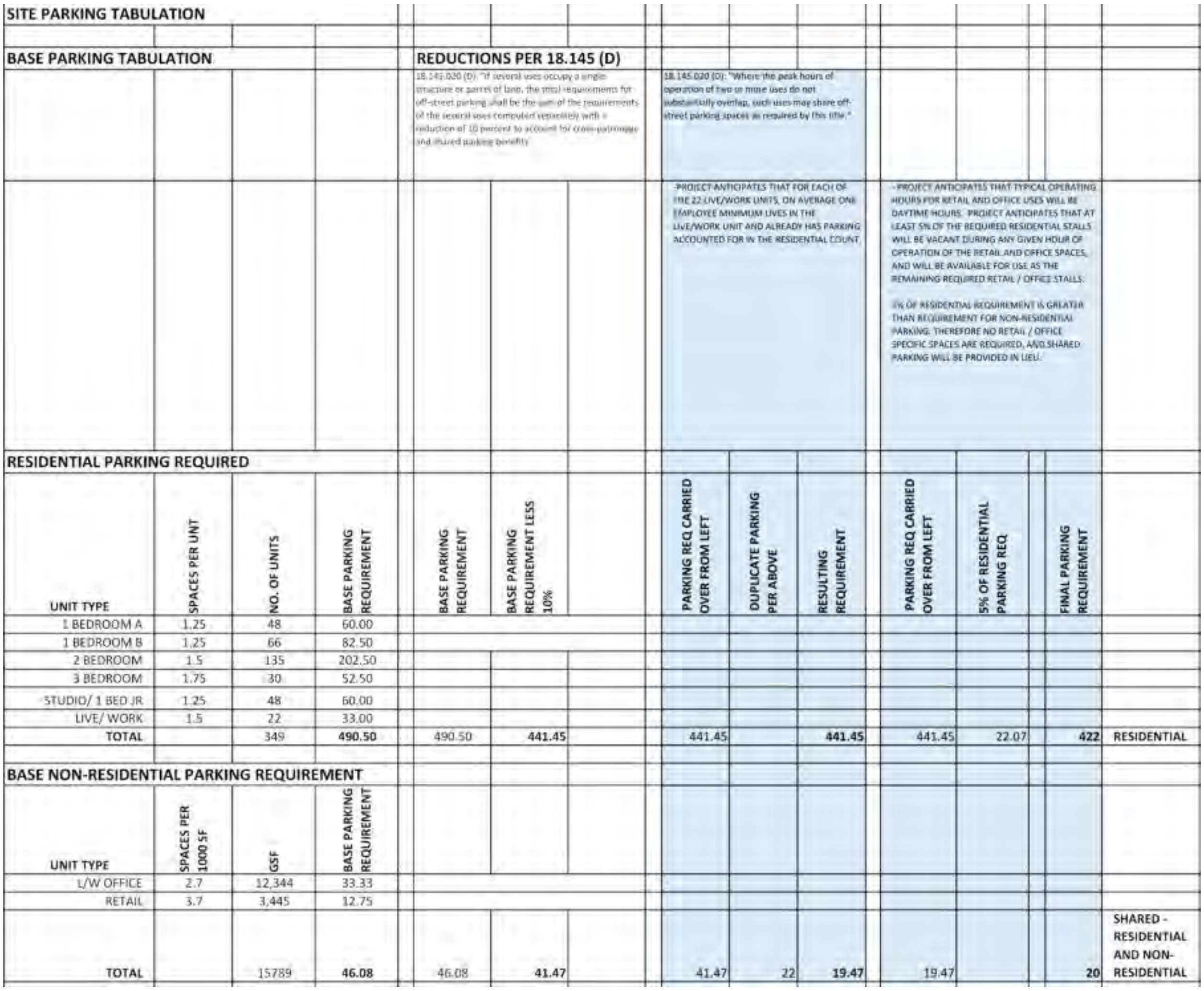
(A) Off-Street Parking Requirements. Off-street parking shall be provided in accordance with the standards in Chapter 18.145 CMC, as adjusted by the following provisions:

(1) On-street parking spaces adjacent to the street frontage of a building or tenant lease space shall be counted toward meeting the minimum off-street parking requirement. Twenty-two feet of uninterrupted street frontage shall count as a single parking space, rounded down to the nearest whole number.

> **Response: 18 on-street parking spaces are proposed, although the minimum off-street parking requirement is met without counting these 18 spaces.**

(2) Shared parking is encouraged in this mixed-use district. In lieu of CMC 18.145.020(D), applicants may propose to reduce the minimum required off-street vehicle parking requirements in CMC 18.145.030 by up to 25 percent if they can demonstrate that overlapping use patterns and peak hours of demand will reduce the parking needs for the development.

Response: **We are seeking a reduction in the minimum parking requirement due to shared parking expected to occur in two ways: First, the residents of the 22 live-work units will typically be employees of the ground floor commercial use, reducing the need for commercial parking by one space per unit. Second, residents are expected to be off-site at their workplaces during business hours, and we expect at least 5% of the residential spaces will be available for use by business visitors and employees during the workday. A reduction of 5% of the required parking spaces is requested and detailed further in the graphic below, which can be found on the Title Sheet/General Information, Sheet G0.01.**



SITE PARKING TABULATION

BASE PARKING TABULATION

REDUCTIONS PER 18.145 (D)

18.145.020 (D). "If several uses occupy a single structure or parcel of land, the total requirements for off-street parking shall be the sum of the requirements of the several uses computed separately with a reduction of 10 percent to account for cross-patronage and shared parking benefits"

18.145.020 (D). "Where the peak hours of operation of two or more uses do not substantially overlap, such uses may share off-street parking spaces as required by this title."

-PROJECT ANTICIPATES THAT FOR EACH OF THE 22 LIVE/WORK UNITS, ON AVERAGE ONE EMPLOYEE MINIMUM LIVES IN THE LIVE/WORK UNIT AND ALREADY HAS PARKING ACCOUNTED FOR IN THE RESIDENTIAL COUNT.

- PROJECT ANTICIPATES THAT TYPICAL OPERATING HOURS FOR RETAIL AND OFFICE USES WILL BE DAYTIME HOURS. PROJECT ANTICIPATES THAT AT LEAST 5% OF THE REQUIRED RESIDENTIAL STALLS WILL BE VACANT DURING ANY GIVEN HOUR OF OPERATION OF THE RETAIL AND OFFICE SPACES, AND WILL BE AVAILABLE FOR USE AS THE REMAINING REQUIRED RETAIL / OFFICE STALLS.

5% OF RESIDENTIAL REQUIREMENT IS GREATER THAN REQUIREMENT FOR NON-RESIDENTIAL PARKING. THEREFORE NO RETAIL / OFFICE SPECIFIC SPACES ARE REQUIRED, AND SHARED PARKING WILL BE PROVIDED IN LIEU.

RESIDENTIAL PARKING REQUIRED

UNIT TYPE	SPACES PER UNT	NO. OF UNITS	BASE PARKING REQUIREMENT	BASE PARKING REQUIREMENT	BASE PARKING REQUIREMENT LESS 10%	PARKING REQ CARRIED OVER FROM LEFT	DUPLICATE PARKING PER ABOVE	RESULTING REQUIREMENT	PARKING REQ CARRIED OVER FROM LEFT	5% OF RESIDENTIAL PARKING REQ	FINAL PARKING REQUIREMENT	
1 BEDROOM A	1.25	48	60.00									
1 BEDROOM B	1.25	66	82.50									
2 BEDROOM	1.5	135	202.50									
3 BEDROOM	1.75	30	52.50									
STUDIO/ 1 BED JR	1.25	48	60.00									
LIVE/ WORK	1.5	22	33.00									
TOTAL		349	**490.50**	490.50	**441.45**	441.45		**441.45**	441.45	22.07	**422**	RESIDENTIAL

BASE NON-RESIDENTIAL PARKING REQUIREMENT

UNIT TYPE	SPACES PER 1000 SF	GSF	BASE PARKING REQUIREMENT									
L/W OFFICE	2.7	12,344	33.33									
RETAIL	3.7	3,445	12.75									
TOTAL		15789	**46.08**	46.08	**41.47**	41.47	22	**19.47**	19.47		**20**	SHARED - RESIDENTIAL AND NON-RESIDENTIAL

(B) Off-street parking areas shall be located to the side or rear of individual lots and/or buildings. No parking areas shall be located between the front of a building and a public street or primary access road.

Response: **All parking is located to the side or rear of the buildings.**

(C) Access.

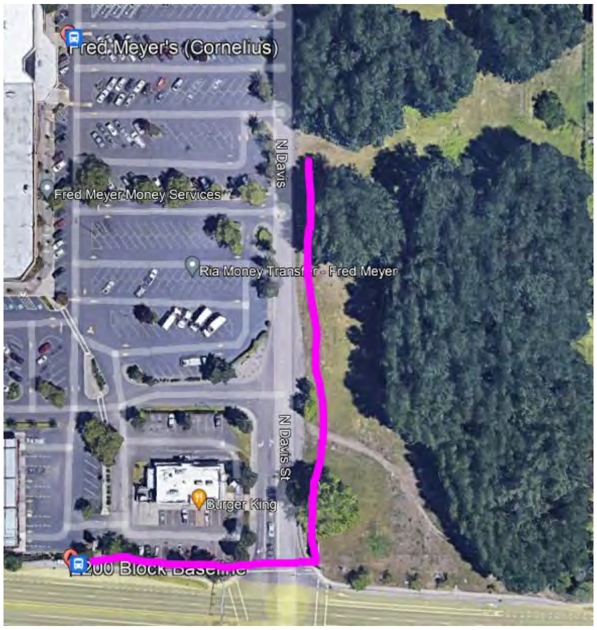
(1) Direct access to the highway will be discouraged with consolidation of access points encouraged. Wherever possible, access is to be provided through internal connections rather than by curb cuts to the

highway, with primary access points located at the signalized intersections with the highway and all highway access coordinated with ODOT.

> **<u>Response:</u> The proposed lot that is being developed for mixed-use residential does not have direct highway access. Access to the existing lots already exists from Baseline Street. The main entrance to the development will be from Davis Street and the private drive.**

(2) Transit access to and within the district is a priority. Direct pedestrian linkages from transit stops to store entries must be provided which may require multiple entry points to buildings.

> **<u>Response:</u> Stores are not currently proposed however Building 1 contains live-work units which could be developed with retail uses. These units have a direct pedestrian linkage via sidewalks to existing Trimet transit stops along Baseline Street and the local Cornelius transit stop at the Fred Meyer. It doesn't appear that the lot south of what is being developed now has a full sidewalk. As that lot is developed there will be a paved walk down to the crosswalk that accesses the bus stop.**



18.75.080 Signs.

Signs within the GMU district shall conform with Chapter [18.175](#) CMC.

> **<u>Response:</u> All signage for the development will meet Chapter 18.175. Monument sign locations are shown on the Dimensioned Site Improvement Plan, Sheets C201-C206. Once designed, all signage will conform with Chapter 18.175 CMC.**

CHAPTER 18.100 SITE DESIGN REVIEW

18.100.040 Approval criteria.

In addition to the other requirements of the zoning code and other city ordinances, a project submitted for design review shall comply with the standards and criteria in subsections (A) and (B) of this section; all applications for a sign permit subject to the provisions of the sign code, Chapter 18.175 CMC, inclusive, shall comply with the rules and regulations of the committee adopted under the provisions of Division III of this title and other applicable provisions of the Cornelius Municipal Code.

(A) Technical Standards. Where applicable, required off-site improvements shall be based on proportional analysis.

(1) Facilities and Services. The public and private facilities and services provided by the development are adequate as to location, size, design and timing of construction in order to serve the residents or establishments to be accommodated and meet city standards and the policies and requirements of the comprehensive plan. The service provider is presumed correct in the evidence which they submit;

> **Response:** **The civil engineer has coordinated with local utility providers and City Engineering to determine adequate sizing for services. The project intends to comply with all current City Standards.**

(2) Traffic Generation. Based on anticipated vehicular and pedestrian traffic generation and the standards and policies of the comprehensive plan, adequate right-of-way and improvements to streets, pedestrian ways, bikeways, transitways and other ways are provided by the development in order to promote safety, reduce congestion, conserve energy and resources, and encourage transit use, bicycling and walking. Consideration shall be given to the need for constructing, widening and/or improving, to the standards of the comprehensive plan and this code, public streets, bicycle, pedestrian, and other ways in the area of the proposed development impacted by the proposed development. This shall include, but not be limited to, improvements to the right-of-way, such as installation of lighting, signalization, turn lanes, median and parking strips, traffic islands, paving, curbs and gutters, sidewalks, bikeways, transit facilities, street drainage facilities, traffic calming devices, and other facilities needed because of anticipated vehicular, transit, bicycle, and pedestrian traffic generation. Access and street design shall comply with the standards identified in Chapter 18.143 CMC, Transportation Facilities, and Chapter 5 of the adopted public works standards. Street trees shall be installed to the standards identified in Chapter 5 of the adopted public works standards. In lieu of actual construction of off-site improvements, the committee may accept written waivers of remonstrance to the formation of local improvement districts for the purpose of providing the needed off-site improvements or cash payment to the city in an amount equal to the estimated cost of said off-site improvements;

> **Response:** **A traffic Impact Analysis (TIA) has been prepared and provided to the City and the Oregon Department of Transportation. Both agencies concurred with the findings of the TIA. Public Improvements include the extension of Davis Street through the development. Improvements include the installation of curb, gutter and sidewalk, stormwater facilities, ADA ramps at all street crossings, crosswalks, street lighting and street trees.**

(3) Dedication. Adequate dedication or reservation of real property for public use, as well as easements and right of entry for construction, maintenance and future expansion of public facilities and services, shall be required to protect the public from any potentially deleterious effects resulting from the proposed use to fulfill the need for additional, improved services, whether on or off site, created by the proposed use, and to effect the implementation of the standards and policies of the comprehensive plan;

<u>Response:</u> **The project will include the dedication of property to the City of Cornelius for the Davis Street extension and improvements. Public utility easements are also proposed.**

(4) Internal Circulation. There is a safe and efficient circulation pattern within the boundaries of the site. Consideration shall include the layout of the site with respect to the location, number, design and dimensions of vehicular, transit, and pedestrian access, exits, drives, walkways, bikeways, transit stops and facilities, building location and entrances, emergency equipment ways and other related on-site or off-site facilities so that there are adequate off-street parking and loading/unloading facilities provided in a safe, well designed and efficient manner. Consideration shall include the layout of parking, storage of all types of vehicles and trailers, shared parking lots and common driveways, garbage collection and storage points, as well as the surfacing, lighting, screening, landscaping, concealing and other treatment of the same. Developments shall provide a safe and reasonably direct pedestrian connection from the main entrance to the public right-of-way and/or the pedestrian system or both. The pedestrian connection shall be reasonably free of hazards from automobile traffic, so as to help encourage pedestrian and bicycle travel;

<u>Response:</u> **The project proposes more than the minimum required parking spaces on site. The internal layout and circulation of the site is designed to be safe and functional with 5' sidewalks internal to the site as well as connections to the public streets with ADA compliant ramps and striped crossings. On site lighting and street lighting will be added to enhance safety.**

(5) Maintenance of Private Facilities. Adequate means are provided to ensure continued maintenance and necessary normal replacement of private common facilities and areas, drainage ditches, streets and other ways, structures, recreation facilities, landscaping, fill and excavation areas, screening and fencing, ground cover, garbage storage areas and other facilities not subject to periodic maintenance by the city or other public agency. Materials, including wastes, shall be stored and managed, and grounds shall be maintained in a manner that will not attract or aid in the propagation of insects or rodents or cause a health hazard;

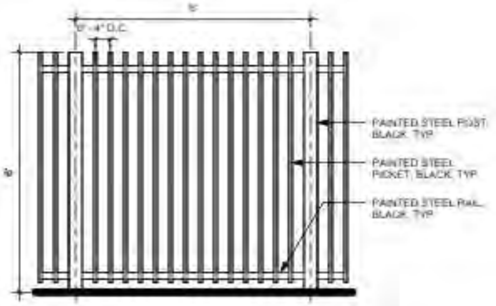
<u>Response:</u> **A stormwater maintenance plan and landscape maintenance plan will be provided to the Owner to address proper maintenance of these facilities and areas of the site. Additionally, the development will provide site maintenance as part of the operations. Material storage is not proposed.**

(6) Public Facilities. The structures and public facilities and services serving the site are designed and constructed in accordance with adopted codes and/or city standards at a level which will provide adequate fire protection and protection from crime and accident, as well as protection from hazardous conditions due to inadequate, substandard or ill-designed development;

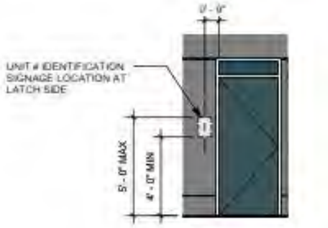
<u>Response:</u> **Buildings and public facilities will be constructed in compliance with current building and fire codes.**

(7) Security. Adequate facilities shall be provided to prevent unauthorized entries to the property, facilitate the response of emergency personnel, and optimize fire protection for the building and its occupants. Adequate facilities may include, but not be limited to, the use of lighted house numbers and a project directory for multi-family projects of three or more units;

<u>Response:</u> A security gate and fencing is proposed for the development at entrances to resident buildings with the exception of the live work building. The gates will only be closed after hours for the protection of the residents. The proposed fencing and gates do not affect connectivity within the site nor the relationship of the site to the adjacent uses. The building design will comply with applicable building and fire codes as required. Unit numbers will be located per the following graphics.



TYP METAL SECURITY FENCE



6 RESIDENTIAL UNIT IDENTIFICATION

1/4" = 1'-0" @ FULL SIZE

5 BUILDING TYPE D - TYP ADDRESS & SIGNAGE LOCATION

1/4" = 1'-0" @ FULL SIZE

(8) Grading. The grading and contouring of the site takes place and site surface drainage and on-site storage of surface waters facilities are constructed so there is no adverse effect on neighboring properties, public rights-of-way or the public storm drainage system and that said site development work will take place in accordance with the city site development code;

<u>Response:</u> Grading and drainage of the site is designed to improve upon existing conditions and all storm drainage infrastructure will be designed to meet applicable codes and standards. Additional details regarding grading and drainage are shown on the Grading Plan, Sheets C300-C307.

(9) Utilities. Prior to the development of a site, utilities shall be extended to serve the site or financially secured for extension to serve the site. Connection to city utilities shall be required prior to final inspection and occupancy. Electric, telephone, and other utility services to new development shall be

located underground. New utilities for redeveloped parcels shall be located underground from the right-of-way to the redeveloped parcels;

> **Response: All necessary utilities are either stubbed to the site or will be extended to the site and all new services will be located underground as required. Additional details regarding utility connections are shown on the Utility Plan, Sheets C401-C407.**

(10) Accessibility. Access and facilities for physically handicapped people are incorporated into the site and building design with particular attention to providing continuous, uninterrupted access routes;

> **Response: Public Sidewalks that connect to the site are designed to be ADA accessible.**

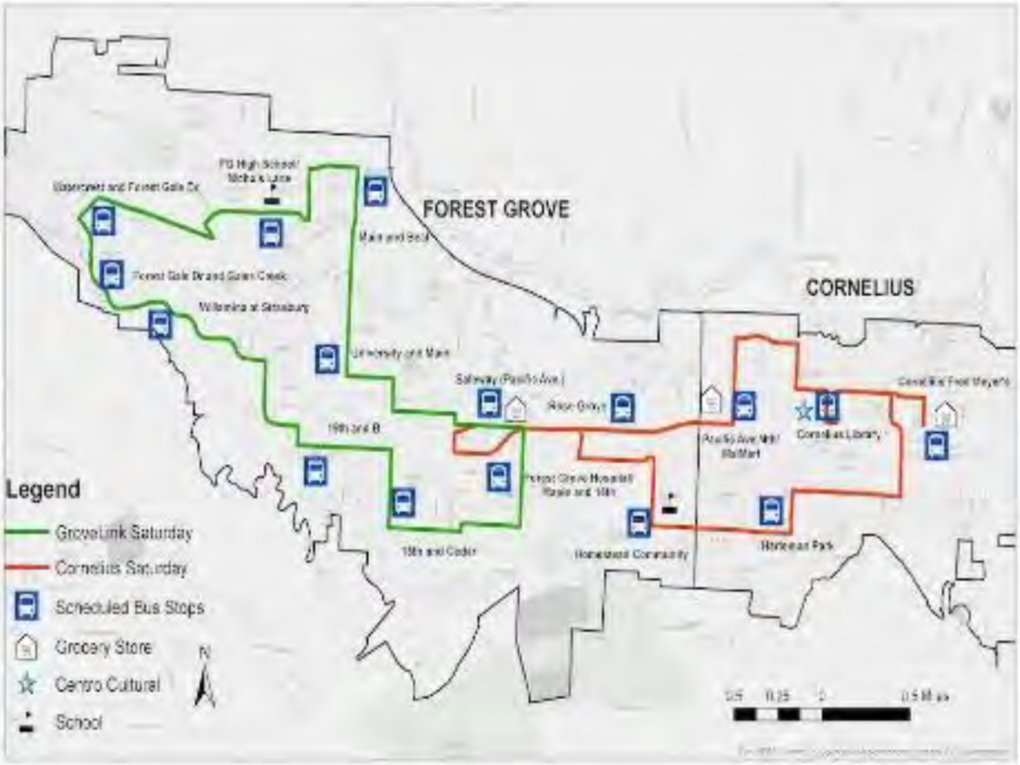
(11) Bicycle Lanes and Sidewalks. Where street improvements on arterials and collectors are required as a condition of development approval, they shall include bicycle lanes or off-street multi-modal pathways, and sidewalks constructed in accordance with city standards.

> **Response: Davis Street is a Collector, therefore improvements include a 12' wide, multi-use path as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.**

(B) Design Standards.

(1) Relation of Building to Site. The proposed structures shall be related harmoniously to the terrain and to existing buildings which have a visual relationship to the proposed structure. Building height, bulk, lot area, coverage, setbacks, and scale should be particularly considered with regard to achieving compatible relationships. Screening, except in the industrial zone, exposed storage areas, utility buildings, machinery, service and truck loading areas, solid waste disposal cans, containers and other structures, and other accessory uses and structures, shall be adequately set back and screened. If a building is constructed, enlarged or altered to meet Type II thresholds and is located within 500 feet of a bus/transit stop, a main entrance door shall be placed on the street side of the bus/transit line and located as close as structurally possible to the bus/transit stop in compliance with this title;

> **Response: The building is designed with a northwest contemporary aesthetic that relates to the site and to other buildings within the City. The proposed development complies with required building height and setbacks.**
>
> **There are three transit stops located within approximately 500 feet of the proposed buildings. A local Cornelius stop is located in front of the Fred Meyer, a Trimet stop is near the Burger King along E Baseline Street and the other is a Trimet stop, located east of the site along E Baseline Street. None of the proposed buildings front on E Baseline however pedestrian connections are proposed from the Buildings to the public streets.**



(2) Trees and Vegetation. The development has been designed to, where possible, incorporate and preserve existing trees or vegetation of significant size and species. Consideration shall be given to whether habitat, survival of the tree species, and aesthetics can best be achieved by preserving groves or areas of trees as opposed to only individual trees;

> **<u>Response:</u> Where possible, existing trees and vegetation have been preserved. In the pre-application meeting Ms. Fryer noted the poplar trees in the southeast corner of the site are invasive, therefore these trees will be removed. Additional detail can be found on the Dimensioned Site Improvement Plan, Sheets C201-C207.**

(3) Historic Structures. Consideration is given to the effect of the proposed development on historic buildings or features both on the site and within the immediate area;

> **<u>Response:</u> There are no historic structures on site or within the immediate area.**

(4) Grading and contouring of the site shall take place with particular attention to minimizing the possible adverse effect of grading and contouring on the natural vegetation and physical appearance of the site;

> **<u>Response:</u> All grading will be done to account for the site's natural appearance.**

(5) Landscaping. The quality, location, size, and structural and aesthetic design of walls, fences, berms, traffic islands, median areas, hedges, screen planting and landscape areas are such that they serve their intended purposes and have no adverse effect on existing or contemplated abutting land uses;

> **Response:** **Landscaping, including walls and fences have been designed to meet the needs of the residential development without adversely impacting adjacent uses.**

(6) Lighting. Adequate exterior lighting shall be provided to promote public safety, and shall be designed to avoid unnecessary glare upon other properties;

> **Response:** **Adequate lighting is proposed to promote public safety and reduce glare as shown on the Electrical Site Plan Photometrics, Sheets E0.1-E1.1B.**

(7) Solar Access. In determining the appropriate relation of the building or structure to the site, the committee shall require that the building or structure be located on the site in a location and direction that will maintain, where feasible, solar access for adjacent properties and buildings or structures within the site.

> **Response:** **The Solar Access Study, Sheets A0.61-A0.62, shows that proposed buildings will not meaningfully impact solar access of neighboring properties. Residential buildings proposed are approximately 39' in height and are at least 20' from adjacent properties to east and west. Internal building layout has been arranged to provide reasonable solar access to all buildings on site.**

18.145.010 General provisions.

(A) The provision and maintenance of off-street parking and loading spaces are continuing obligations of the property owner. No building or other permit shall be issued until plans are presented that show property that is and will remain available for exclusive use as off-street parking and loading space as required by this title. The subsequent use of property for which the building permit is issued shall be conditional upon the unqualified continuance and availability of the amount of parking and loading space required for the specific use. Use of property in violation of the off-street parking and loading requirements located herein shall be a violation of this code. Should the owner or occupant of a lot or building change the use to which the lot or building is put, thereby increasing off-street parking or loading requirements, it shall be a violation of this code to begin or maintain the altered use until the required increase in off-street parking or loading is provided, except as provided in the central mixed use (CMU) and corridor commercial (CC) zoning districts (see CMC 18.145.020(C)).

(B) Unless otherwise provided, required parking and loading spaces shall not be located in a required yard.

> **Response:** **As shown on the Dimensioned Site Improvement Plan, sheets C201-C206, parking areas are located out of the required setbacks.**

(C) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same parking and loading spaces when the hours of operation do not overlap; provided, that satisfactory legal evidence is presented to the community development director in the form of deeds, leases, or contracts to establish the joint use.

<u>Response:</u> As detailed on the Architectural Title Sheet, sheet G0.01, parking for the residential buildings and live/work buildings will be shared.

(D) A plan drawn to scale, indicating how the off-street parking and loading requirement is to be fulfilled, shall accompany the request for a building permit, site plan review, or certificate of occupancy. The plan shall show all those elements necessary to indicate that these requirements are being fulfilled and shall include but not be limited to:

(1) Delineation of individual parking and loading spaces and their dimensions;

(2) Circulation area necessary to serve spaces;

(3) Access to streets, alleys and properties to be served;

(4) Curb cuts;

(5) Location and dimensions of all landscaping, including the type and size of plant material to be used, as well as any other nonliving landscape material incorporated into the overall plan, excluding single- and two-family residences and multi-family uses with not more than four units in the core residential zone; and

(6) Specifications as to signs and bumper guards, excluding single- and two-family residences and multi-family uses with not more than four units in the core residential zone

<u>Response:</u> The Dimensioned Site Improvement Plan, sheets C201-C206 provides the required information for items 1-6 above.

(E) Requirements for types of buildings and uses not specifically listed herein shall be determined by the community development director, based upon the requirements of comparable uses listed.

<u>Response:</u> The type of use is listed above.

18.145.020 Off-street parking.

(A) At the time of erection of a new structure or at the time of enlargement or change in use of an existing structure within any zone in the city, off-street parking spaces shall be provided in accordance with CMC 18.145.030. If parking space has been provided in connection with an existing use or is added to an existing use, the parking space shall not be eliminated if elimination would result in less space than is specified in the standards of this section when applied to the entire use. In cases of enlargement of a building or use of land existing on the effective date of the ordinance codified in this title, the number of parking spaces required shall be based only on floor area or capacity of such enlargement.

<u>Response:</u> The site is currently vacant and the proposal is for a new structure, therefore the requirements for an enlargement or change in use do not apply.

(B) Where square feet are specified, the area measured shall be the gross floor area primary to the functioning of the particular use of the property but shall exclude space devoted to off-street parking or loading. Where employees are specified, persons counted shall be those working on the premises during the largest shift at the peak season, including proprietors.

(C) In the central mixed use and corridor commercial zoning districts, change of use of an existing commercial structure will not require additional parking to be constructed. However, construction of a new building or addition to an existing building will require the provision of off-street parking as required in CMC 18.145.030.

<u>Response:</u> **The site is located in the GMU zone, therefore this criteria does not apply.**

(D) If several uses occupy a single structure or parcel of land, the total requirements for off-street parking shall be the sum of the requirements of the several uses computed separately with a reduction of 10 percent to account for cross-patronage and shared parking benefits. Where the peak hours of operation of two or more uses do not substantially overlap, such uses may share off-street parking spaces as required by this title.

<u>Response:</u> **As detailed under section *18.75.070 (A)(2),* we are seeking a reduction in the minimum parking requirement due to shared parking expected to occur in two ways: First, the residents of the 22 live-work units will typically be employees of the ground floor commercial use, reducing the need for commercial parking by one space per unit. Second, residents are expected to be off-site at their workplaces during business hours, and we expect at least 5% of the residential spaces will be available for use by business visitors and employees during the workday. A reduction of 5% of the required parking spaces is requested and further detail can be found on the Title Sheet/General Information, Sheet G0.01.**

(E) Parking spaces in public streets or alleys shall not be eligible as fulfilling any part of the parking requirements, except as allowed in the central mixed use and core commercial zoning districts.

<u>Response:</u> **On-street parking is provided but is not counted toward fulfilling the required parking.**

(F) Required parking spaces shall be available for the parking of operable motor vehicles for residents, customers, patrons, and employees only, and shall not be used for the storage or sale of vehicles or other materials and shall not be rented, leased or assigned to any other person or organization not using or being directly served by the use.

<u>Response:</u> **Parking spaces will not be used for storage or any other prohibited use.**

(G) Off-street parking spaces for dwellings shall be located on the same lot with the dwelling, unless specified elsewhere in the code.

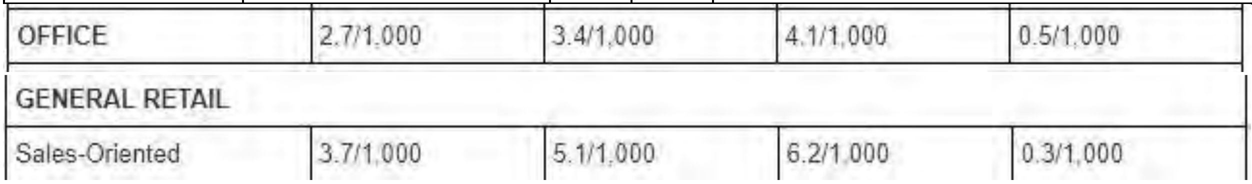
<u>Response:</u> **All residential parking will be located on-site for the development.**

18.145.030 Required off-street parking spaces.

(A) Off-street parking shall be provided based on the primary use of the site according to the following standards and regardless of the zone in which the use is located (see Map 1 following this chapter).

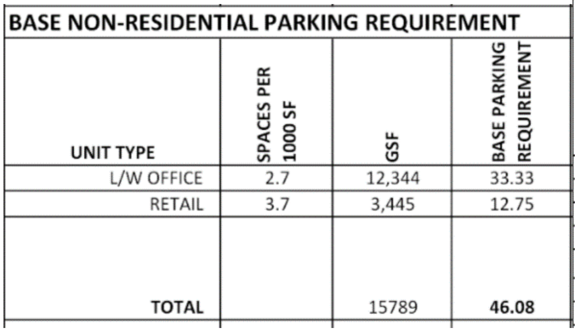
Multi-Family Units	DU < 500 sq ft: 1.0/DU; 1 bedroom: 1.25/DU;	none	none	1.0/2 DUs except elderly, which is 1.0/20 DUs

	2 bedroom: 1.5/DU; 3 bedroom: 1.75/DU			



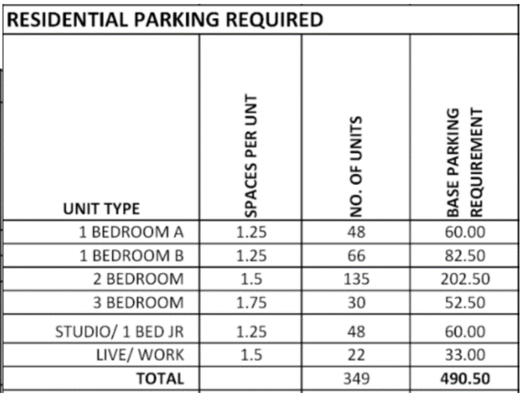
OFFICE	2.7/1,000	3.4/1,000	4.1/1,000	0.5/1,000
GENERAL RETAIL				
Sales-Oriented	3.7/1,000	5.1/1,000	6.2/1,000	0.3/1,000

<u>Response:</u> **The following tables, also found on the Architectural Title Sheet, G0.01, detail the required parking based on the number of units and the square footages of commercial and retail spaces within the development**



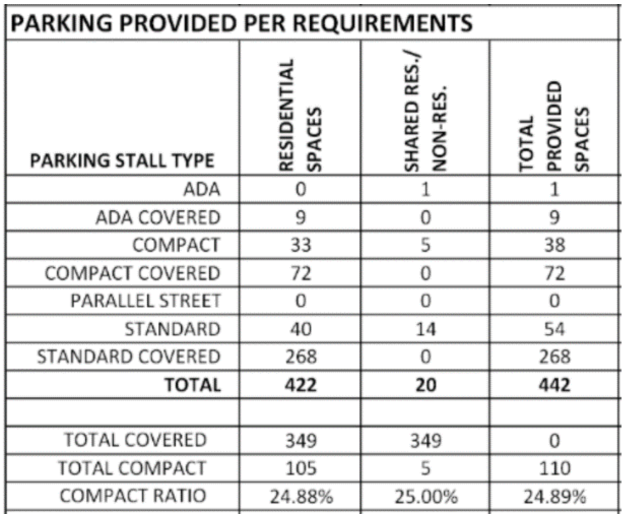
BASE NON-RESIDENTIAL PARKING REQUIREMENT

UNIT TYPE	SPACES PER 1000 SF	GSF	BASE PARKING REQUIREMENT
L/W OFFICE	2.7	12,344	33.33
RETAIL	3.7	3,445	12.75
TOTAL		15789	**46.08**



RESIDENTIAL PARKING REQUIRED

UNIT TYPE	SPACES PER UNT	NO. OF UNITS	BASE PARKING REQUIREMENT
1 BEDROOM A	1.25	48	60.00
1 BEDROOM B	1.25	66	82.50
2 BEDROOM	1.5	135	202.50
3 BEDROOM	1.75	30	52.50
STUDIO/ 1 BED JR	1.25	48	60.00
LIVE/ WORK	1.5	22	33.00
TOTAL		349	**490.50**



PARKING PROVIDED PER REQUIREMENTS

PARKING STALL TYPE	RESIDENTIAL SPACES	SHARED RES./ NON-RES.	TOTAL PROVIDED SPACES
ADA	0	1	1
ADA COVERED	9	0	9
COMPACT	33	5	38
COMPACT COVERED	72	0	72
PARALLEL STREET	0	0	0
STANDARD	40	14	54
STANDARD COVERED	268	0	268
TOTAL	**422**	**20**	**442**
TOTAL COVERED	349	349	0
TOTAL COMPACT	105	5	110
COMPACT RATIO	24.88%	25.00%	24.89%

18.145.050 Design and maintenance standards for off-street parking and loading facilities.

(A) Except as otherwise defined in this code, "one standard parking space" means a minimum of a parking stall of nine feet in width and 20 feet in length. To accommodate compact cars more efficiently, up to 25 percent of the available parking spaces may have a minimum dimension of eight feet in width and 16 feet in length, so long as they are identified as compact car stalls and are not readily accessible to large cars.

Response: There are 442 parking stalls on site. 25 percent of the available parking stalls is 110.5. 110 compact stalls are provided.

(B) Excluding single-family and duplex residences and multi-family uses with not more than four units in the core residential zone, groups of two or more parking spaces shall be served by a service drive so that no backing movements or other maneuvering within a street or other public right-of-way would be required.

Response: All parking spaces are designed so that maneuvering within the street is not required.

(C) Service drives shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress consistent with CMC 18.150.070, and maximum safety of pedestrians and vehicular traffic on the site.

(D) Each parking and/or loading space shall be accessible from a street and the access shall be of a width and location as described in this section.

Response: All parking will be accessible from the street as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.

(E) Parking space configuration, stall and access aisles shall be of sufficient width for all vehicles turning and maneuvering.

Response: Parking stalls are 9' x 20' and drive aisles within the parking areas are 24' wide to provide for adequate vehicle maneuvering as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.

(F) Except for single- and two-family residences and multi-family uses with not more than four units in the core residential zone, any area intended to be used to meet the off-street parking requirements as contained in this title shall have all parking spaces clearly marked using a permanent paint. All interior drives and access aisles shall be clearly marked and signed to show direction of flow and maintain vehicular and pedestrian safety.

Response: All parking spaces and internal circulation areas within the development will be clearly marked as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.

(G) Except for single- and two-family residences and multi-family uses with not more than four units in the core residential zone, all areas used for the parking and/or storage and/or maneuvering of any vehicle, boat and/or trailer shall be improved with asphalt or concrete surfaces according to the same standards required for the construction and acceptance of city streets. Off-street parking spaces for single- and two-family residences and multi-family uses with not more than four units in the core residential zone shall be improved with an asphalt or concrete surface to specification as approved by the building official.

Response: Parking lot areas will be improved with asphalt as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.

(H) Parking spaces along the outer boundaries of a parking lot or adjacent to interior landscaped areas or sidewalks shall be provided with a wheel stop at least four inches high located three feet back from

the front of the parking stall. The facilities and design review committee or the planning commission may approve parking spaces without wheel stops, provided the abutting sidewalk is increased by three feet in width and/or the appropriate landscaping is planted where the bumper would overhang.

> **Response: Most of the onsite parking spaces contain wheel stops, but where wheel stops are not provided, the adjacent landscaping is appropriate for the bumper to overhang. Additional details on the parking lot buffer planting list can be found on the Planting Legend, Sheet L10.**

I) Off-street parking and loading areas shall be drained in accordance with specifications approved by the city engineer.

> **Response: Off-street parking and loading areas will be designed to meet the approved specifications. Runoff from off-street parking areas will be collected, conveyed, treated and disposed pe the specifications. Additional detail can be found on the Grading Plan and Utility Plan, Sheets C300-C407.**

(J) Artificial lighting on all off-street parking facilities shall be designed to deflect all light away from surrounding residences and so as not to create a hazard to the public use of any road or street.

> **Response: The parking lot lighting is shown on the Electrical Site Plan Photometrics, Sheets E0.1-E1.1B. All light fixtures will be cut-off at the property line to avoid impact to surrounding uses.**

(K) Signs which are provided on parking lots for the purpose of meeting this section shall be as prescribed by the building official.

> **Response: ADA compliant signage is provided on the Site Details Sheet, sheet A1.02A. Additional code compliant signage will be reviewed during the building permit process.**

(L) All parking lots shall be kept clean and in good repair at all times. Breaks in paved surfaces shall be repaired promptly, and broken or splintered wheel stops shall be replaced so that their function will not be impaired.

> **Response: The parking areas will be appropriately maintained for the safety of the residents.**

(M) Bicycle parking spaces shall be conveniently located with respect to the street, bicycle path/lane and building entrance. Bicycle parking spaces shall not conflict with off-street vehicle parking spaces and drive aisles. There shall be at least 36 inches of clearance between parked bicycles and other obstructions or buildings.

(1) Short-Term Bicycle Parking. Short-term bicycle parking shall be provided to encourage shoppers, customers, and other visitors to use bicycles by providing a convenient and readily accessible place to park bicycles.

(a) Short-term bicycle facilities shall be in the form of either a lockable enclosure or a stationary rack, either covered or uncovered, to which the bicycle can be locked.

(b) Short-term bicycle facilities shall be located within 30 feet of the main entrance to the building, in a location that is easily accessible for bicycles.

Response: **Short term bicycle parking is provided throughout the site and is designed as double space racks. There is no way to physically store bicycles within 30' of the entries without blocking the sidewalk or being within 36" of the buildings in the less than 5' between sidewalk and building. We've therefore prioritized life-safety code compliance over short-term bicycle parking and identified convenient short term bicycle parking locations to the sides of the buildings. Enlarged bicycle rack details can be found on the Site Details, Sheet A1.02B and locations can be found on the Enlarged Site Plan, Sheets A1.03-A1.08.**

(c) Short-term bicycle facilities may be located within the right-of-way adjacent to the street frontage of a property within the central mixed use and core commercial districts if approved by the city engineer.

Response: **No short-term bicycle parking is proposed within the right-of-way.**

(2) Long-Term Bicycle Parking. Long-term bicycle parking provides employees, students, residents, commuters, and others who generally stay at a site for several hours a weather-protected place to park bicycles.

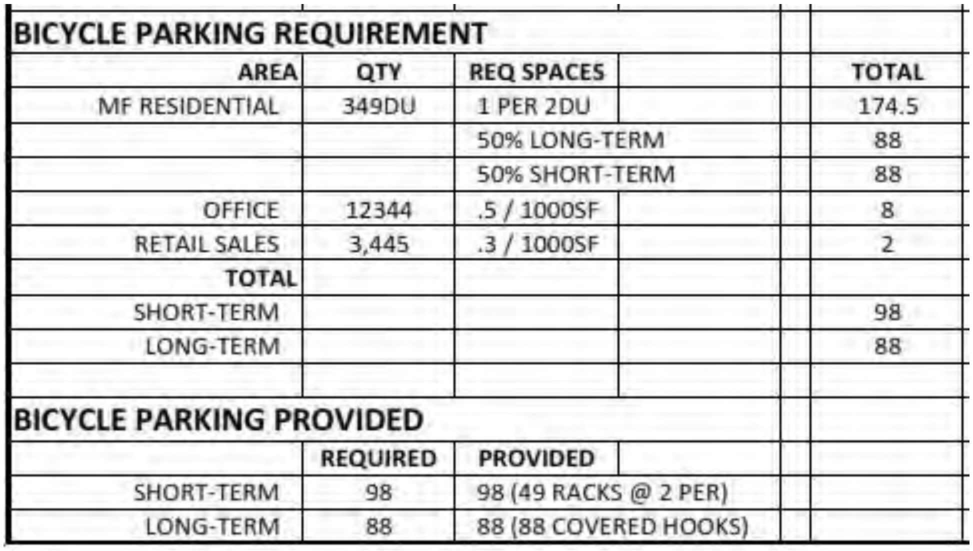
(a) A minimum of 50 percent of the bicycle parking spaces shall be provided as long-term bicycle parking in any of the following situations:

(i) When 10 percent or more of automobile vehicle parking is covered.

(ii) If more than four bicycle parking spaces are required.

(iii) Multi-family residential development with nine or more units.

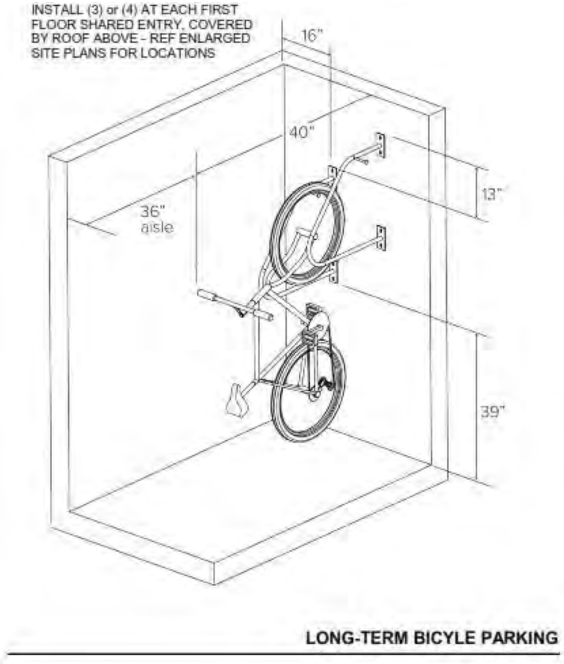
Response: **All of the above situations apply to the proposed development, therefore 50% of the required bicycle parking spaces must be long-term spaces. For multi-family units, 1 bicycle parking space per 2 dwelling units is required which results in a requirement of 175 bicycle parking spaces. 88 long term bicycle parking spaces are required. 88 long term spaces are provided.**



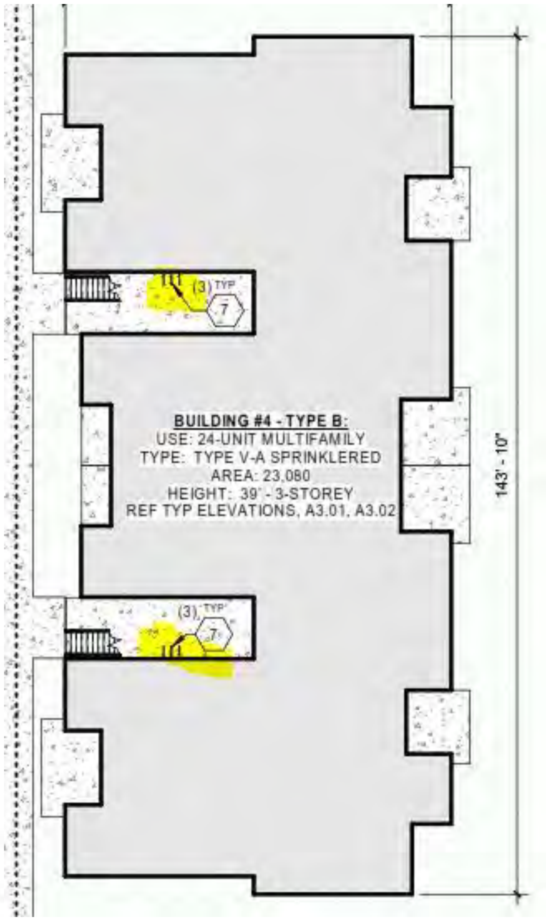
BICYCLE PARKING REQUIREMENT				
AREA	**QTY**	**REQ SPACES**		**TOTAL**
MF RESIDENTIAL	349DU	1 PER 2DU		174.5
		50% LONG-TERM		88
		50% SHORT-TERM		88
OFFICE	12344	.5 / 1000SF		8
RETAIL SALES	3,445	.3 / 1000SF		2
TOTAL				
SHORT-TERM				98
LONG-TERM				88
BICYCLE PARKING PROVIDED				
	REQUIRED	**PROVIDED**		
SHORT-TERM	98	98 (49 RACKS @ 2 PER)		
LONG-TERM	88	88 (88 COVERED HOOKS)		

(b) Secured bicycle parking facilities shall be provided on site; facilities can include a bicycle storage room, bicycle lockers, covered racks, or other secure storage space inside or outside of the building. Long-term bicycle parking facilities shall be located not more than 75 feet from a building entrance.

<u>Response:</u> The development will provide 88 long term bicycle parking spaces in all cases within 75' of a primary entrance of the adjacent building(s). These single-bicycle wall-mounted hooks permit locking of bicycles and are located below the overhang at each residential building primary entry at the ground floor as highlighted on the graphic below.



LONG-TERM BICYLE PARKING



18.145.070 Parking lot design standards.

(A) Required Landscaping Adjacent to Public Right-of-Way. A strip of land at least five feet in width located between the abutting right-of-way and the off-street parking area or vehicle use area which is exposed to an abutting right-of-way, except in required vision clearance areas as provided in CMC 18.150.070.

<u>Response:</u> 18.75.065(N)(3) requires a 5-foot landscaped buffer at the perimeter of all parking areas. Compliance with this requirement can be found on the Planting Plan, Sheets L102-L107.

(B) Perimeter Landscaping Relating to Abutting Properties. On the site of a building or structure or open lot use providing an off-street parking area or other vehicular use area, where such areas will not be

entirely screened visually by an intervening building or structure from abutting property, a five-foot landscaped strip shall be between the common lot line and the off-street parking area or other vehicular use area exposed to abutting property.

> **<u>Response:</u> See response to (A) above. All parking areas are screened by a 5-foot landscaped buffer.**

(C) Where the boundary of a parking lot in a nonresidential zone adjoins a residential district, a 10-foot landscaped strip shall be provided along the entire length abutting the residential zone, and shall be landscaped with evergreen plant material and maintained at a minimum height of 36 inches.

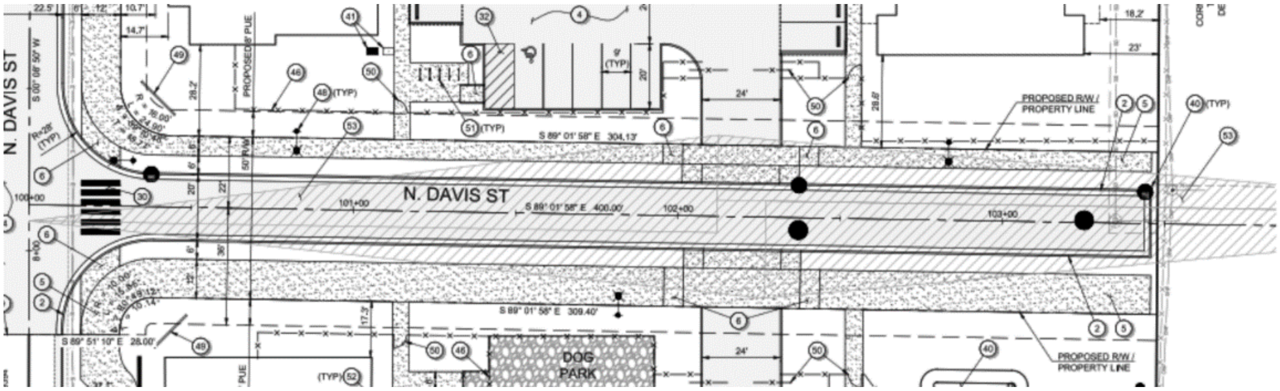
> **<u>Response:</u> The proposed property does not abut any residential district.**

(D) Parking Area Interior Landscaping. Landscaped islands shall be provided a minimum of every 10 parking spaces with a depth equivalent to the depth of the adjacent parking spaces and a minimum width of six feet to break up large expanses of pavement, improve the appearance and climate of the site, improve safety, and delineate pedestrian walkways and traffic lanes. Except for industrial development within industrial zones, the following interior landscaping shall be met:

> **<u>Response:</u> 18.75.065(N)(3) requires a landscaped island every 10 parking spaces. Compliance with this requirement can be found on the Planting Plan, Sheets L102-L107.**

(1) Sight Distance for Landscaping at Points of Access. When an accessway intersects a public right-of-way or when the subject property abuts the intersection of two or more public rights-of-way, all landscaping within vision clearance areas pursuant to CMC [18.150.070]() shall provide unobstructed cross-visibility at a level between three feet and 10 feet above the curb line; provided however, visibility areas shall be allowed, provided they are so located so as not to create a traffic hazard. Landscaping except required grass or ground cover shall not be located closer than three feet from the edge of any accessway pavement.

> **<u>Response:</u> Clear vision areas are shown on the Dimensioned Site Improvement Plan, sheets C201-C206. An example of the clear vision area denoted on the plans is shown in the graphic below.**



(2) Parking lots that are more than three acres in size shall provide street features along major drive aisles. These features shall include at a minimum curbs, sidewalks and street trees and/or planter strips or both.

> **Response: The proposed development does not contain parking lots more than 3 acres in size as demonstrated on the Zoning and Site Use Plan, Sheet A0.10.**

(3) Access to and from parking spaces/areas shall not permit backing onto a public street and/or a public vehicle travel lane or both, except for single-family or duplex dwellings and multi-family uses with not more than four units in the core residential zone.

> **Response: Drive aisles within the parking areas are 24' wide to provide for adequate vehicle maneuvering as shown on the Dimensioned Site Improvement Plan, Sheets C201-C206.**

CHAPTER 18.143 TRANSPORTATION FACILITIES

18.143.020 General provisions.

(A) All transportation facilities shall be designed and improved in accordance with the standards of this code and the adopted Cornelius public works standards. In addition, when development abuts or impacts a transportation facility under the jurisdiction of one or more other governmental agencies, the city shall condition the development to obtain permits required by the other agencies.

(B) In order to protect the public from potentially adverse impacts of the proposal, to fulfill an identified need for public services related to the development, or both, development shall provide traffic capacity, traffic safety, and transportation improvements in proportion to the identified impacts of the development.

(C) For applications that meet the threshold criteria of CMC 18.143.030(B), Analysis Threshold, this analysis or limited elements thereof may be required.

(D) The decision-making authority may impose development conditions of approval per this title. Conditions of approval may be based on the traffic impact analysis.

(E) Dedication of rights-of-way shall be determined by the decision-making authority.

(F) Traffic calming may be approved or required by the decision-making authority in a design of the proposed and/or existing streets within the area of influence or any additional locations identified by the city engineer. Traffic calming measures shall be designed to city standards.

(G) Intersection performance shall be determined using the Highway Capacity Manual, Sixth Edition, published by the Transportation Research Board. The city engineer may approve a different intersection analysis method prior to use when the different method can be justified. Terms used in this subsection are defined in the Highway Capacity Manual, Sixth Edition.

(H) City street intersections shall maintain a level of service (LOS) of "D" during the p.m. peak hour of the day. An LOS of "E" may be accepted for local street approaches or driveway access points that intersect with collector or arterial streets, if these intersections are found to operate safely.

> **Response: Criteria A-H above are understood by the applicant.**

18.143.030 Traffic impact analysis.

For each development proposal that exceeds the analysis threshold of subsection (B) of this section, the application for land use or design review approval shall include a traffic impact analysis as required by this code. The traffic impact analysis shall be based on the type and intensity of the proposed land use change or development and its estimated level of impact to the existing and future local and regional transportation systems.

(A) Engineer Certification. The traffic impact analysis shall be prepared and certified by a traffic engineer or civil engineer licensed in the state of Oregon.

> **Response: The TIA submitted with this application was prepared by a licensed and certified engineer.**

(B) Analysis Threshold. A traffic impact analysis is required when the proposed land use change or development will generate 200 vehicles or more per day (vpd) in average weekday trips as determined by the city engineer.

> **Response: The project is expected to generate more than 200 weekday trips therefore a TIA is required.**

(C) A traffic impact analysis or some elements of a traffic impact analysis may be required when projects that generate less than 200 average daily vehicle trips and the volume threshold under subsection (B) of this section is not met, but the city engineer finds that the traffic impacts attributable to the development have the potential to significantly impact the safe and efficient operation of the existing public transportation system.

> **Response: The project is expected to generate more than 200 weekday trips therefore a TIA is required.**

(D) Study Area. The traffic impact analysis shall evaluate the area of influence of the proposed development and all segments of the surrounding transportation system where users are likely to experience a change in the quality of traffic flow. At a minimum, the analysis will consider all road segments, access points, and intersections within the influence area. The city engineer may identify additional locations for study if existing traffic operation, safety, or performance is marginal or substandard. Prior to report preparation, the applicant shall submit the proposed scope and analysis assumptions of the traffic impact analysis. The city engineer shall determine whether the scope and analysis assumptions are adequate.

> **Response: The scope of the analysis was reviewed by the city engineer and is detailed in the Executive Summary of the TIA.**

(E) Traffic impact analysis shall be based on the type and intensity of proposed land use change or development and its estimated level of impact to the existing and future local and regional transportation systems.

(1) The traffic impact analysis report shall at a minimum contain the following information:

(a) A description of the proposal and/or development including the intended use of the site.

(b) Vicinity map shall identify the influence area map, which includes the existing traffic conditions, the functional classification of the subject roads, existing right-of-way and pavement widths, striping, channelization, and all existing driveways and intersections within the influence area.

(c) Traffic forecasts of future traffic within the influence area.

(d) Traffic impact shall be analyzed to evaluate access, safety, feasibility, operation and performance, considering the movement of site-generated traffic relating to existing conditions, traffic flow, access points and intersections within the influence area. Mitigation for identified deficiencies shall be recommended to provide safe and efficient traffic flow.

(e) Technical appendices and other information that demonstrates the technical adequacy of the analysis.

Response: The TIA submitted with this application contains items (a) through (e) as required.

(2) Traffic Forecasts. The report shall include complete documentation of trip generation calculations including Institute of Transportation Engineers' (ITE) trip generation use code(s), from the most recent published edition. Traffic flow diagrams displaying distribution, assignment, existing, added and total traffic shall be included. Intersections, access points and turning movements within the area of influence shall be included.

(3) Trip Generation. Estimates for trip generation shall be made for peak-hour traffic. The peak-hour traffic in the analysis will be justified and will at a minimum include the a.m. and p.m. peak hours. Trip generation estimates shall be based on the most recent issue of the ITE trip generation. The city engineer may approve different trip generation rates when trip generation rates are not available in ITE's trip generation or different rates are justified.

(4) Trip Distribution and Assignment. Traffic generated by the proposed development shall be logically distributed and assigned to the street system within the influence area and any additional locations identified by the city engineer. The trip distribution information shall be based on Washington County, Metro, or ODOT for local traffic patterns no more than 12 months old, or alternative data approved by the city engineer.

(5) Performance analysis shall be based on safety considerations that evaluate conflicting turning movements among driveways, intersections and internal traffic. Geometric design concerns shall be addressed and operational improvements shall be considered, evaluated and recommended when determined to be necessary by the standards of Washington County, ODOT or the city engineer. Adequate sight distance shall be addressed at the proposed road access point(s) of the existing and the ultimate road configuration based on the improvements identified in the city transportation system plan. Bicycle, pedestrian and transit issues shall be identified and evaluated. Other operational, circulation, safety, capacity and improvement issues shall be evaluated and addressed as required by the code and the city engineer.

(6) The traffic impact analysis shall identify traffic impacts attributable to a development and the appropriate mitigation measures where a development causes traffic impacts that bring a road below acceptable levels of service, or impacts a road that is already operating below acceptable levels of service, or impacts a road that has a documented safety problem. Mitigation measures shall be

implemented as a condition of approval. Mitigation shall include alternative methods to safely and efficiently improve traffic flow through improvements that address the identified deficiencies. Improvements shall be consistent with those identified in the transportation system plan. If traffic signal warrants are met in conformance with the Highway Capacity Manual and the Manual of Uniform Traffic Control Devices, traffic signals shall be required with development. Before a signal can be installed on a state highway, a traffic signal and location shall have been approved by the State Highway Engineer.

> **Response: The TIA submitted with this application contains items (2) through (6) as required.**

(7) State and County Facilities. Access to state (ODOT) and/or Washington County facilities or both requires approval from those agencies. Traffic analyses shall meet ODOT and county requirements, in addition to those of the city for a traffic impact analysis.

> **Response: ODOT concurred with the scope of the traffic study in an email dated August 30,2021 addressed to the City and PBS. The TIA was finalized on April 27, 2022. ODOT concurred with the report's conclusions on the same day per a copy of the email submitted with this application.**

18.143.040 Street design cross-sections per transportation system plan.

Street cross-sections include the right-of-way, paved section, sidewalk and planter strip widths. The functional classification of a street as designated in the transportation system plan shall determine its design and width. Identification of functional classifications for streets in the city limits is found in the adopted Cornelius transportation system plan. Street design standards, which are based on functional classification and use, are found in the adopted Cornelius public works standards. Full street connections shall be provided at intervals consistent with the adopted Cornelius public works standards for the identified street classification, except as modified by Chapter 18.115 CMC, or where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers.

(A) Deviations to Adopted Street Cross-Sections. A deviation from the adopted street cross-sections and/or widths or both shall require demonstration of a hardship or other exceptional circumstances resulting from conditions of the property. Hardship or exceptional circumstances may include, but are not limited to, unique topographic conditions, environmental protection requirements, and existing development and buildings. A request for a deviation shall comply with this title and, where applicable, the transportation planning rule (TPR).

> **Response: Public street improvements are designed to meet current public works standards.**

18.143.050 Access standards

Access standards establish requirements and regulations for safe and efficient vehicle access to and from a site and enhance general circulation within a site.

> **Response: The Traffic Impact Analysis (TIA), prepared by PBS and dated October 28, 2021, addresses Access and Circulation for the proposed development.**

(A) Access Spacing. Access spacing shall be designed in conformance with the adopted Cornelius public works standards.

> **<u>Response:</u> Site access spacing meets or exceeds 100 feet per City Public Works Standard 5.03(c)(3) on the east/west section of Davis Street. On the north/south section of Davis the existing Fred Meyers access spacing makes meeting the 100 feet spacing infeasible as no improvements can be made to private property. See Figure 2 of the TIA below for the driveway alignment.**

(1) Access spacing for all state facilities shall be coordinated with the Oregon Department of Transportation (ODOT).

> **<u>Response:</u> No new access is proposed on state facilities.**

(B) An access report shall be submitted with all new development and/or redevelopment proposals that demonstrates the street/driveway is safe as designed and meets adequate stacking, site distance, deceleration distance, on-site circulation and deceleration requirements as set by the city, American Association of State Highway and Transportation Officials (AASHTO), and relevant agencies.

> **<u>Response:</u> Section 4 of the TIA provides an access report addressing safety and access evaluation.**

(*C) Driveway/Access Points. The location and number of driveways or access points have a direct effect on safe and efficient traffic flow. The following access management standards shall apply toward new driveways:*

(1) Driveway spacing shall be designed in accordance with adopted public works standards. In some cases, driveway setbacks may be greater than the standard depending upon the influence area, as determined by city engineer review of a traffic impact report submitted by the applicant's traffic engineer. If the subject property has less than 150 feet of street frontage, the applicant shall first investigate a shared access as an option. If a shared access is not possible, the driveway shall be placed as far from the intersection as possible.

> **Response: Driveway spacing meets or exceeds 100 feet per City Public Works Standard 5.03(c)(3) on the east/west section of Davis Street. On the north/south section of Davis the existing Fred Meyers driveway spacing makes meeting the 100 feet spacing infeasible. See Figure 2 of the TIA for the driveway alignment.**

(2) Based on the applicants' proposal and its compliance with the comprehensive plan, transportation system plan and the development and zoning code, the city shall require the closing or consolidation of existing driveways or other vehicle access points, the recording of reciprocal access easements (i.e., for shared driveways), and installation of traffic control devices or other measures as a condition of approval to mitigate the impacts of the development.

> **Response: Based on the analysis provided, consolidation of existing driveways is not required for the development.**

(3) New developments shall provide cross-over easements to ensure potential shared driveway access points where existing conditions (i.e., surrounding land uses, lot configurations, physical characteristics, etc.) warrant consideration.

> **Response: Shared Access easements will be provided between the proposed parcels to facilitate reciprocal access along the private street that extends south to E Baseline Street and East between the new Parcel 2 and Parcel 3.**

(4) Access to arterials shall only be from public streets. When a site that has private access onto a principal arterial is redeveloped, the private access shall be eliminated if alternate access exists or can be developed to the site.

> **Response: The proposed parcels do not have access from an arterial.**

(5) Direct access to a collector street shall only be considered if there is no alternative way to access the site. If direct access is permitted by the city, the applicant shall be required to mitigate for any safety or neighborhood traffic management impacts deemed applicable by the city engineer. In no case shall the design of driveways, drive aisles or service drives require or encourage the backward movement or other maneuvering of a vehicle within a street, except for single-family and duplex residences.

> **Response: The site does propose access to N. Davis Street, which is a collector and will be permitted by the City. Driveways have been designed to avoid the need for vehicle maneuvering within the street.**

(6) Proposed shared-use paths shall be located to provide access to existing or planned commercial services and other neighborhood facilities, such as schools, shopping areas and park and transit facilities. To the greatest extent possible, access shall be reasonably direct, providing a route or routes that do not

deviate unnecessarily from a straight line or that do not involve a significant amount of out-of-direction travel.

Response: A 12 foot wide multi-use path is proposed along the public Davis Street extension.

(I) Dedications. Public streets, sidewalks, pedestrian ways, bike paths, parks, open space, and other public rights-of-way required by or reasonably related to the development shall be dedicated or otherwise conveyed to the city or the appropriate jurisdiction for maintenance. Further, any park or open space proposed may be required to be dedicated to the public if it is designated in the city's comprehensive plan. An appropriate instrument granting or conveying the park or open space must be approved by the jurisdiction to whom the park or open space is being dedicated prior to final plat approval.

Response: As noted on Sheet C300 of the Preliminary Plat Plans, 50,404 square feet is being dedicated to the City of Cornelius for the public right-of-way. No parks or open space is proposed for dedication.

(J) Utilities. All utilities shall be placed underground per standards identified by the city engineer.

Response: All new services will be located underground as required.

(K) Street Trees. Trees shall be installed along street frontages in accordance with the adopted Cornelius public works standards. Actual location and spacing of trees shall be at the discretion of the city engineer.

Response: Street trees are proposed along the frontage of all parcels. A preliminary planting plan is being submitted for review with the Design Review Application and shows the proposed location, sizing, and type of the street trees.

18.143.060 Transit supportive amenities.

(A) New commercial, industrial and institutional buildings developed on sites adjacent to major transit stops shall provide transit-related improvements. Major transit stops are identified as part of the regional transit system or as otherwise defined in Chapter 18.195 CMC. Properties are considered "at" a major transit stop when they are within 200 feet of the stop. A proposed development that is adjacent to or includes an existing or planned major transit stop will be required to plan for access to the transit stop and provide for transit improvements, in consultation with TriMet and consistent with an agency adopted or approved plan at the time of development. Requirements apply where the subject parcel(s) or portions thereof are within 200 feet of a major transit stop. Development requirements and improvements may include the following:

(1) Intersection or mid-block traffic management improvements to allow for pedestrian crossings at major transit stops.

(2) Building placement within 20 feet of the transit stop, a transit street or an intersection street, or a pedestrian plaza at the stop or a street intersections.

(3) Transit passenger landing pads accessible to disabled persons to transit agency standards.

(4) An easement or dedication for a passenger shelter and an underground utility connection to a major transit stop if requested by TriMet.

(5) Lighting to TriMet standards.

(6) Intersection and mid-block traffic management improvements as needed and practicable to enable marked crossings at major transit stops.

(B) For an existing use or proposed use on a site located within one-quarter mile from a bus stop where at least 10 off-street parking spaces are required, the applicant may apply for a reduction in the number of required spaces by 10 percent through the provision of transit supportive amenities, subject to city approval.

> **Response: The proposed development is not adjacent to a major transit stop as defined in subsection (A) above.**

18.143.070 Intelligent transportation systems.

Intelligent transportation systems (ITS) manage and enhance operational performance through advanced technologies and management techniques to help relieve congestion, promote safety and provide suitable transportation strategies.

In order to provide for efficient installation of future intelligent transportation systems (ITS), all roadway improvement projects, including private development with frontage improvements, shall install three-inch conduit to support local interconnect infrastructure. The location, design and type of conduit shall be approved by the city engineer.

> **Response: The criteria is noted and the project will comply with the standard.**

Neighborhood Review Meeting

on a

Preliminary Development Proposal affecting

2300 E Baseline St (Next to Fred Meyer)

Proposed as

Davis Street Multifamily - 3-Story Apartment Complex with Approximately 350 Units

A meeting to discuss the preliminary development proposal is scheduled for

December 7, 2021 at 5:30PM
via Zoom
https://us02web.zoom.us/j/82878005826?pwd=RnArQW9uTlRQYlRCTDNjNjArOFFrQT09

All interested persons may attend

For more information and to request the

Zoom link via email, please contact:

Greg Elmore 503-507-5320

greg@e2kconsulting.com

DEVELOPER OR AGENT: Calida Residential LLC

PROJECT LOCATION: 2300 E Baseline St

AFFIDAVIT OF MAILING NOTICE

I, Greg Elmore, being first duly sworn; say that I am (represent) the party intended to submit an application to the City of Cornelius for a proposed multifamily housing development affecting land located at 2300 E Baseline St, and that pursuant to Ordinance 810, Chapter 18.10, and the guidelines set out by the Community Development Director, did on the 15th day of November, 2021, personally mail notice to affected property owners within 250 feet of the proposed development site.

Sign and Date in the presence of a Notary Public. Certain City staff are Notary Publics and are available for witnessing.

Signature:

Dated this 16th day of November, 2021.

State of Oregon
County of Marion

Subscribed and sworn to (or affirmed) before me this 16 *day of* November 2021

OFFICIAL STAMP
Darcy Marie Koenig
NOTARY PUBLIC - OREGON
COMMISSION NO. 1005470
MY COMMISSION EXPIRES November 4, 2024

DK

Notary Public for the State of Oregon

My Commission expires: November 4, 2024

OFFICIAL STAMP
Darcy Marie Koenig
NOTARY PUBLIC - OREGON
COMMISSION NO. 1005470
MY COMMISSION EXPIRES November 4, 2024

APN - FORMATTED	OWNER MAILING NAME	SITUS FULL ADDRESS	SITUS STREET ADDRESS	SITUS CITY	SITUS STATE	SITUS ZIP CODE	MUNICIPALITY/TOWNSHIP	COUNTY	MAILING FULL ADDRESS	MAILING STREET ADDRESS	MAIL CITY	MAIL STATE	MAIL ZIP/ZIP+4	SUBDIVISION
R402683	F Davis Properties Llc	2405 Baseline St Cornelius, OR 97113	2405 Baseline St	Cornelius	OR	97113	Cornelius	Washington	PO Box 67 Forest Grove, OR 97116	Po Box 67	Forest Grove	OR	97116	
R2082116	Frontier Communications Northwest Inc	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	PO Box 619015 Dallas, TX 75261-9015	Po Box 619015	Dallas	TX	75261-9015	1998-136 partition plat
R2063769	Cesar & Gina Lemus	2497 N Fremont St Cornelius, OR 97113	2497 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	PO Box 227 Cornelius, OR 97113	Po Box 227	Cornelius	OR	97113	Council Creek Estates
R2063697	David Kabiru	628 N 21st Ave Cornelius, OR 97113	628 N 21st Ave	Cornelius	OR	97113	Cornelius	Washington	896 N 18th Ave Cornelius, OR 97113-8710	896 N 18th Ave	Cornelius	OR	97113-8710	Council Creek Estates
R2063697	David Kabiru	628 N 21st Ave Cornelius, OR 97113	628 N 21st Ave	Cornelius	OR	97113	Cornelius	Washington	896 N 18th Ave Cornelius, OR 97113-8710	896 N 18th Ave	Cornelius	OR	97113-8710	Council Creek Estates
R2063689	Aimee Mazzarolo	2290 N Fremont St Cornelius, OR 97113	2290 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	867 N 19th Ave Cornelius, OR 97113-9201	867 N 19th Ave	Cornelius	OR	97113-9201	Council Creek Estates
R402601	Erik Vo	2575 Baseline St Cornelius, OR 97113	2575 Baseline St	Cornelius	OR	97113	Cornelius	Washington	825 NE Broadway St Portland, OR 97232-1215	825 NE Broadway St	Portland	OR	97232-1215	William Mclinn
R2109405	Council Creek Estates Hoa	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	817 N 21st Ave	817 N 21st Ave	Cornelius	OR	97113	Council Creek Estates No.2
R755515	Thomas Moyer	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	805 SW Broadway #2020, Portland, OR 97205-3360	805 SW Broadway #2020	Portland	OR	97205-3360	Forest Grove/Cornelius
R2218310	TOM MOYER THEATRES LLC	OR			OR			Washington		760 SW 9TH AVE STE 2250	Portland	OR	97205	
R755533	Haney Industrial Properties Inc	273 N 26th Ave Cornelius, OR 97113	273 N 26th Ave	Cornelius	OR	97113	Cornelius	Washington	760 SW 9th Ave #2250, Portland, OR 97205-2584	760 SW 9th Ave #2250	Portland	OR	97205-2584	Forest Grove/Cornelius
R755551	Haney Industrial Properties Inc	139 N 26th Ave Cornelius, OR 97113	139 N 26th Ave	Cornelius	OR	97113	Cornelius	Washington	760 SW 9th Ave #2250, Portland, OR 97205-2584	760 SW 9th Ave #2250	Portland	OR	97205-2584	Forest Grove/Cornelius
R2032358	Pacific Outdoor Advertising	OR			OR			Washington	715 NE Everett St Portland, OR 97232-2724	715 NE Everett St	Portland	OR	97232-2724	
R2109400	Mariam Ali	634 N 20th Pl Cornelius, OR 97113	634 N 20th Pl	Cornelius	OR	97113	Cornelius	Washington	634 N 20th Pl Cornelius, OR 97113-7343	634 N 20th Pl	Cornelius	OR	97113-7343	Council Creek Estates No.2
R2063804	Catarino Ixcolin	625 N 21st Ave Cornelius, OR 97113	625 N 21st Ave	Cornelius	OR	97113	Cornelius	Washington	625 N 21st Ave Cornelius, OR 97113-7380	625 N 21st Ave	Cornelius	OR	97113-7380	Council Creek Estates
R2063804	Catarino Ixcolin	625 N 21st Ave Cornelius, OR 97113	625 N 21st Ave	Cornelius	OR	97113	Cornelius	Washington	625 N 21st Ave Cornelius, OR 97113-7380	625 N 21st Ave	Cornelius	OR	97113-7380	Council Creek Estates
R2109399	Michael Jackson	616 N 20th Pl Cornelius, OR 97113	616 N 20th Pl	Cornelius	OR	97113	Cornelius	Washington	616 S 20th Ave Cornelius, OR 97113-6643	616 S 20th Ave	Cornelius	OR	97113-6643	Council Creek Estates No.2
R2063768	Tamyra & Troy Brown	602 N 25th Ave Cornelius, OR 97113	602 N 25th Ave	Cornelius	OR	97113	Cornelius	Washington	602 N 25th Ave Cornelius, OR 97113-7406	602 N 25th Ave	Cornelius	OR	97113-7406	Council Creek Estates
R2109398	Tierney Charles & Markie Ashby	598 N 20th Pl Cornelius, OR 97113	598 N 20th Pl	Cornelius	OR	97113	Cornelius	Washington	598 N 20th Pl Cornelius, OR 97113-7433	598 N 20th Pl	Cornelius	OR	97113-7433	Council Creek Estates No.2
R2109396	Arthur Wahome	574 N 20th Pl Cornelius, OR 97113	574 N 20th Pl	Cornelius	OR	97113	Cornelius	Washington	574 N 20th Pl Cornelius, OR 97113-7433	574 N 20th Pl	Cornelius	OR	97113-7433	Council Creek Estates No.2
R2109395	Mariah Armenta & Enrique Castaneda	562 N 20th Pl Cornelius, OR 97113	562 N 20th Pl	Cornelius	OR	97113	Cornelius	Washington	562 N 20th Pl Cornelius, OR 97113-7433	562 N 20th Pl	Cornelius	OR	97113-7433	Council Creek Estates No.2
R2218309	Reach Communty Development	OR			OR			Washington		4150 SW Moody Ave	Portland	OR	97239	
R2218311	Reach Communty Development	OR			OR			Washington		4150 SW Moody Ave	Portland	OR	97239	
R2063690	Uziel & Socorro Galvez	2272 N Fremont St Cornelius, OR 97113	2272 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	4109 Cloudview Ct Hood River, OR 97031-6701	4109 Cloudview Ct	Hood River	OR	97031-6701	Council Creek Estates
R2063691	Uziel & Socorro Galvez	2258 N Fremont St Cornelius, OR 97113	2258 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	4109 Cloudview Ct Hood River, OR 97031-6701	4109 Cloudview Ct	Hood River	OR	97031-6701	Council Creek Estates
R2109397	Opendoor Property	586 N 20th Pl Cornelius, OR 97113	586 N 20th Pl	Cornelius	OR	97113	Cornelius	Washington	410 N Scottsdale Rd #1600, Tempe, AZ 85281	410 N Scottsdale Rd #1600	Tempe	AZ	85281	Council Creek Estates No.2
R755542	Cornelius Self Storage Llc	401 N 26th Ave Cornelius, OR 97113	401 N 26th Ave	Cornelius	OR	97113		Washington	35 Corte Madera Ave Mill Valley, CA 94941-1800	35 Corte Madera Ave	Mill Valley	CA	94941-1800	
R2079322	Juan & Teobaldo Lopez	2386 S Alpine St Cornelius, OR 97113	2386 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2648 N Fremont St Cornelius, OR 97113-1000	2648 N Fremont St	Cornelius	OR	97113-1000	Cornelius Greenich Village
R2063681	Winnie Cruz	2492 N Fremont St Cornelius, OR 97113	2492 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2492 N Fremont St Cornelius, OR 97113-7384	2492 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063770	Saul Rodriguez & Maria Tenorio	2485 N Fremont St Cornelius, OR 97113	2485 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2485 N Fremont St Cornelius, OR 97113-7384	2485 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063682	Maricela Dechavez & Monico Rios	2478 N Fremont St Cornelius, OR 97113	2478 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2478 N Fremont St Cornelius, OR 97113-7384	2478 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079315	Luis Perez	2466 S Alpine St Cornelius, OR 97113	2466 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2466 S Alpine St Cornelius, OR 97113-7109	2466 S Alpine St	Cornelius	OR	97113-7109	Cornelius Greenich Village
R2063771	Liliana Olalde	2463 N Fremont St Cornelius, OR 97113	2463 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2463 N Fremont St Cornelius, OR 97113-7384	2463 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079316	Gamaliel Medel	2460 S Alpine St Cornelius, OR 97113	2460 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2460 S Alpine St Cornelius, OR 97113-7109	2460 S Alpine St	Cornelius	OR	97113-7109	Cornelius Greenich Village
R2079317	Natalie & Russell Olson	2454 S Alpine St Cornelius, OR 97113	2454 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2454 S Alpine St Cornelius, OR 97113-7109	2454 S Alpine St	Cornelius	OR	97113-7109	Cornelius Greenich Village
R2063683	Maria Lara	2440 N Fremont St Cornelius, OR 97113	2440 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2440 N Fremont St Cornelius, OR 97113-7384	2440 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063772	Constance & Samuel Rinehold	2431 N Fremont St Cornelius, OR 97113	2431 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2431 N Fremont St Cornelius, OR 97113-7384	2431 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079319	Kenneth Long & Serena Habib	2428 S Alpine St Cornelius, OR 97113	2428 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2428 S Alpine St Cornelius, OR 97113-7109	2428 S Alpine St	Cornelius	OR	97113-7109	Cornelius Greenich Village
R2079320	Richard Smith	2416 S Alpine St Cornelius, OR 97113	2416 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2416 S Alpine St Cornelius, OR 97113-7109	2416 S Alpine St	Cornelius	OR	97113-7109	Cornelius Greenich Village
R2063684	Nicholas Vandenbrink	2414 N Fremont St Cornelius, OR 97113	2414 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2414 N Fremont St Cornelius, OR 97113-7384	2414 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063773	Marisela Coria & Samuel Juarez-Zamudio	2405 N Fremont St Cornelius, OR 97113	2405 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2405 N Fremont St Cornelius, OR 97113-7384	2405 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079321	Maria Ortiz & Jesus Lopez	2398 S Alpine St Cornelius, OR 97113	2398 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2398 S Alpine St Cornelius, OR 97113-7120	2398 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2063685	Juan Guzman	2386 N Fremont St Cornelius, OR 97113	2386 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2386 N Fremont St Cornelius, OR 97113-7384	2386 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063774	David & Melanie Johnston	2379 N Fremont St Cornelius, OR 97113	2379 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2379 N Fremont St Cornelius, OR 97113-7384	2379 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063686	Magdalena & Rodrigo Soto	2364 N Fremont St Cornelius, OR 97113	2364 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2364 N Fremont St Cornelius, OR 97113-7384	2364 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079324	Michael Williams	2362 S Alpine St Cornelius, OR 97113	2362 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2362 S Alpine St Cornelius, OR 97113-7120	2362 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2063775	Kimberly & Larry Torris	2357 N Fremont St Cornelius, OR 97113	2357 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2357 N Fremont St Cornelius, OR 97113-7384	2357 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079325	Laura Gutierrez & Isidoro Rodriguez	2350 S Alpine St Cornelius, OR 97113	2350 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2350 S Alpine St Cornelius, OR 97113-7120	2350 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2079326	Lisa & Terry North	2348 S Alpine St Cornelius, OR 97113	2348 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2348 S Alpine St Cornelius, OR 97113-7120	2348 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2063687	Alicia & Ronald Twitchell	2342 N Fremont St Cornelius, OR 97113	2342 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2342 N Fremont St Cornelius, OR 97113-7384	2342 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079328	Raul Flores-Aguirre	2336 S Alpine St Cornelius, OR 97113	2336 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2336 S Alpine St Cornelius, OR 97113-7120	2336 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2063776	Amanda Miller	2335 N Fremont St Cornelius, OR 97113	2335 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2335 N Fremont St Cornelius, OR 97113-7384	2335 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063688	Jose & Leticia Velasquez	2328 N Fremont St Cornelius, OR 97113	2328 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2328 N Fremont St Cornelius, OR 97113-7384	2328 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079329	Maria Caldaron & Jose Rodriguez	2324 S Alpine St Cornelius, OR 97113	2324 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2324 S Alpine St Cornelius, OR 97113-7120	2324 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2079330	Darlene & Richard Penland	2312 S Alpine St Cornelius, OR 97113	2312 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2312 S Alpine St Cornelius, OR 97113-7120	2312 S Alpine St	Cornelius	OR	97113-7120	Cornelius Greenich Village
R2063777	Amy Manley	2311 N Fremont St Cornelius, OR 97113	2311 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2311 N Fremont St Cornelius, OR 97113-7384	2311 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R1244503	Paul & Siobhan Olney	2300 S Alpine St Cornelius, OR 97113	2300 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2300 S Alpine St Cornelius, OR 97113-7300	2300 S Alpine St	Cornelius	OR	97113-7300	Tara No.2
R2063778	Caitlan Kuhn	2287 N Fremont St Cornelius, OR 97113	2287 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2287 N Fremont St Cornelius, OR 97113-7384	2287 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063780	Jaime & Gertrudix Alvarez	2249 N Fremont St Cornelius, OR 97113	2249 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2249 N Fremont St Cornelius, OR 97113-7384	2249 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2079323	Leticia Salinas	2374 S Alpine St Cornelius, OR 97113	2374 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	2232 S Alpine St Cornelius, OR 97113-7330	2232 S Alpine St	Cornelius	OR	97113-7330	Cornelius Greenich Village
R2063692	Kathleen Denham	2226 N Fremont St Cornelius, OR 97113	2226 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2226 N Fremont St Cornelius, OR 97113-7384	2226 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063781	Jesus & Karen Amezcua	2213 N Fremont St Cornelius, OR 97113	2213 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2213 N Fremont St Cornelius, OR 97113-7384	2213 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063693	Aimee & Jonathan Klum	2204 N Fremont St Cornelius, OR 97113	2204 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2204 N Fremont St Cornelius, OR 97113-7384	2204 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063782	Rani Matti	2195 N Fremont St Cornelius, OR 97113	2195 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2195 N Fremont St Cornelius, OR 97113-7384	2195 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063694	Donna Shaw	2182 N Fremont St Cornelius, OR 97113	2182 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2182 N Fremont St Cornelius, OR 97113-7384	2182 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063783	Angelina Andres & Felipe Lucas	2173 N Fremont St Cornelius, OR 97113	2173 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2173 N Fremont St Cornelius, OR 97113-7384	2173 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063783	Angelina Andres & Felipe Lucas	2173 N Fremont St Cornelius, OR 97113	2173 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2173 N Fremont St Cornelius, OR 97113-7384	2173 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063695	Jose Amezcua	2134 N Fremont St Cornelius, OR 97113	2134 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2134 N Fremont St Cornelius, OR 97113-7384	2134 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063784	Connie & Michael Mccord	2125 N Fremont St Cornelius, OR 97113	2125 N Fremont St	Cornelius	OR	97113		Washington	2125 N Fremont St Cornelius, OR 97113-7384	2125 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063785	Peggy & Richard Stark	2107 N Fremont St Cornelius, OR 97113	2107 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2107 N Fremont St Cornelius, OR 97113-7384	2107 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063786	Ernesto Sanchez & Luz Verduzco	2099 N Fremont St Cornelius, OR 97113	2099 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2099 N Fremont St Cornelius, OR 97113-7384	2099 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063787	Mildred Mcdonald	2083 N Fremont St Cornelius, OR 97113	2083 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2083 N Fremont St Cornelius, OR 97113-7384	2083 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063787	Mildred Mcdonald	2083 N Fremont St Cornelius, OR 97113	2083 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2083 N Fremont St Cornelius, OR 97113-7384	2083 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063803	Alma Guitron & Cesar Ponce	2076 N Fremont St Cornelius, OR 97113	2076 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2076 N Fremont St Cornelius, OR 97113-7384	2076 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063788	Marcos Barragan	2071 N Fremont St Cornelius, OR 97113	2071 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2071 N Fremont St Cornelius, OR 97113-7384	2071 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063789	Jesus Gonzalez	2059 N Fremont St Cornelius, OR 97113	2059 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2059 N Fremont St Cornelius, OR 97113-7384	2059 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063802	Brian Lertkantitham & Victoria Trempala	2052 N Fremont St Cornelius, OR 97113	2052 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2052 N Fremont St Cornelius, OR 97113-7384	2052 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063801	Dean Nelson	2018 N Fremont St Cornelius, OR 97113	2018 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2018 N Fremont St Cornelius, OR 97113-7384	2018 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063790	Priscilla Betancourt	2015 N Fremont St Cornelius, OR 97113	2015 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2015 N Fremont St Cornelius, OR 97113-7384	2015 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063791	Maria Loza	2006 N Fremont St Cornelius, OR 97113	2006 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	2006 N Fremont St Cornelius, OR 97113-7384	2006 N Fremont St	Cornelius	OR	97113-7384	Council Creek Estates
R2063779	Julie Burgess	2265 N Fremont St Cornelius, OR 97113	2265 N Fremont St	Cornelius	OR	97113	Cornelius	Washington	1808 201st St Ocean Park, WA 98640-3001	1808 201st St	Ocean Park	WA	98640-3001	Council Creek Estates
R402665	Powell Street Commercial Rental Llc	2355 Baseline St Cornelius, OR 97113	2355 Baseline St	Cornelius	OR	97113	Cornelius	Washington	16331 NW Avamere Ct Portland, OR 97229-8830	16331 NW Avamere Ct	Portland	OR	97229-8830	
R1437555	Shalimar Properties Inc	2245 Baseline St Cornelius, OR 97113	2245 Baseline St	Cornelius	OR	97113	Cornelius	Washington	16331 NW Avamere Ct Portland, OR 97229-8830	16331 NW Avamere Ct	Portland	OR	97229-8830	
R2190615	Bk2200 Venture Llc	OR			OR		Cornelius	Washington	16255 Ventura Blvd #700, Encino, CA 91436-2311	16255 Ventura Blvd #700	Encino	CA	91436-2311	2015-006 partition plat
R2079318	G & K Investment Properties Llc	2432 S Alpine St Cornelius, OR 97113	2432 S Alpine St	Cornelius	OR	97113	Cornelius	Washington	160 NW 336th Ave Hillsboro, OR 97124-3630	160 NW 336th Ave	Hillsboro	OR	97124-3630	Cornelius Greenich Village
R403343	Don & Mayme Sohn	2223 Baseline St Cornelius, OR 97113	2223 Baseline St	Cornelius	OR	97113	Cornelius	Washington	15303 SE Rivercrest Dr Vancouver, WA 98683-5352	15303 SE Rivercrest Dr	Vancouver	WA	98683-5352	
R2063988	Cornelius City Of	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	1355 N Barlow St Cornelius, OR 97113-8912	1355 N Barlow St	Cornelius	OR	97113-8912	Council Creek Estates
R2100674	Cornelius City Of	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	1355 N Barlow St Cornelius, OR 97113-8912	1355 N Barlow St	Cornelius	OR	97113-8912	
R2100675	Cornelius City Of	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR			Washington	1355 N Barlow St Cornelius, OR 97113-8912	1355 N Barlow St	Cornelius	OR	97113-8912	
R2100676	Cornelius City Of	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	1355 N Barlow St Cornelius, OR 97113-8912	1355 N Barlow St	Cornelius	OR	97113-8912	

R2063990	Cornelius City Of	Ns #Ns Ns, Cornelius, OR	Ns #Ns Ns	Cornelius	OR		Cornelius	Washington	1355 N Barlow St Cornelius, OR 97113-8912	1355 N Barlow St	Cornelius	OR	97113-8912	Council Creek Estates
R755463	Portland General Electric Co	350 N 19th Ave Cornelius, OR 97113	350 N 19th Ave	Cornelius	OR	97113	Cornelius	Washington	121 SW Salmon St Portland, OR 97204-2908	121 SW Salmon St	Portland	OR	97204-2908	
R1304939	Fred Meyer Inc	2200 Baseline St Cornelius, OR 97113	2200 Baseline St	Cornelius	OR	97113	Cornelius	Washington	1014 Vine St #7, Cincinnati, OH 45202-1141	1014 Vine St #7	Cincinnati	OH	45202-1141	Partition 2015-006

Cornelius Multifamily

Proposed Apartments and Live-Work

Cornelius Neighborhood Meeting – December 7, 2021 (via ZOOM)

Baseline Street and Davis Road
Cornelius, Oregon

Calida Residential LLC

The Calida Group / Calida Residential LLC

- The Calida Group was Founded in 2007 as a Real Estate Development & Investment Group
  - Privately Owned

- Multifamily and Mixed-Use Specialist
  - Urban and Suburban Regions in the Western United States

- Company Headquarters are in Las Vegas, NV
  - Offices in Los Angeles, CA & Kirkland, WA

- Experienced Team
  - Key Personnel have Built Multifamily Projects across 26 Markets
  - 16,000+ Units – Developed or Acquired

Douglas Eisner and Eric Cohen – Founders
Bill Hardt – Pacific Northwest Development Partner
Jared Weinstock – Chief Operating Officer & General Counsel
Josh Nelson – Senior Vice President of Development

Key Personnel Experience Includes Projects across the United States
Current Active Markets include:
- Washington / Oregon / California / Idaho / Nevada / Utah

Project – Overview

- Calida Residential LLC is the development company of this proposed 324 Unit Apartment Complex and 22 Unit Live/Work Townhomes
  - Total of 346 Units
- These Buildings are Three-story Garden Style Walk-up Apartments and Three-story Live/Work Townhomes with a Commercial/Work area on the Ground Floor and attached Living on the Upper Two Floors
- A Few Resident Amenities include:
  - Clubhouse
  - Indoor Mail Room
  - Gym with Weights / Cardio / Yoga or Class Area
  - Gathering and Conference Space
  - Swimming Pool and Hot Tub w/ Exterior Lounge Area
  - Sport Courts
  - Outdoor Grills and Picnic Areas
  - Dog Park

Existing Site

Property Information

- 15.48 Acres
- Zoned GMU
- Multifamily / Mixed-Use / Commercial are All Approved Uses

Proposed Site Plan

1 ARCHITECTURAL CONCEPT SITE PLAN

UNIT MIX MATRIX

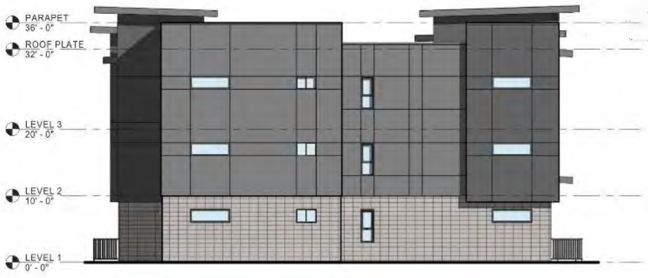
UNIT TYPE	AREA (SF)	QTY	%	TOTAL AREA (SF)	REQ. PARKING RATIO	PARKING REQ.
STUDIO	576.0 SF	54	15%	31,104 SF	1.25	67.50
1 BED	708.0 SF	111	30%	78,588 SF	1.25	138.75
2 BED	1080.0 SF	135	37%	145,800 SF	1.5	202.50
LIVE/ WORK - WORK AREA	768.0 SF	22	6%	16,896 SF	0	0.00
LIVE/ WORK - 2 BED LIVING AREA	1536.0 SF	22	6%	33,792 SF	1.5	33.00
3 BED	1368.0 SF	24	7%	32,832 SF	1.75	42.00
		368		339,012 SF		483.75

PARKING PROVIDED

PARKING STALL TYPE	QTY PROVIDED
LIVE/ WORK PARKING	
ADA COVERED	2
COMPACT	13
COMPACT COVERED	7
PARALLEL STREET	7
STANDARD COVERED	12
	41
RESIDENT	
ADA	6
ADA COVERED	5
ADA FUTURE TENANT	1
COMPACT	43
COMPACT COVERED	76
PARALLEL STREET	11
STANDARD	63
STANDARD COVERED	261
STANDARD FUTURE TENANT	4
STANDARD MANAGEMENT	6
	476
Grand total	517

Proposed Elevations

① NORTH ELEVATION
0' 2' 4' 8' 1/8" = 1'-0" @ FULL SIZE



② EAST ELEVATION
0' 2' 4' 8' 1/8" = 1'-0" @ FULL SIZE

③ SOUTH ELEVATION
0' 2' 4' 8' 1/8" = 1'-0" @ FULL SIZE

④ WEST ELEVATION
0' 2' 4' 8' 1/8" = 1'-0" @ FULL SIZE

Cornelius Multi-Family // Calida Residential, LLC

CONCEPTUAL ELEVATION - RESIDENTIAL BUILDING B

BLRB architects

Proposed Elevations

1 NORTH ELEVATION
1" = 10'-0" @ FULL SIZE
0' 2' 4' 8'

2 EAST ELEVATION
1" = 10'-0" @ FULL SIZE
0' 2' 4' 8'

3 WEST ELEVATION
1" = 10'-0" @ FULL SIZE
0' 2' 4' 8'

4 SOUTH ELEVATION
1" = 10'-0" @ FULL SIZE
0' 2' 4' 8'

Cornelius Multi-Family // Calida Residential, LLC

CONCEPTUAL ELEVATION - LIVE WORK BUILDING D

BLRB architects

Proposed Perspective Images

NORTHWEST PERSPECTIVE

NORTHEAST PERSPECTIVE

SOUTHWEST PERSPECTIVE

SOUTHEAST PERSPECTIVE

①EXTERIOR RENDERINGS
N.T.S.

Cornelius Multi-Family // Calida Residential, LLC

CONCEPTUAL RENDERINGS - RESIDENTIAL BUILDING B

BLRB architects

PRESUBMISSION MEETING MINUTES

Cornelius Multifamily

BLRB Project No.: 021091

Meeting Information:

Date:	December 07, 2021	Neighborhood Meeting
Location:	Zoom Meeting	

Attendees:

	Name	Affiliation	Email
x	Bill Hardt	The Calida Group	bhardt@thecalidagroup.com
x	Greg Elmore	e2k Consulting, LLC	greg@e2kconsulting.com
x	Nick Radon	Project Manager - BLRB Architects	nradon@blrb.com
x	Brad Thomas	BLRB Architects	bthomas@blrb.com
x	Alysa Embree	BLRB Architects	aembree@blrb.com
x	Allison Reynolds	Stoel Rives	Allison.Reynolds@Stoel.com
x	Tom Archer	PBS engineering	Tom.Archer@pbsusa.com
x	Maureen White	PBS Engineering	Maureen.White@pbsusa
x	Dean Nelson	Neighbor of project	Dean.Nelson@gmail.com

Discussion Items:

1. Introductions/Project Description

Item	Topic	Discussion
1.1	Introduction of Site and team	Gregory Elmore of E2k land use consulting provided information about the site and developer
1.2	Description of proposed development	Nicholas Radon with BLRB architects introduced the proposed development in greater detail, including proposed number of units, site arrangement, amenities, unit mix, and proposed typical elevations and renderings of the project.

2. Neighborhood Comments

Item	Topic	Discussion
2.1	Wetland	Questions were taken from attendees. Questions touched on potential traffic impacts and expected schedule. Text of questions received in zoom chat can be found in enclosed text file ("meeting_saved_chat.txt"). Answers provided can be found in enclosed meeting video ("video1116296699.mp4").
2.2	Complete Site Plan Application Requirements	One question was received by email after the meeting. This question regarded the existing informal path at the west end of the property. This question and response can be found in the enclosed email conversation ("FW Zoom Link.txt").

Attachments:

2021_12.07-Cornelius NBHD_BLRB2.pptx – *Visual presentation used in meeting*
video1116296699.mp4 – *recording of meeting*
meeting_saved_chat.txt – *chat log from zoom meeting*
FW Zoom link.txt – *Text of email question received*

These minutes are an accurate account of the meeting to the best of my knowledge.

Meeting minutes prepared and interpreted by:

Brad Thomas
Architect
541.330.6506 | Bend
BLRB architects
TACOMA | SPOKANE | PORTLAND | BEND
BLRB.com

```
17:52:54 From  Dean Nelson  to  Everyone:
	Question about traffic
17:53:02 From  Dean Nelson  to  Everyone:
	at Davis and 19th
17:53:19 From  Dean Nelson  to  Everyone:
	Will probably be a lot mor congested
17:54:52 From  Dean Nelson  to  Everyone:
	Thanks
17:55:56 From  Dean Nelson  to  Everyone:
	When d you hope / expect to start?
17:56:53 From  Dean Nelson  to  Everyone:
	Thank
17:56:56 From  Dean Nelson  to  Everyone:
	you
17:57:29 From  Dean Nelson  to  Everyone:
	Sounds good thanks again
```

From:	Gregory Elmore
Sent:	Wednesday, December 8, 2021 8:48 AM
To:	Nicholas Radon; Brad Thomas; Bill Hardt; Reynolds, Allison J.
Cc:	Darcy Koenig
Subject:	FW: Zoom link

This email came in last night as well. We should add it to the list of comments.

Greg Elmore | Partner
e2k Consulting, LLC
LAND USE + ENTITLEMENT + PROJECT COORDINATION
m. 503.507.5320
greg@e2kconsulting.com
NEW WEBSITE www.e2kconsultingllc.com

From: Gregory Elmore <greg@e2kconsulting.com>
Sent: Tuesday, December 7, 2021 6:49 PM
To: Dean Nelson <dean.nelson@gmail.com>
Subject: RE: Zoom link

Good suggestion on the link.

Yes, the path, or a path area, will remain. There is a "green space/park" that is planned between the two developments.

Have a good night and Happy Holidays to you and yours.

Greg Elmore | Partner
e2k Consulting
Land Use + Entitlement + Project Coordination
503.507.5320
www.e2kconsultingllc.com

Please excuse any grammar or spelling mistakes. This email was sent via cell phone.

-------- Original message --------
From: Dean Nelson <dean.nelson@gmail.com>
Date: 12/7/21 6:41 PM (GMT-08:00)
To: Gregory Elmore <greg@e2kconsulting.com>
Subject: Re: Zoom link

No problem. Thanks for answering my questions during the call. A quick suggestion if you need to send out letters like this again with really long Zoom links - use a URL shortener website like bit.ly so there's less for people to type in. :)

One last question, you might not know the answer but it's worth an ask. On the northwest side of the development, right between your development and the other development to the west, there's currently a walking path that goes through the field. My family, and many in our neighborhood, use that path often. Do you know if there will still be a path between the developments once they're finished? I don't imagine your buildings and the other development's buildings will be butting up against each other.

Thanks,
Dean

On Tue, Dec 7, 2021, 6:22 PM Gregory Elmore <greg@e2kconsulting.com> wrote:

> Sorry Dean. Just saw this. Glad you could join us.
>
> Thank you.
>
> Greg Elmore | Partner
> e2k Consulting
> Land Use + Entitlement + Project Coordination
> 503.507.5320
> www.e2kconsultingllc.com
>
> Please excuse any grammar or spelling mistakes. This email was sent via cell phone.
>
> -------- Original message --------
> From: Dean Nelson <dean.nelson@gmail.com>
> Date: 12/7/21 5:33 PM (GMT-08:00)
> To: Gregory Elmore <greg@e2kconsulting.com>
> Subject: Zoom link
>
> I tried joining the meeting for the new development in Cornelius OR by typing the link from the notice, but I must not be typing it correctly. Would you please send the link?
>
> Thanks,
> Dean Nelson

December 6, 2021

Barbara Fryer
Community Development Director
City of Cornelius

RE: Proposed Davis Street Multi-Family Development at 2300 E Baseline Street, Cornelius, OR

Dear Ms. Fryer,

I am the owner of property at 401 North 26th Avenue, adjacent to proposed multi-family development project at 2300 E Baseline Street. I am writing this letter to express support for the Davis Street project.

I believe that this project will benefit the area, providing much needed multi-family units. Additionally, the project's inclusion of live/work housing provides more housing variability and meets with the recent zoning changes in the Gateway Mixed Use zone. The proximity of the project to Baseline Road mitigates traffic impacts. In addition, the proposed housing units will benefit by their location near the Fred Meyer store. We are strongly in favor of this project and hope the city will embrace this development.

Best Regards,

R Michael House
401 North 26th Ave.

Clean Water Services

March 30, 2022

BILL HARDT
THE CALIDA GROUP
5000 CARILLON POINT, STE 400
KIRKLAND, WA 98033
(425) 576-4041

RE: **Multi-Family Residential Development at 2300 E Baseline Street, Cornelius.**
CWS file 21-003156 (Tax map 1N334CD Tax lot 00100, 06700, 00200)

Clean Water Services has received your Sensitive Area Certification for the above referenced site. District staff has reviewed the submitted materials including site conditions and the description of your project. If a concurrence letter from Oregon Department of State Lands (DSL) documents a non-jurisdictional wetland onsite, then staff concurs that the above referenced project will not significantly impact water quality. In light of this result, this document will serve as your Service Provider letter as required by Resolution and Order 19-5, Section 3.02.1, as amended by Resolution and Order 19-22. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

Prior to issuance of development or construction permits, a concurrence letter from DSL, documenting the jurisdictional status of the onsite artificial wetland, is required. If the concurrence determines a jurisdictional onsite wetland, updated documentation and amendment to this Service Provider Letter will be required.

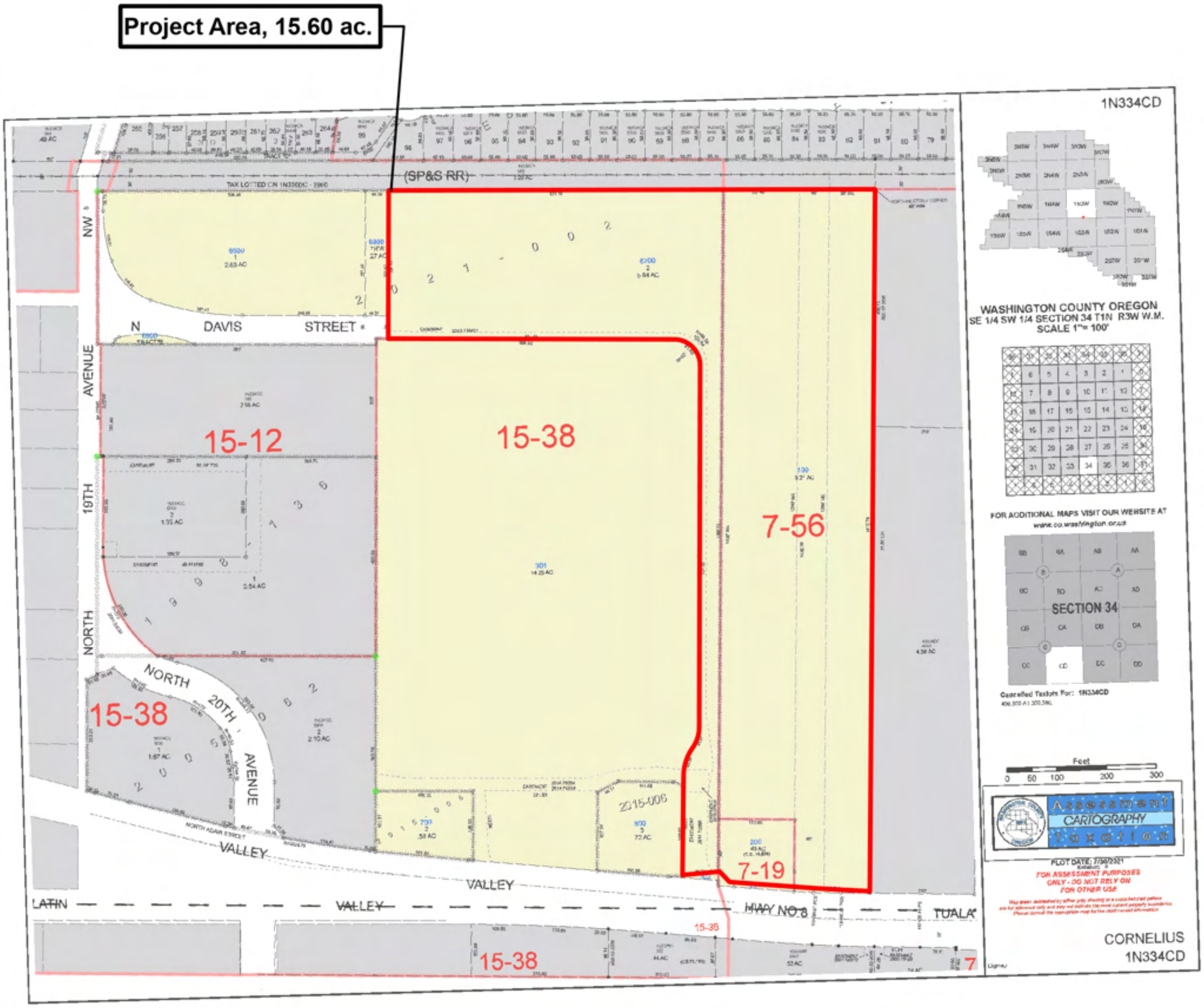
This letter does NOT eliminate the need to protect Sensitive Areas if they are subsequently identified on your site.

Sincerely,

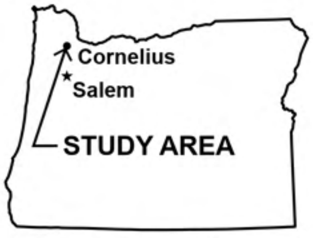
Lindsey Obermiller

Lindsey Obermiller
Environmental Plan Review

Attachments (7)



SOURCE: ORMAP (2022).



OREGON

COLOR COPY

CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 1 OF 7

SCALE: 1" = 340' (8.5X11 SHEET)

0' 170' 340' 680'

PREPARED FOR: THE CALIDA GROUP.

PBS

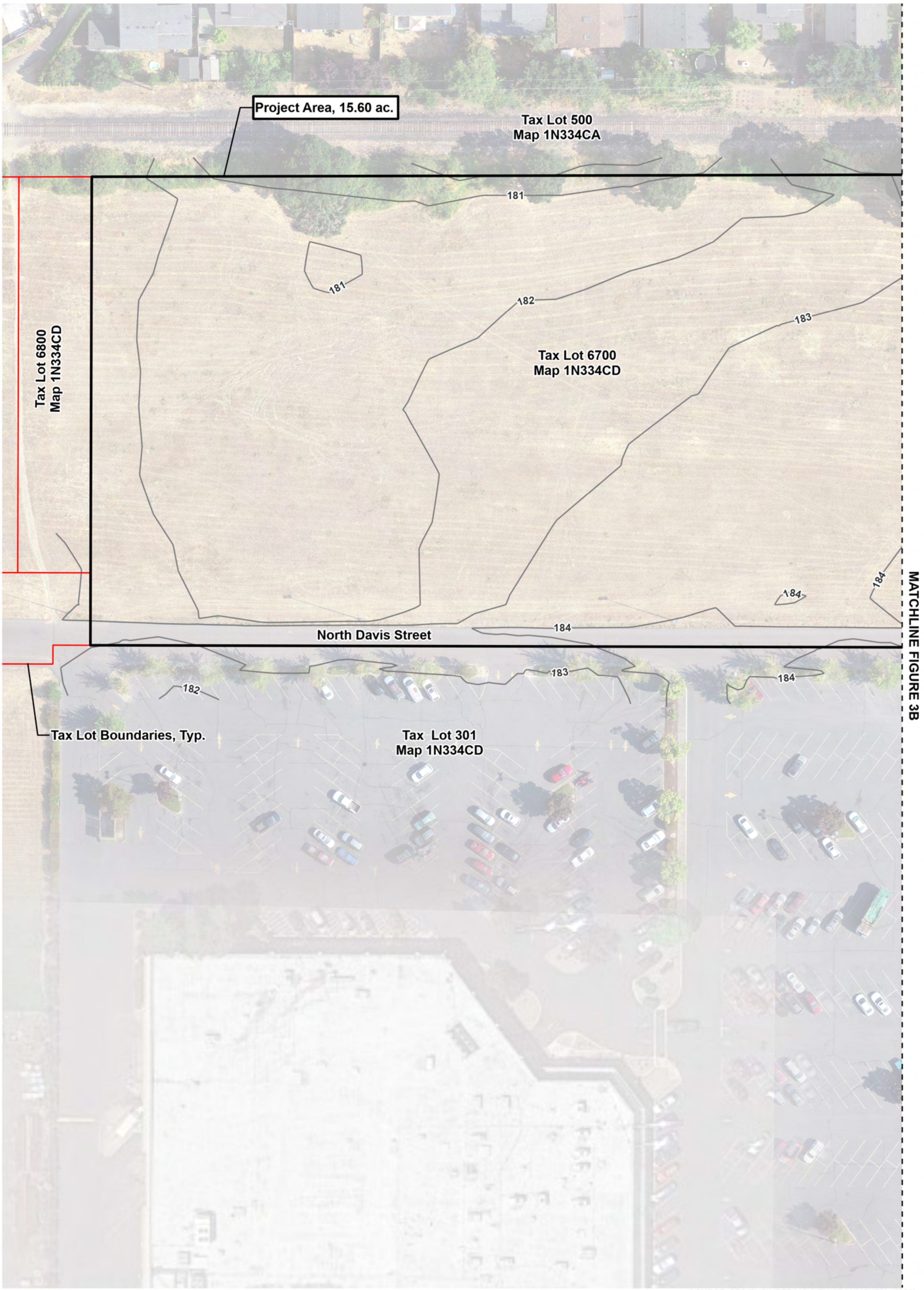
TAX LOT MAP 1N334CD

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000

FIGURE
2

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:43 PM



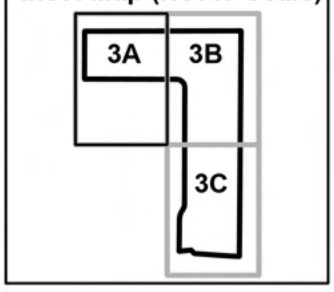
SOURCE: PBS ENGINEERING & ENVIRONMENTAL (2021).

Legend

- Plot 1 ◐ Data Plot Locations
- ▶ ① Ground Level Photograph Locations
- ▨ Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 2 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

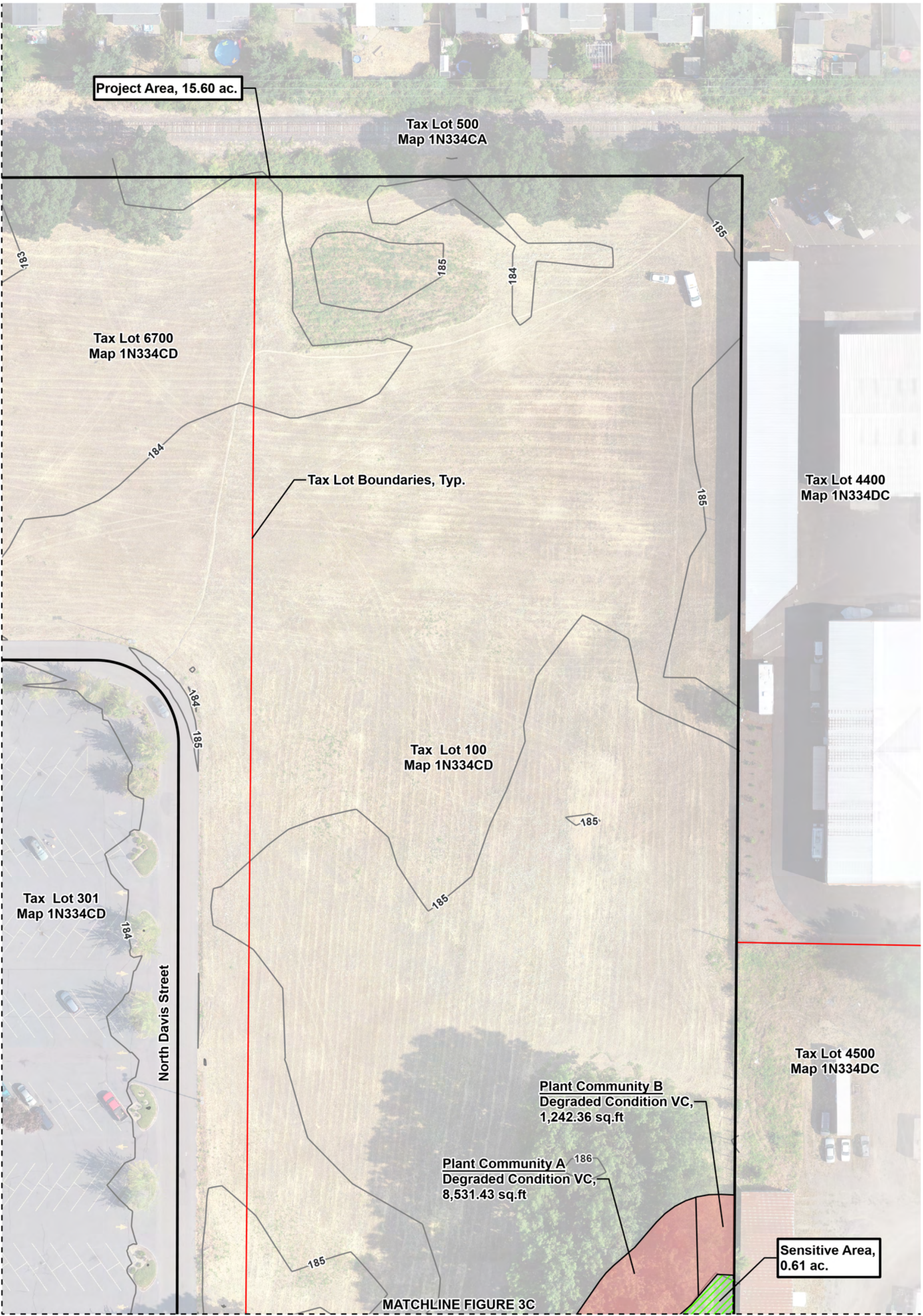
PBS

EXISITING CONDITIONS MAP

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
3A

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:47 PM



SOURCE: PBS ENGINEERING & ENVIRONMENTAL (2021).

Legend

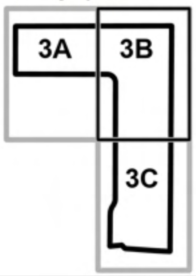
Plot 1 Data Plot Locations

1 Ground Level Photograph Locations

🟩 Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 3 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

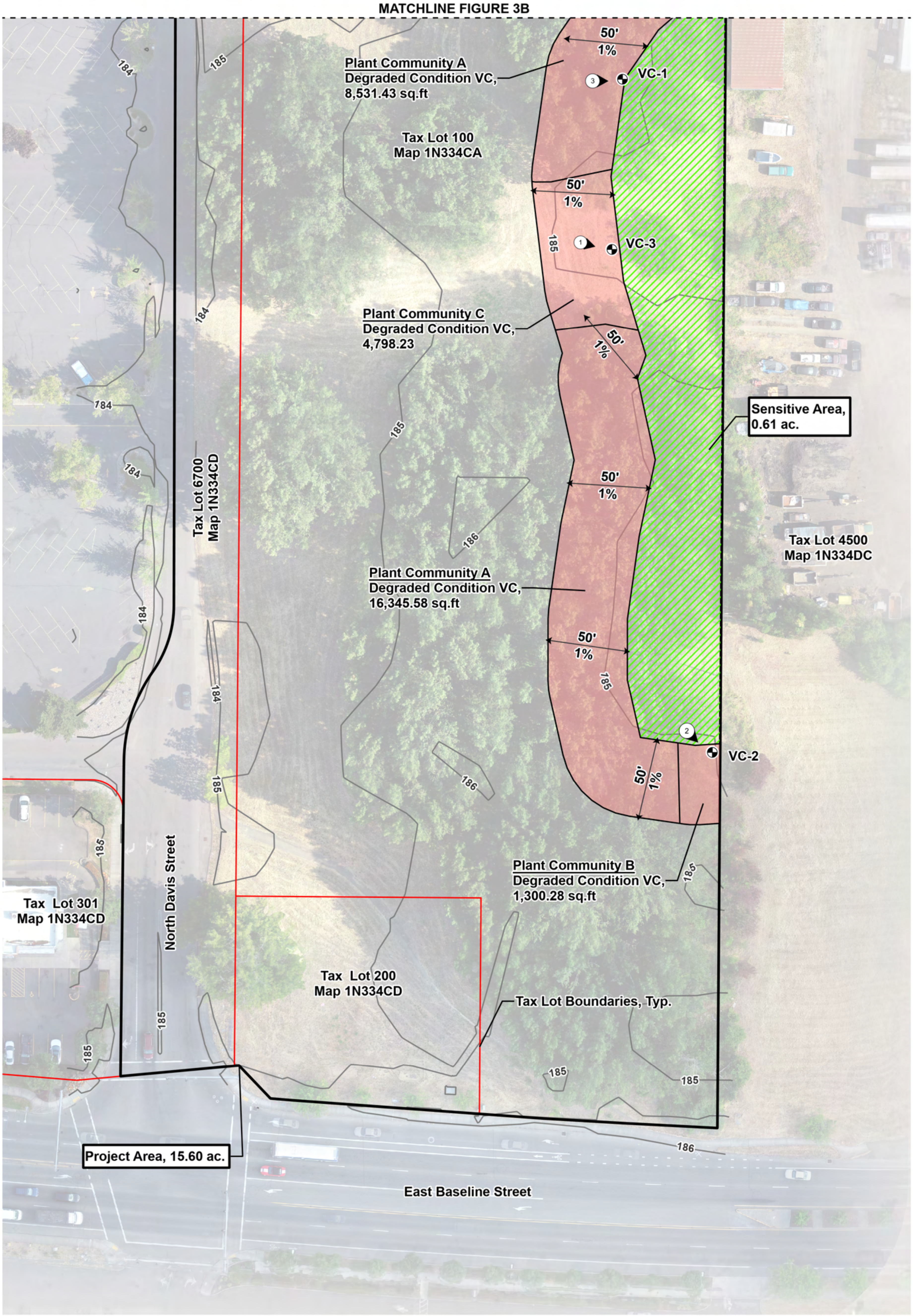
PREPARED FOR: THE CALIDA GROUP.

EXISTING CONDITIONS MAP

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
3B

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:43 PM



SOURCE: PBS ENGINEERING & ENVIRONMENTAL (2021).

Legend

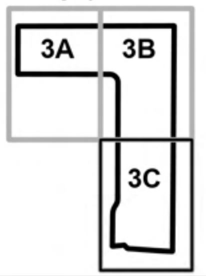
Plot 1 ● Data Plot Locations

① Ground Level Photograph Locations

🟩 Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 4 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

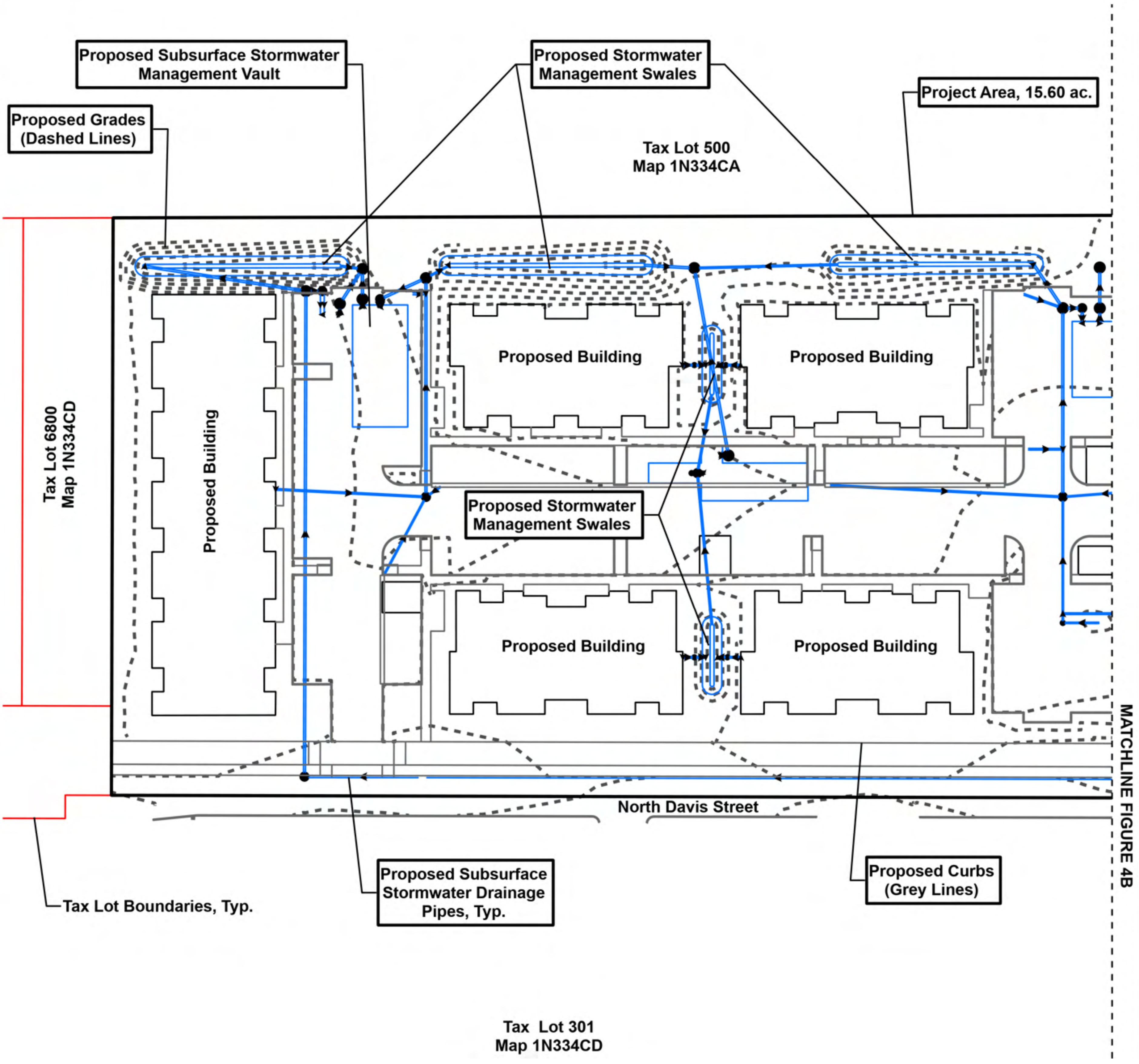
PREPARED FOR: THE CALIDA GROUP.

EXISTING CONDITIONS MAP

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
3C

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:43 PM

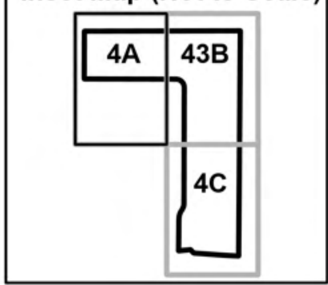


Legend

●	Proposed Stormwater Inlet
▨	Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



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CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 5 OF 7

SOUCE: PBS ENGINEERING AND ENVIRONMENTAL (2021).

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

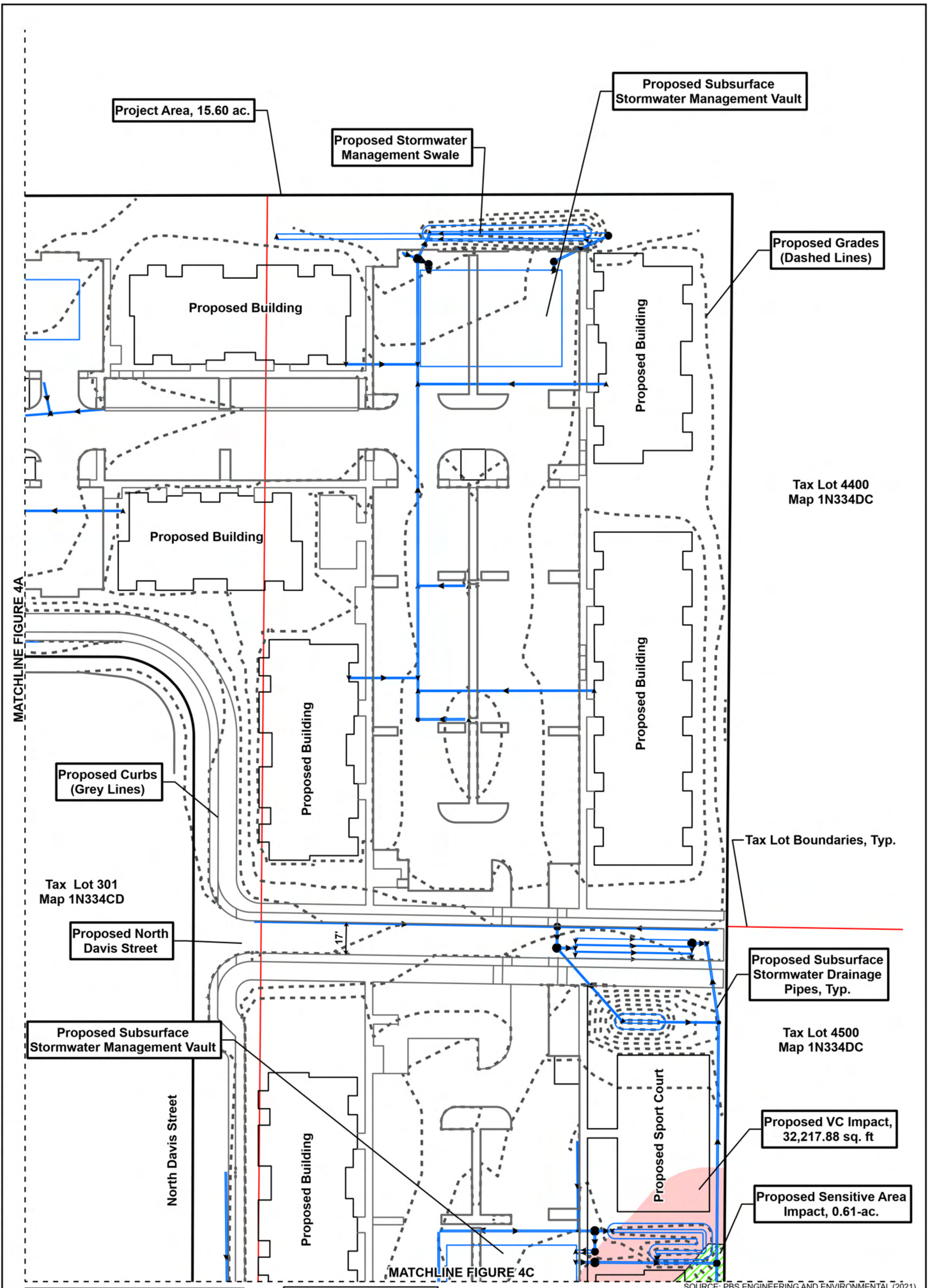
PBS

PROPOSED DEVELOPMENT

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
4A

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:44 PM



SOURCE: PBS ENGINEERING AND ENVIRONMENTAL (2021).

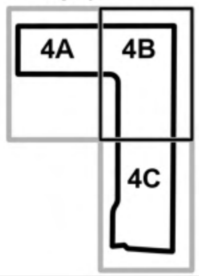
Legend

● Proposed Stormwater Inlet

▨ Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



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CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LD Date 03/30/2022
SPL ATTACHMENT 6 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

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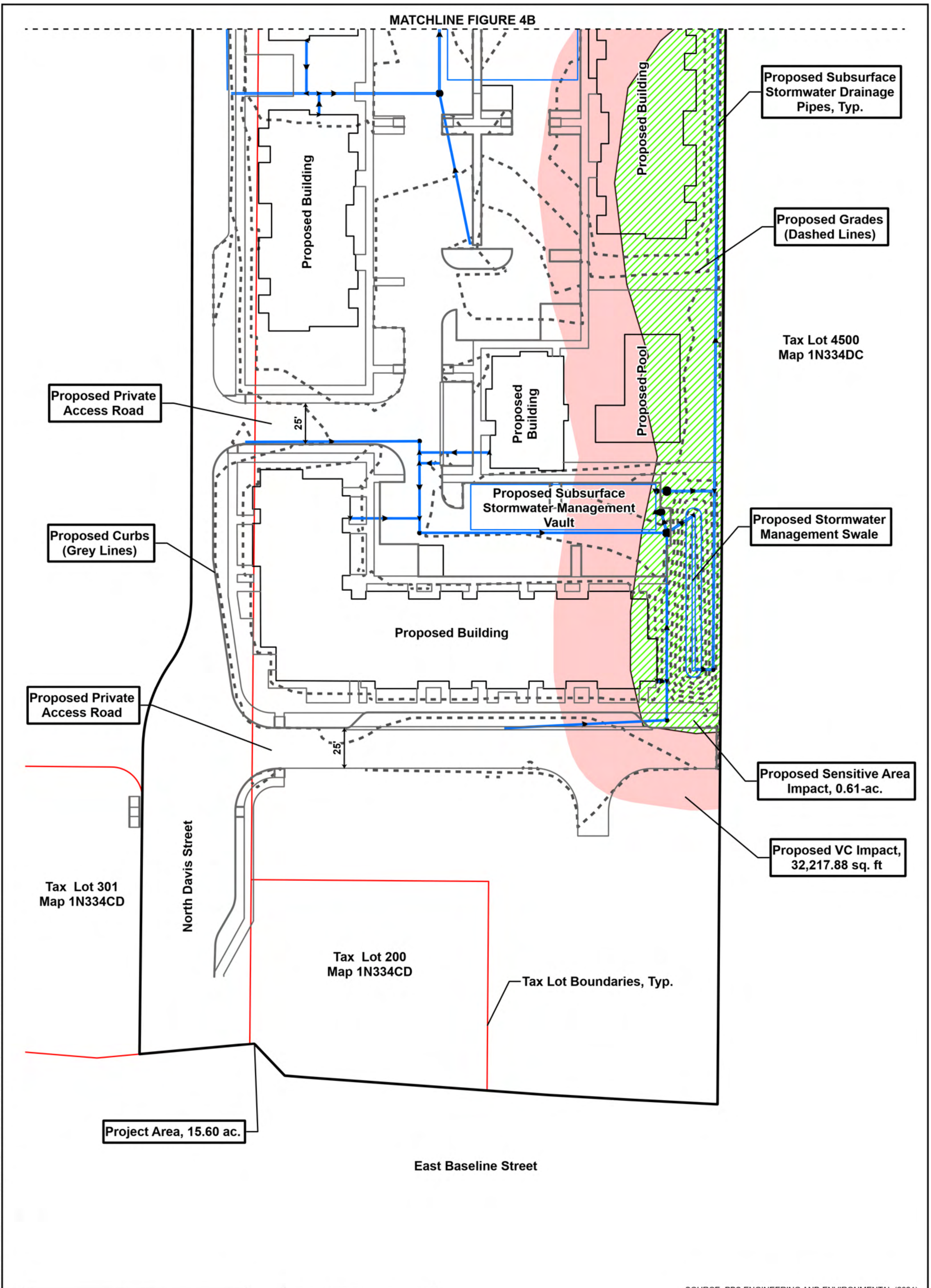
PBS

PROPOSED DEVELOPMENT

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
4B

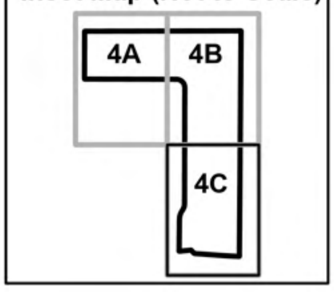


Legend

- ● Proposed Stormwater Inlet
- 🟩 Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



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CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By Date 03/30/2022
SPL ATTACHMENT 7 OF 7

SOURCE: PBS ENGINEERING AND ENVIRONMENTAL (2021).

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

PBS

PROPOSED DEVELOPMENT

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
4C

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Cornelius
Oregon's Family Town

CWS File Number
☐

Sensitive Area Pre-Screening
Site Assessment

Jurisdiction: CITY OF CORNELIUS

Property Information: (*example 1S234AB01400*)
Taxlot ID(s): 100, 200 AND 6700, located at 1N334CD

OR Site Address: 2200 E Baseline Street
City State Zip: Cornelius, Oregon 97113
Nearest Cross Street: N Davis Street

Owner Information:
Name: Bill Hardt
Company: Calida Residential, LLC.
Address: 1077 W Twain Ave, Suite 115
City State Zip: Las Vegas, Nevada 89135
Phone/Fax: 702.947.2000
E-mail: bhardt@thecalidagroup.com

Development Activity: Check all that apply

Addition to Single Family Residence (*rooms, deck, garage*) ☐

Lot Line Adjustment	☐	Minor Land Partition	☐
Residential Condominium	☐	Commercial Condominium	☐
Residential Subdivision	☐	Commercial Subdivision	☐
Single Lot Commercial	☐	Multi Lot Commercial	☐

Other Multi-family residential

Applicant Information:
Name: Bill Hardt
Company: Calida Residential, LLC.
Address: 1077 W Twain Ave, Suite 115
City State Zip: Las Vegas, Nevada 89135
Phone/Fax: 702.947.2000
E-mail: bhardt@thecalidagroup.com

Will the project involve any off-site work: YES ☐ NO ☒ Unknown ☐ **Location and description of off-site work:**

Additional comments or information that may be needed to understand your project: N/A

This application does NOT replace the need for Grading and Erosion Control Permits, Connection Permits, Building Permits, Site Development Permits, DEQ 1200-C Permit or other permits as issued by the Department of Environmental Quality, Department of State Lands and/or Department of the Army COE. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

By signing this form, the Owner or Owner's authorized agent or representative, acknowledges and agrees that employees of The City of Cornelius and Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site. I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Print/Type Name: ______ Print/Type Title: ______

Signature: ______ Date: ______

FOR CITY AND CLEAN WATER SERVICES (CWS) USE ONLY

☒ Sensitive areas potentially exist on site or within 200' of the site. **THE APPLICANT MUST PERFORM A SITE ASSESSMENT PRIOR TO ISSUANCE OF A SERVICE PROVIDER LETTER.** If Sensitive Areas exist on the site or within 200 feet on adjacent properties, a Natural Resources Assessment Report may also be required.

☐ Based on review of the submitted materials and best available information Sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does **NOT** eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by CWS Resolution and Order 07-20, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, State, and federal law.

☐ Based on review of the submitted materials and best available information the above referenced project will not significantly impact the existing or potentially sensitive area(s) found near the site. This Sensitive Area Pre-Screening Site Assessment does **NOT** eliminate the need to evaluate and protect additional water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by CWS Resolution and Order 07-20, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

☐ **This Service Provider Letter is not valid unless ______ CWS approved site plan(s) are attached.**

☐ The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2). NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.

Reviewed By: ______ **Agency:** ______ **Date:** ______

City of Cornelius: 1300 S. Kodiak Circle • Cornelius, Oregon 97113
Phone: (503) 357-3011 • Fax: (503) 357-3424 • www.ci.cornelius.or.us
Revised: March 7, 2018

CWS: 2550 SW Hillsboro Highway • Hillsboro, Oregon 97123
Phone: (503) 681-5100 • Fax: (503) 681-4439 • www.cleanwaterservices.org

Cornelius Multi-Family Preliminary Drainage Report

Cornelius, Oregon

Prepared for:

The Calida Group
5000 Carillon Point, Suite 400
Kirkland, WA 98033

January 07, 2022
PBS Project 74217.000

4412 S CORBETT AVENUE
PORTLAND, OR 97239
503.248.1939 MAIN
866.727.0140 FAX
PBSUSA.COM

Table of Contents

TABLES

FIGURES

APPENDICES

Certificate of Engineer

Cornelius Multi-Family

Preliminary Drainage Report

The technical information and data contained in this report was prepared under the direction and supervision of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

REGISTERED PROFESSIONAL ENGINEER
72882PE
PRELIMINARY
OREGON
JUNE 14, 2007
RICHARD D. BOYLE
EXPIRES: 12/31/2021

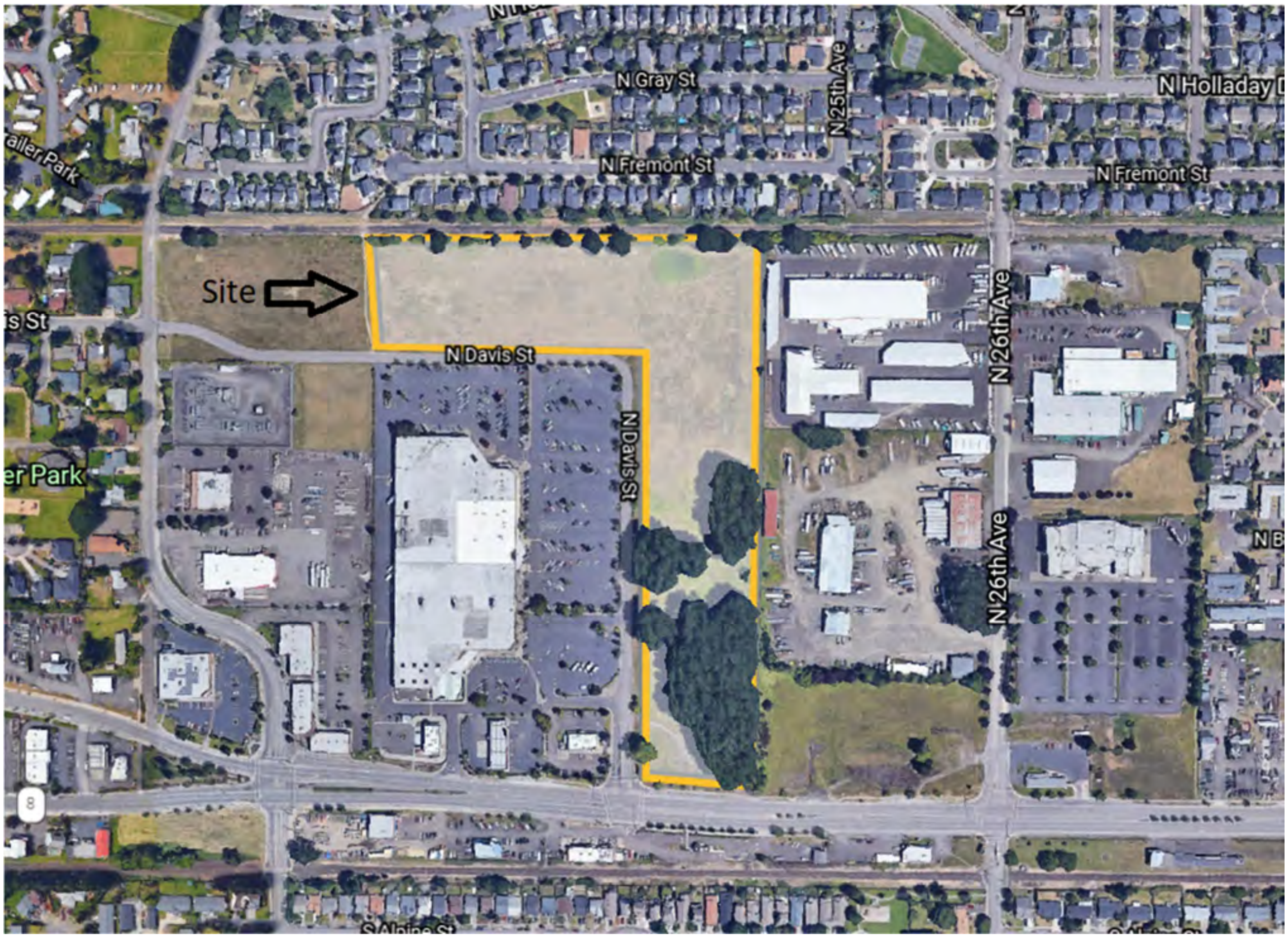
REGISTERED PROFESSIONAL ENGINEER
96351PE
PRELIMINARY
OREGON
SEP. 14, 2021
LAUREN KAHLE
EXPIRES: JUNE 30, 2023

Prepared by: ______________________
Lauren Kahle, P.E.

Reviewed by: ______________________
Richard Boyle, P.E.

Preamble: This Preliminary Drainage Report for Cornelius Multi-Family was completed prior to recent changes to the project site plan that contain a reduction in new impervious area created by the project. As presented, this Preliminary Drainage Report demonstrates compliance with development requirements for water quality treatment and detention in accordance with City of Cornelius and Clean Water Services Standards.

VICINITY MAP



1 EXECUTIVE SUMMARY

The Cornelius Multi-Family property is approximately 15.48 acres located near the corner of N David Street and E Baseline Street in Cornelius, Oregon (See Figure 1 – Vicinity Map). The purpose of this report is to describe the surface water management, stormwater quality, and stormwater quantity facilities that are being proposed as part of the Cornelius Multi-Family development and to show that the design conforms to the requirements of the Clean Water Services Design & Construction Standards adopted November 12, 2019.

The nearest surface water body is Council Creek, situated approximately 1,300 feet northwest of the site boundary, which joins Dairy Creek, a tributary to the Tualatin River. As the site is not located within the 100-year flood plain (see Appendix A – Flood Insurance Rate Map (FIRM Map)), flood plain regulations do not apply.

Water quality treatment will be provided with Water Quality Manholes combined with Vegetated Swales for five private basins and one public basin. Non-Structural Flow-Through Planters will be used for two private basins and one public basin. Detention will be achieved using stormwater chambers for one public basin and eight private basins, and by using large diameter pipe for one public basin. Detention has been sized to detain the difference in the pre-development and post-development runoff for the 2, 10, and 25-year return period storms with a 24-hour duration.

2 PROJECT DESCRIPTION

The Cornelius Multi-Family property is approximately 15.48 acres located near the corner of N David Street and E Baseline Street in Cornelius, Oregon (See Figure 1 – Vicinity Map). The purpose of this report is to describe the surface water management, stormwater quality, and stormwater quantity facilities that are being proposed as part of the Cornelius Multi-Family development and to show that the design conforms to the requirements of the Clean Water Services Design & Construction Standards adopted November 12, 2019.

3 EXISTING CONDITIONS

3.1 Topography

The existing property is flat with a slight slope to the northwest of approximately 0.5%. The lowest spot on the site is situated along the northwest corner (See Appendix B – Sheet C100 – Existing Conditions).

3.2 Climate

The site is located approximately 40 miles inland from the Pacific Ocean. There is a gradual change in seasons with defined seasonal characteristics. Average daily temperatures range from 26°F to 93°F. Record temperatures recorded for this region of the state are 3°F and 114°F. Average annual precipitation in this area is 35 inches.

3.3 Site Geology

There are two underlying soil types on the Cornelius Multi-Family property site, as classified by the Natural Resources Conservation Service (NRCS) Soil Survey of Washington County, Oregon. The soil types are identified below in Table 1 (See Appendix C – Soil Map – Washington County area, Oregon).

Soil Type	Hydrologic Group
Aloha Silt Loam	C/D
Quatama Loam	C

Table 1 – Onsite Soil Characteristics

Group C soils have slow infiltration rates at approximately 0.05 to 0.15 inches per hour, where group D soils have very slow infiltration rates at approximately 0.05 or less inches per hour.

3.4 Hydrology

Currently, runoff from the site predominately drains to the northwest.

Curve Number

The factors in determining the curve number (CN) values are hydrologic soil group, ground cover type, hydrologic conditions, and antecedent runoff conditions. The curve number represents the runoff potential from the soil. The existing site is a commercial site and is classified as valley prairie land. The land was previously used for farming. The post-developed curve number of 86 represents open space in poor condition, as shown in Table 2-2a of the TR-55 manual. The associated runoff curve numbers are shown in Table 2 for existing and post-developed conditions (See Appendix D – TR-55 Table 2-2a – Runoff Curve Numbers).

Existing	
Pervious (CN)	74
Post-Developed	
Pervious (CN)	86
Impervious (CN)	98

Table 2 – Curve Numbers – Existing and Post-Developed Conditions

3.5 Time of Concentration

The Time of Concentration (T_c) as described in the National Engineering Handbook – Section 4 (NEH-4) Chapter 15 is defined in two ways; the time for runoff to travel from the furthermost point of the watershed to the point in question, and the time from the end of excess rainfall to the point of inflection on the trailing limb of the unit hydrograph. The NRCS method was used in this analysis.

3.6 Basin Areas

Impervious and pervious surface areas for the site's existing conditions are shown in Table 3. The existing site was analyzed as zero percent impervious.

Existing	sq. ft.	Acres
Impervious Area	0	0.00
Pervious Area	674,309	15.48
Total Existing Basin Area	674,309	15.48

Table 3 – Basin Area – Existing Conditions

4 POST DEVELOPED CONDITIONS

4.1 Hydrology

Runoff from the proposed development will be collected in roof drains and catch basins and routed via the proposed storm conveyance system to the proposed Vegetated Swales and Non-Structural Flow-Through Planters for treatment, and stormwater chambers and large pipe for detention (See Appendix E – Preliminary Basin Delineation Map). Treated runoff from private basins will discharge to a public storm sewer line running along the northern and eastern edge of the property. A separate storm main will be constructed to receive treated discharge coming from the public right-of-way. The storm sewer flows generally northwest and discharges to Council Creek.

4.2 Basin Areas

Impervious and pervious surface areas for the proposed development are shown in Table 4 (See Appendix E – Preliminary Basin Delineation Map).

Basin ID	Pervious (Ac.)	Impervious (Ac.)	Total (Ac.)
Public A1	0.37	0.59	0.96
Public A2	0.11	0.00	0.11
Public A1 + A2	0.47	0.59	1.06
Public B	0.41	0.27	0.68
Private C	0.17	0.36	0.54
Private D	0.06	0.36	0.42
Private E	0.32	1.18	1.49
Private F	0.48	2.24	2.72
Private G	0.86	1.89	2.76
Private H	0.43	1.54	1.98
Private I	0.24	1.02	1.26
Private J	0.00	0.15	0.15

Table 4 – Basin Area – Post-Developed Conditions

5 HYDROLOGIC ANALYSIS DESIGN GUIDELINES

5.1 Design Guidelines

The site is located within the jurisdiction of Clean Water Services. The analysis and design criteria used for stormwater management described in this section follows the Clean Water Services Design & Construction Standards adopted November 12, 2019.

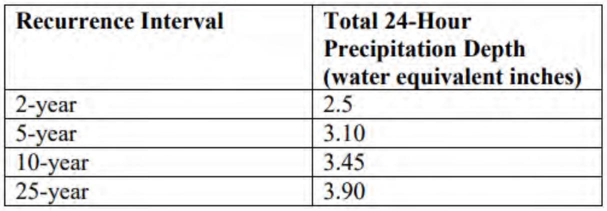
5.2 Hydrograph Method

Naturally occurring rainstorms dissipate over long periods of time. The most effective way of estimating storm rainfall is by using the hydrograph method. The Santa Barbara Urban Hydrograph Method (SBUH) computes a runoff hydrograph by converting the incremental runoff depths into instantaneous hydrographs, and uses a time delay equal to the basin time of concentration.

EPA-SWMM Version 5.1 will be used for our hydrology and hydraulics analysis in the next phase of the project. SWMM is an approved method of analysis by Clean Water Services.

5.3 Design Storm

The design storm to be used within the Clean Water Services jurisdiction for the water quality event is the dry weather storm event totaling 0.36 inches of precipitation falling in 4 hours with an average storm return period of 96 hours. Detention facilities will be sized to detain the difference in the pre-development and post-development runoff for the 2, 10, and 25-year Type 1A, 24-hour events.



Recurrence Interval	Total 24-Hour Precipitation Depth (water equivalent inches)
2-year	2.5
5-year	3.10
10-year	3.45
25-year	3.90

Table 5 – Design Storms

6 HYDRAULIC ANALYSIS AND DESIGN CHARACTERISTICS

6.1 Manning's 'n' Values for Pipes

A Manning's 'n' value of 0.013 was selected to be used for all storm drain pipes. The Manning's 'n' value is 8 percent higher than the recommended Manning's 'n' value for concrete, plastic and ductile iron pipe (n=0.012) in order to account for entrance, exit, junction and bend head losses. An exit loss coefficient between 0.02 and 0.25 will be added into each catch basin and manhole. The value is dependent upon the angle of the pipe leaving each catch basin or manhole. Hydraulic design will be further completed in the next phase of the project.

6.2 EPA-SWMM Hydraulics

EPA-SWMM solves equations throughout the drainage network and includes modeling of backwater effects, flow reversal, surcharging, looped connections and pressure flow. EPA-SWMM will be used for development of construction documents.

6.3 System Capacities

The detention system has been designed to detain the difference between the pre-development and post-development runoff for the 2, 10, and 25-year return period storms of a 24 hour duration. Water quality and detention structures will maintain at least 1 foot of freeboard from top of structure during the 25-year design storm event.

7 WATER QUALITY

7.1 Water Quality Guidelines

The water quality flows are derived from the following formula, per Clean Water Services Design & Construction Standards.

$$\text{Water Quality Flow (cfs)} = \frac{0.36\ (\text{in.}) \times \text{Area (sq. ft.)}}{12\ \left(\frac{\text{in}}{\text{ft}}\right)(4\ \text{hr})\left(60\,\frac{\text{min}}{\text{hr}}\right)(60\,\frac{\text{sec}}{\text{min}})}$$

7.2 Water Quality Facilities

The Cornelius Multi-Family development will create greater than 1000 square feet of impervious surfaces, and as such falls under the requirement to implement permanent water quality approaches to reduce contaminants entering the storm and surface water system per Chapter 4 of the Clean Water Services Design & Construction Standards. Approved approaches to be used to manage water quality at the site include Water Quality Manholes as pretreatment in combination with six Vegetated Swales and three Non-Structural Flow-Through Planters (See Appendix F – Water Quality Manhole Standard Detail). Runoff from one basin (Private Basin J) is currently and will continue to be routed to the neighboring property to the west for water quality treatment.

Vegetated Swales

The Vegetated Swales have been designed following the Clean Water Services Design & Construction Standards and have been sized to treat the water quality storm event. The swales were designed with the following characteristics (See Appendix G – Vegetated Swale Standard Detail):

- Maximum side slopes (H:V) 4:1
- Maximum velocity: 2.0 fps based on 25-year flow
- Maximum water design depth: 0.5 feet
- Minimum freeboard: 1 foot
- Minimum length: 100 feet
- Minimum bottom width: 2 feet
- Minimum hydraulic residence time: 9 minutes
- Channel slope: 0.5% minimum
- Manning ‘n’ value: 0.24

Table 6 shows the characteristics for each swale.

Facility ID	Impervious Area (ac)	Water Quality Flow Rate (cfs)	Velocity (ft/s)	Channel Slope (ft/ft)	Length (ft)	Bottom Width (ft)	Hydraulic Residence Time (min)
Public Swale A	0.59	0.05	0.11	0.005	100	2	16
Private Swale E	1.18	0.11	0.13	0.005	100	2	13
Private Swale F	2.24	0.20	0.17	0.005	100	2	10
Private Swale G	1.89	0.17	0.16	0.005	100	2	11
Private Swale H	1.54	0.14	0.16	0.005	100	2	11
Private Swale I	1.02	0.09	0.13	0.005	100	2	13

Table 6 – Vegetated Swale Characteristics

Non-Structural Flow Through Planter

The Non-Structural Flow Through Planters have been designed following the Clean Water Services Design & Construction Standards and have been sized to treat the water quality storm event. The planters were designed with the following characteristics (See Appendix H – Non-Structural Flow Through Planter Standard Detail):

- Maximum side slopes (H:V) 3:1
- Maximum water design depth: 0.5 feet
- Minimum freeboard: 0.5 feet
- Minimum length: 15 feet
- Minimum bottom width: 2 feet
- Maximum slope: 6%

Table 7 shows the characteristics for each Non-Structural Flow Through Planter.

Facility ID	Impervious Area (ac)	Water Quality Volume (cu. ft.)	Treatment Surface Area (sq. ft.)	Length (ft)	Bottom Width (ft)
Public Planter B	0.27	351.53	42.18	15	2
Private Planter C	0.36	474.37	56.92	15	2
Private Planter D	0.36	470.45	56.45	15	2

Table 7 – Non-Structural Flow-Through Planter Characteristics

8 WATER QUANTITY

8.1 Water Quantity Facilities

The Cornelius Multi-Family development will create greater than 1000 square feet of impervious surfaces, and as such falls under the requirement to perform a Hydromodification Assessment per Chapter 4 of the Clean Water Services Design & Construction Standards. The Reach-Specific Risk Level at this site is low, Development Class is Developed Area, and it falls under Project Size Category C as over 80,000 feet of new impervious area will be constructed, putting the project in Hydromodification Approach Project Category 2. The approved option this project will utilize to address hydromodification is Peak-Flow Matching Detention. The detention has been designed such that the post-development discharge rates from the site will not exceed the pre-development runoff rates for the 2, 10, and 25-year return period storms of a 24 hour duration. Flow splitter manholes split the first flush flow to the water quality treatment facility (See Appendix I – Typical Flow Splitter Detail). Detention will be achieved using stormwater chambers and a large pipe (See Appendix J – Typical Stormwater Chamber Detail). Flow control manholes will be used downstream of detention to release predevelopment rates of discharge (See Appendix K – Flow Control Structure Standard Detail).

8.2 Detention Volumes

The required detention volumes are shown below in Table 8.

Water Quantity Facility	Detention Volume (cu.ft.) 2-year, 24 hr	Detention Volume (cu.ft.) 10-year, 24 hr	Detention Volume (cu.ft.) 25-year, 24 hr
Public A	4,091	5,146	5,612
Public B	2,079	2,729	3,025
Private C	2,386	2,932	3,167
Private D	2,239	2,684	2,870
Private E	7,442	8,999	9,653
Private F	14,052	16,917	18,114
Private G	12,386	15,204	16,414
Private H	9,801	11,865	12,733
Private I	6,444	7,768	8,322
Private J	893	1,055	1,120

Table 8 – Detention Volumes

9 SUMMARY

The water quality and quantity facility designs are in compliance with Clean Water Services Design & Construction Standards adopted November 12, 2019.

The proposed stormwater management system will meet or exceed the stormwater requirements set forth by Clean Water Services.

Figures

Appendix A

Flood Insurance Rate Map (FIRM Map)

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator zone 10. The **horizontal datum** was NAD 83, GRS 80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by the Metro Data Resources Center. This information was compiled from many local sources and includes transportation features, water features, political boundaries, and Public Land Survey System features.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on this map.

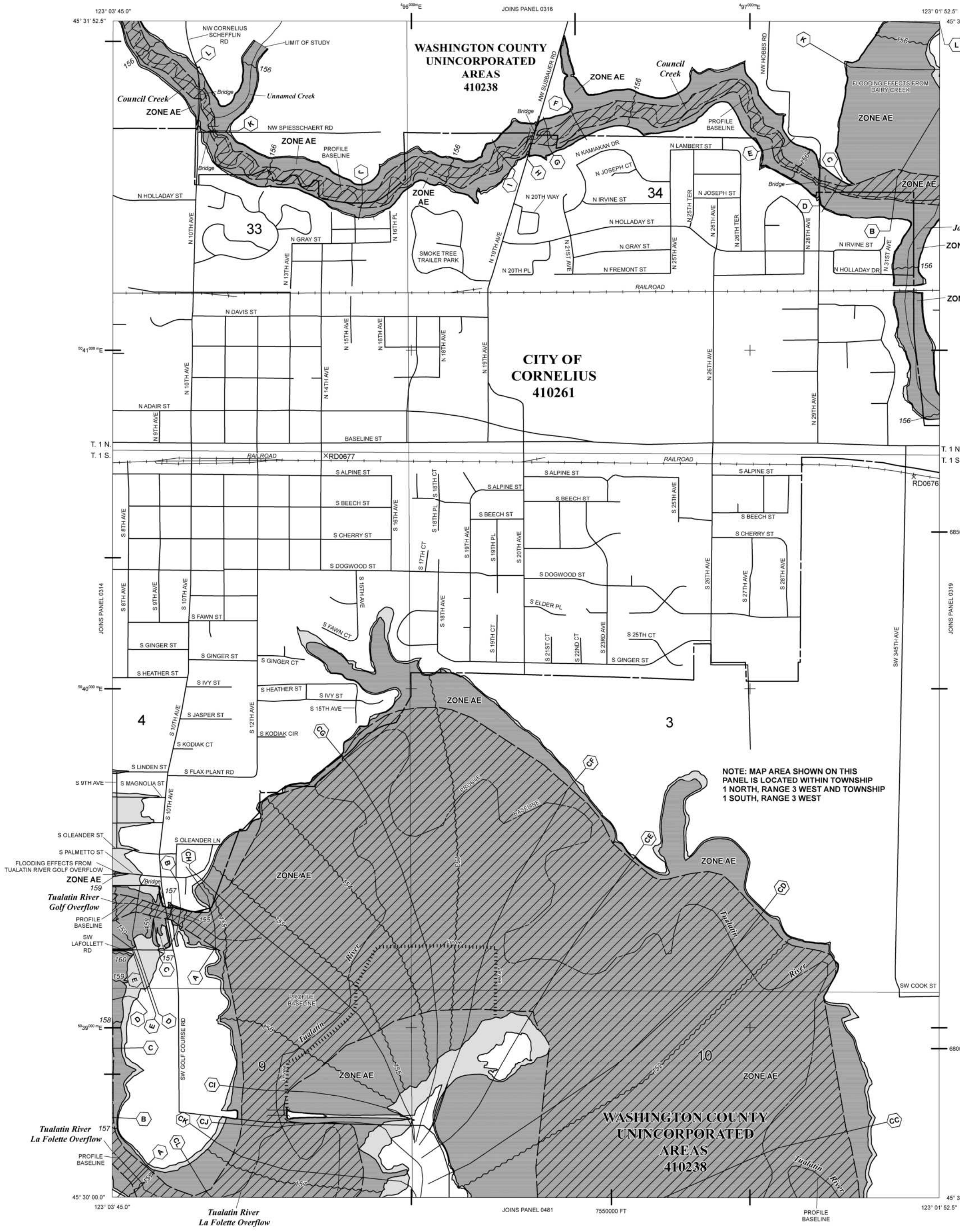
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

The **profile base lines** depicted on this map represent the hydraulic modeling base lines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile base line**, in some cases may deviate significantly from the channel centerline or appear outside the SFHA.

For information on available products associated with this FIRM visit the **FEMA Flood Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

▩	SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance of greater flood event.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

▨	FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

▒	OTHER FLOOD AREAS
ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
☐	OTHER AREAS
ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.
▧	COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS
▧	OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

———	1% annual chance floodplain boundary
———	0.2% annual chance floodplain boundary
— — — —	Floodway boundary
—— —— ——	Zone D boundary
••••••••••••	CBRS and OPA boundary
▬	Boundary dividing Special Flood Hazard Area Zones, and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet *
(EL 978)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Ⓐ——Ⓐ	Cross section line
㉓- - - -㉓	Transect line
97°10'30.5",32°10'30.5"	Geographic coordinates referenced to North American Datum of 1983 (NAD 83)
$^{42}76^{000m}$E	1000-meter Universal Transverse Mercator grid values, zone 10
600000 FT	5000-foot grid ticks: Oregon State Plane coordinate system, North zone (FIPSZONE 3601), Lambert Conformal Conic projection
MG5510 x	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile
⊢-----⊣	Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
⟩═⟨	Road or Railroad Bridge

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
November 4, 2016

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0318E

FIRM
FLOOD INSURANCE RATE MAP
WASHINGTON COUNTY, OREGON
AND INCORPORATED AREAS

PANEL 318 OF 650

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CORNELIUS, CITY OF	410261	0318	E
WASHINGTON COUNTY	410238	0318	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

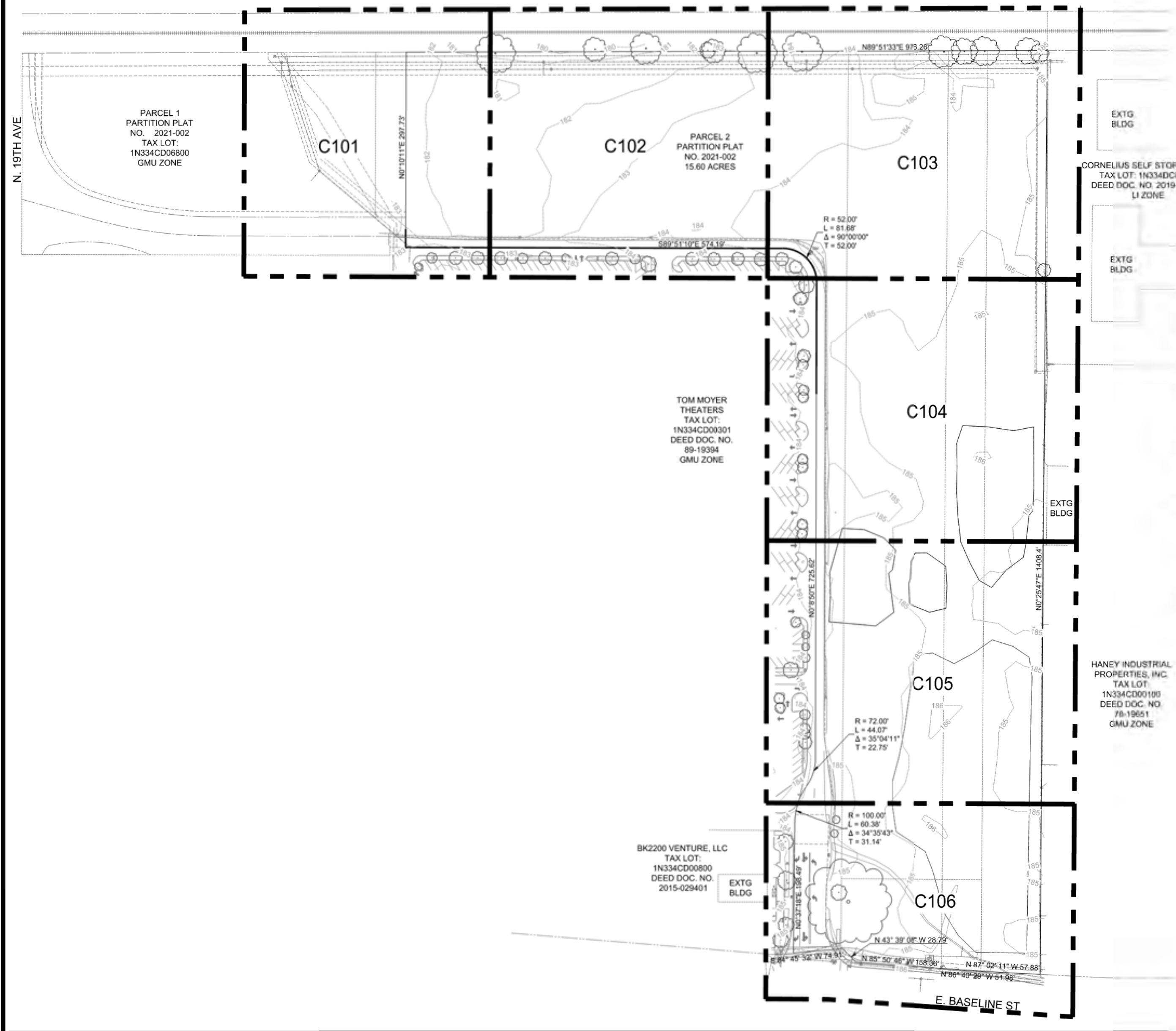
MAP NUMBER
41067C0318E

EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

Appendix B

Sheet C-100 – Existing Conditions



VICINITY MAP
NOT TO SCALE

EXISTING CONDITIONS SURVEY NOTES:

1. THE VERTICAL DATUM FOR THIS SURVEY IS NGVD29 (WASHINGTON COUNTY).
*SITE ELEVATIONS WERE TRANSFERRED THROUGH DIFFERENTIAL LEVELS FROM WASHINGTON COUNTY BENCHMARK 501 (ELEVATION=182.865')

SITE BENCHMARK: PBS CP #3
N:172634.34'
E:252842.71'
ELEVATION=185.15'
DESCRIPTION: MAG NAIL IN ASPHALT LOCATED APPROXIMATELY 0.9' SOUTHWEST OF THE EDGE OF ASPHALT AND 28.5' SOUTHEAST OF A LIGHT POLE.

2. HORIZONTAL: OREGON COORDINATE REFERENCE SYSTEM (OCRS) PORTLAND ZONE- NAD 83/2011 BASIS OF BEARINGS IS NORTH 28°46'04" EAST BETWEEN CONTROL POINTS 1 AND 15 BASED ON DUAL OCRS GNSS OBSERVATIONS.

3. THIS TOPOGRAPHIC SURVEY WAS PERFORMED FOR THE PURPOSE OF DESIGNING SITE IMPROVEMENTS.

4. CONTOURS DERIVED BY DIRECT FIELD OBSERVATIONS. ELEVATION AND CONTOUR ACCURACY IS ONE-HALF THE CONTOUR INTERVAL.

5. THIS MAP IS HAS BEEN PRODUCED FOR DESIGN PURPOSES AND SHOWS AN ACCURATE BOUNDARY DEPICTION.

6. BOUNDARIES SHOWN HAVE BEEN DETERMINED.

7. THE UNDERGROUND UTILITIES SHOWN HEREON WERE BASED ON FIELD MEASUREMENT OF UTILITY LOCATE PAINT MARKS SUPPLIED BY THE MT. VIEW LOCATING SERVICES INC. AS WELL AS SURFACE EVIDENCE AND PRIVATE ASBUILT RECORDS. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY. ADDITIONALLY, CERTAIN UTILITIES ONSITE (WATER, SANITARY, STORM, GAS, ETC.) MAY NOT HAVE CONDUCTIBLE OR TRACEABLE LINES AND MAY BE PRESENT.
*PRIVATE ON-SITE CONDUCTIBLE UTILITY LOCATES WERE PERFORMED BY MT. VIEW LOCATING SERVICES INC. ON 7/29/2021

PRELIMINARY

Full Size Sheet Format Is 22x34; If Printed Size Is Not 22x34, Then This Sheet Format Has Been Modified & Indicated Drawing Scale Is Not Accurate.

Filename: L:\Projects\74000\74217\74217-000\Civil\CAD\Working\Sheets\74217.000_C101-C107.dwg   Layout Tab: C100   User: Peter Reich   CAD Plot Date/Time: 12/17/2021 2:03:19 PM

PBS
PBS Engineering and Environmental Inc.
pbsusa.com

EXISTING CONDITIONS KEY MAP FOR:

CORNELIUS MULTIFAMILY DEVELOPMENT

A SITE LOCATED IN THE CITY OF CORNELIUS, OREGON

811
Know what's below.
Call before you dig.

DESIGNED:
PAR/JEK
CHECKED:
KIPW
DECEMBER 2021
74217.000
SHEET ID
C100
SHEET 3 OF 48

Appendix C

Soil Map – Washington County Area, Oregon

Hydrologic Soil Group—Washington County, Oregon

Map Scale: 1:2,470 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- □ Area of Interest (AOI)

Soils

Soil Rating Polygons

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

Soil Rating Lines

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

Soil Rating Points

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

Water Features

- 〰 Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ■ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Oregon
Survey Area Data: Version 21, Oct 27, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 19, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Aloha silt loam	C/D	13.4	98.4%
37A	Quatama loam, 0 to 3 percent slopes	C	0.2	1.6%
Totals for Area of Interest			**13.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Appendix D

TR-55 Table 2-2a – Runoff Curve Numbers

Table 2-2a Runoff curve numbers for urban areas 1/

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area 2/	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) 3/:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) 4/		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) 5/		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

---

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

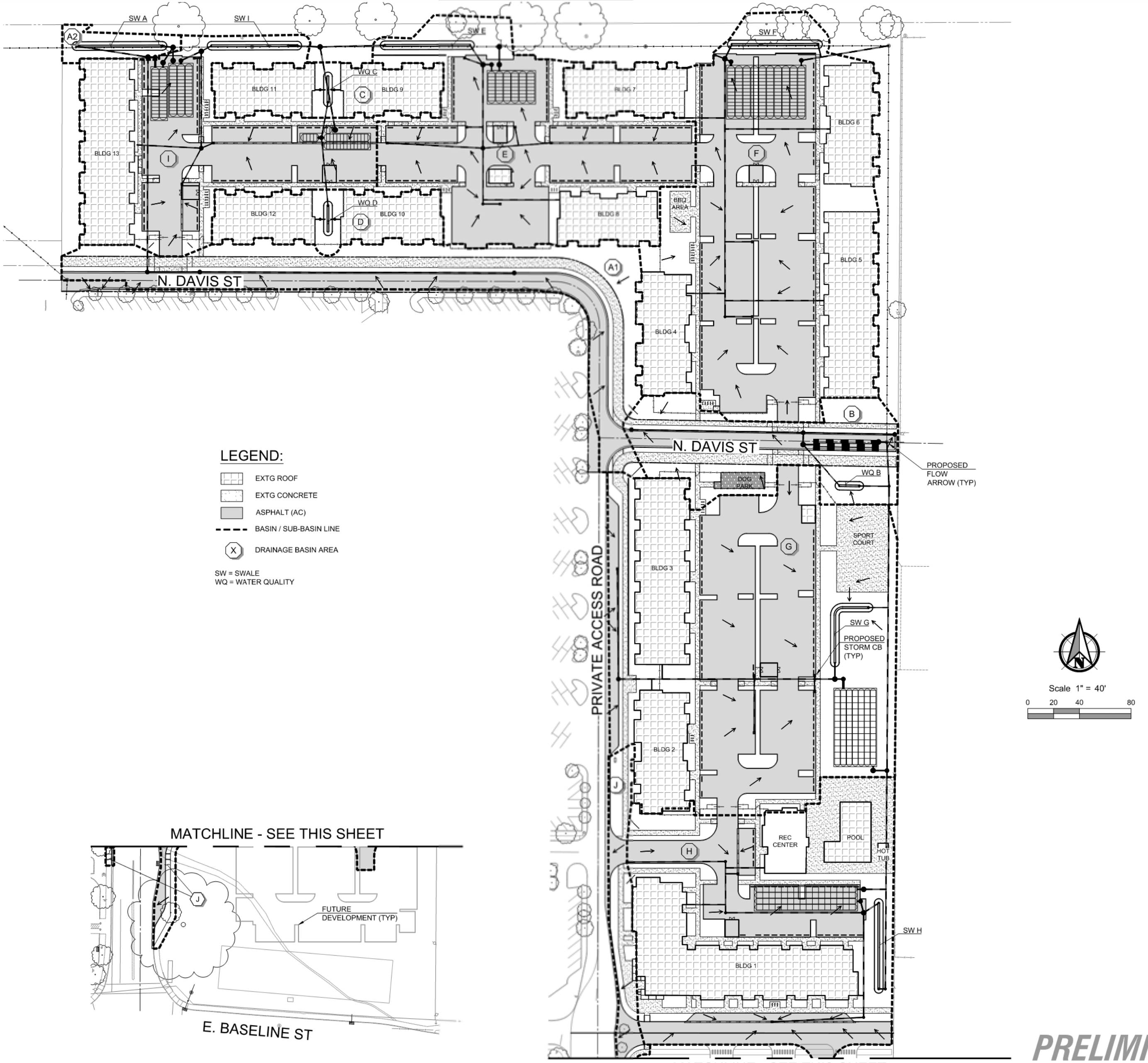
[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Appendix E

Preliminary Basin Delineation Map

PUBLIC SUB-BASIN A1 AREAS ROUTED TO PUBLIC SWALE A		
IMPERVIOUS	25,750 SF	0.591 AC
PERVIOUS	15,941 SF	0.366 AC
TOTAL	41,691 SF	0.957 AC
PUBLIC SUB-BASIN A2 AREAS ROUTED TO PUBLIC SWALE A		
IMPERVIOUS	0 SF	0.000 AC
PERVIOUS	4,623 SF	0.106 AC
TOTAL	4,623 SF	0.106 AC
PUBLIC SUB-BASIN B AREAS ROUTED TO WATER QUALITY FACILITY B		
IMPERVIOUS	11,720 SF	0.269 AC
PERVIOUS	17,870 SF	0.410 AC
TOTAL	29,590 SF	0.679 AC
PRIVATE BASIN C AREAS ROUTED TO PRIVATE WATER QUALITY FACILITY C		
IMPERVIOUS	15,800 SF	0.363 AC
PERVIOUS	7,581 SF	0.174 AC
TOTAL	23,381 SF	0.537 AC
PRIVATE BASIN D AREAS ROUTED TO PRIVATE WATER QUALITY FACILITY D		
IMPERVIOUS	15,699 SF	0.360 AC
PERVIOUS	2,764 SF	0.063 AC
TOTAL	18,463 SF	0.424 AC
PRIVATE BASIN E AREAS ROUTED TO PRIVATE SWALE E		
IMPERVIOUS	51,167 SF	1.175 AC
PERVIOUS	13,719 SF	0.315 AC
TOTAL	64,886 SF	1.490 AC
PRIVATE BASIN F AREAS ROUTED TO PRIVATE SWALE F		
IMPERVIOUS	97,590 SF	2.240 AC
PERVIOUS	21,095 SF	0.484 AC
TOTAL	118,685 SF	2.725 AC
PRIVATE BASIN G AREAS ROUTED TO PRIVATE SWALE G		
IMPERVIOUS	82,446 SF	1.893 AC
PERVIOUS	37,528 SF	0.862 AC
TOTAL	119,974 SF	2.754 AC
PRIVATE BASIN H AREAS ROUTED TO PRIVATE SWALE H		
IMPERVIOUS	67,254 SF	1.544 AC
PERVIOUS	18,900 SF	0.434 AC
TOTAL	86,154 SF	1.978 AC
PRIVATE SUB-BASIN I AREAS ROUTED TO SWALE I		
IMPERVIOUS	44,593 SF	1.024 AC
PERVIOUS	10,330 SF	0.237 AC
TOTAL	54,923 SF	1.261 AC
PRIVATE BASIN J AREAS NEW UNTREATED IMPERVIOUS AREAS		
IMPERVIOUS	6,449 SF	0.148 AC
TOTAL	6,449 SF	0.148 AC



PRELIMINARY

PRELIMINARY BASIN DELINEATION MAP FOR:

CORNELIUS MULTIFAMILY DEVELOPMENT

A SITE LOCATED IN THE CITY OF CORNELIUS, OREGON

Know what's below. Call before you dig.

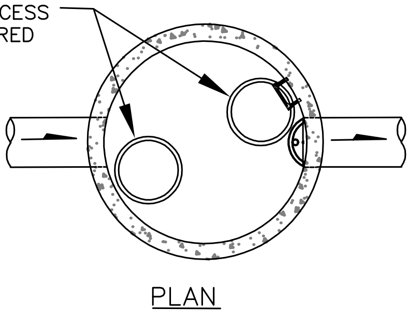
DESIGNED: PAR
CHECKED: RDE
JANUARY 2022
74217.000
SHEET ID
1
SHEET 1 OF 1

Full Size Sheet Format Is 22x34; If Printed Size Is Not 22x34, Then This Sheet Format Has Been Modified & Indicated Drawing Scale Is Not Accurate.

Filename: L:\Projects\74000\74217\74217-000\Civil\CAD\Working\Exhibits\74217.000_BASIN MAP.dwg Layout Tab: 1 User: Peter Reich CAD Plot Date/Time: 1/5/2022 4:46:19 PM

Appendix F

Water Quality Manhole Standard Detail

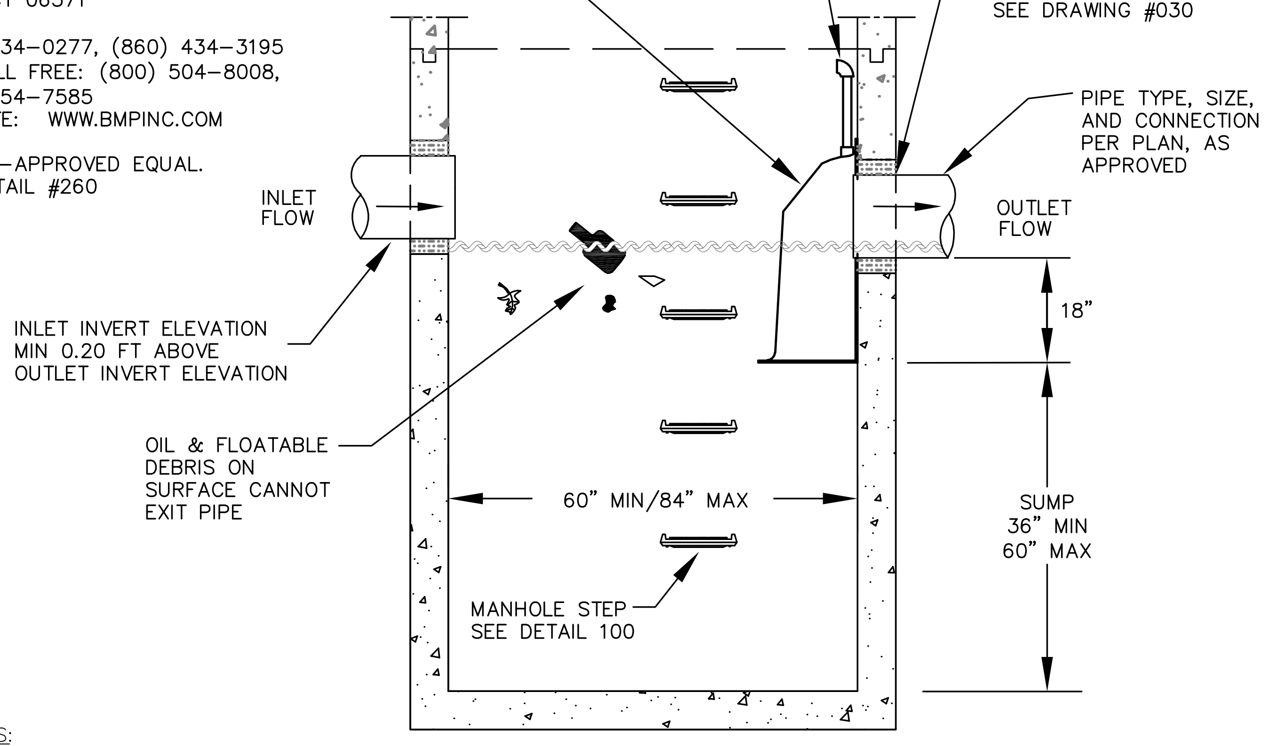


ALL SNOUTS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY:

BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371

(860) 434–0277, (860) 434–3195
FAX TOLL FREE: (800) 504–8008,
(888) 354–7585
WEB SITE: WWW.BMPINC.COM

OR PRE–APPROVED EQUAL.
SEE DETAIL #260



NOTES:

1. ALL MANHOLE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C–478 AND APPLICABLE PROVISIONS OF STD. MANHOLE DRAWING NO. 010.
2. INLET AND OUTLET PIPE NOT TO EXCEED 18" DIA.
3. PROVIDE SPECIAL DETAIL FOR SNOUT, EXCEEDING 18" DIA.
4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY THE OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATIONS.
5. ANCHORING HARDWARE FOR THE HOOD SHALL BE EMBEDDED INTO CONCRETE; ANCHORING INTO GROUT IS NOT AUTHORIZED.
6. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.
7. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
8. ALL MANHOLE FLAT TOPS SHALL CONFORM TO ASTM C–478 AND ARE DESIGNED TO MEET H–20 TRAFFIC LOADING.

SUMP VOLUME AVAILABLE PER DEPTH OF SUMP

	36" MINIMUM	60" MAXIMUM
60" M.H.=	58.9 CF	98.1 CF
72" M.H.=	84.8 CF	141.3 CF
84" M.H.=	115.4 CF	192.4 CF

PROVIDE SPECIAL DETAIL FOR VOLUME REQUIREMENTS EXCEEDING 192.4 CF

SUMP VOLUME REQUIREMENTS
20 CF/1.0 CFS OF INFLOW
58.9 CF MINIMUM REQUIRED

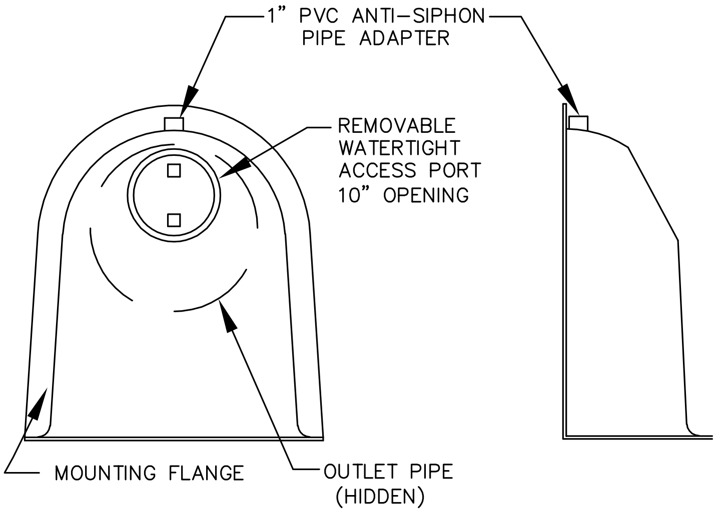
WATER QUALITY MANHOLE (SNOUT) A

DRAWING NO. 250

REVISED 10–31–19

Clean Water Services

CONFIGURATION DETAIL

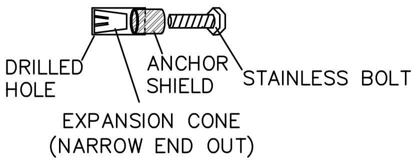


FRONT VIEW

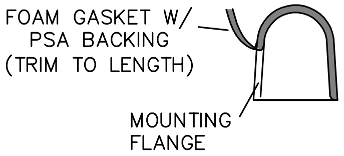
SIDE VIEW

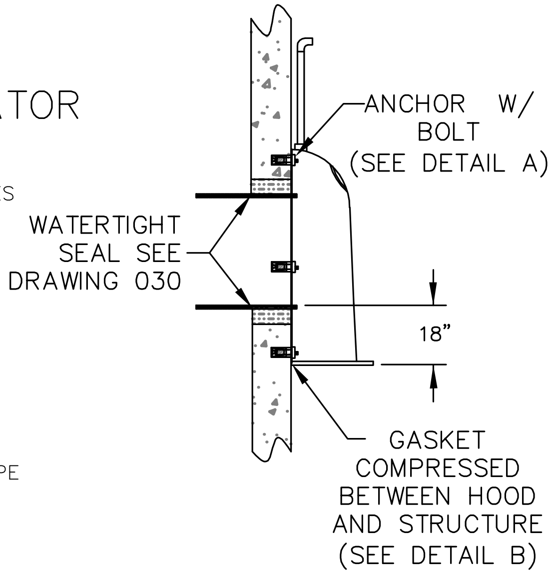
INSTALLATION DETAIL

DETAIL A



DETAIL B





SNOUT OIL–WATER–DEBRIS SEPARATOR

NOTES:

1. ALL HOODS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY BEST MANAGEMENT PRODUCTS, INC. OR PRE–APPROVED EQUAL.
2. ALL HOODS SHALL BE CONSTRUCTED OF A GLASS REINFORCED RESIN COMPOSITE WITH ISO GEL COAT EXTERIOR FINISH WITH A MINIMUM 0.125" LAMINATE THICKNESS.
3. ALL HOODS SHALL BE EQUIPPED WITH A MINIMUM 10", WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI–SIPHON VENT AS DRAWN. (SEE CONFIGURATION DETAIL)
4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATION.
5. THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A DISTANCE OF 18" FROM I.E. OUT.
6. THE ANTI–SIPHON VENT SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 24" ACCORDING TO STRUCTURE CONFIGURATION.
7. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.
8. THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH STAINLESS STEEL BOLTS AND OIL–RESISTANT GASKET.
9. ANCHOR BOLTS SHALL BE INSTALLED INTO THE CONCRETE OF THE STRUCTURE'S WALL. (NOT WITHIN GROUT)
10. INSTALLATION INSTRUCTIONS SHALL BE FURNISHED WITH MANUFACTURER SUPPLIED INSTALLATION KIT.
    KIT SHALL INCLUDE:
    A. INSTALLATION INSTRUCTIONS
    B. PVC ANTI–SIPHON VENT PIPE AND ADAPTER
    C. OIL–RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
    D. 3/8" STAINLESS STEEL BOLTS
    E. ANCHOR SHIELDS

BEST MANAGEMENT PRODUCTS, INC.
53 MT. ARCHER RD.
LYME, CT 06371
TOLL FREE: (800) 504–8008 (888) 354–7585
WEB SITE: WWW.BMPINC.COM

WHEN ORDERING, SPECIFY IF THE STRUCTURE IN WHICH THE HOOD WILL BE ATTACHED IS FLAT OR ROUND.

WATER QUALITY
MANHOLE (SNOUT) B

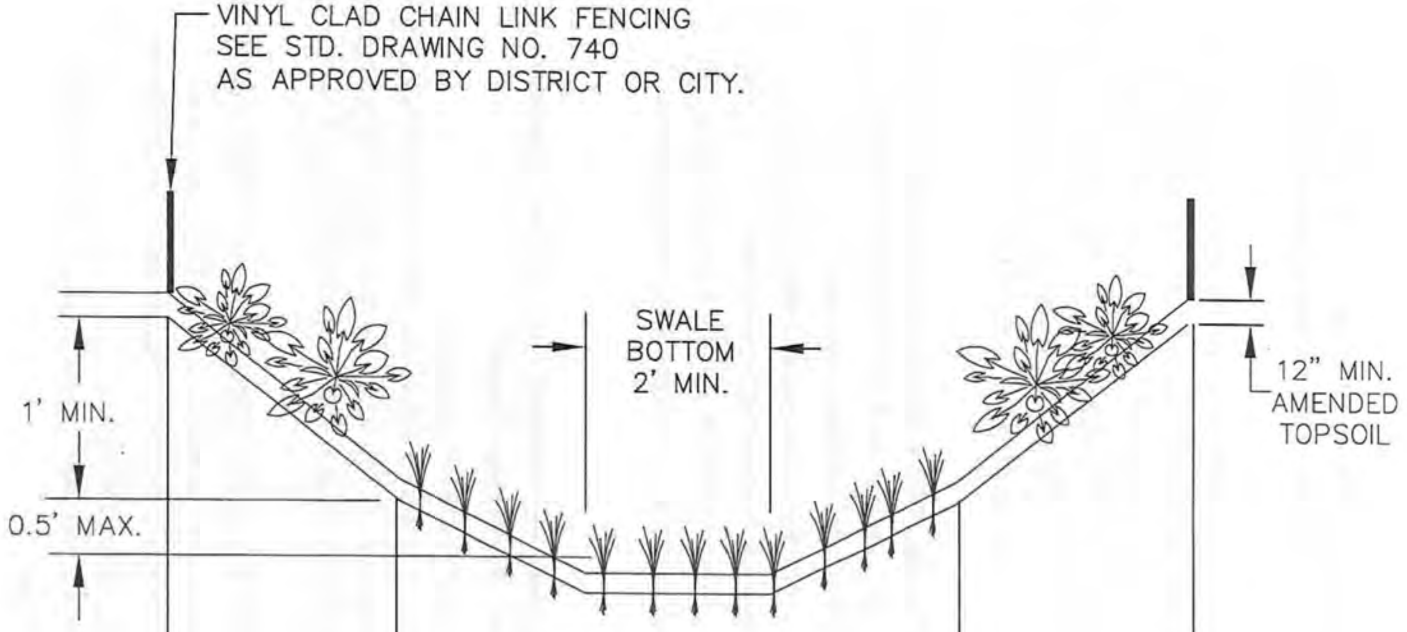
DRAWING NO. 260

REVISED 10–31–19

Clean Water Services

Appendix G

Vegetated Swale Standard Detail



SWALE AREA	SIDE SLOPE AREA	TREATMENT AREA 6' MINIMUM WIDTH			SIDE SLOPE AREA
EC MATTING	ECONOJUTE*	COCONUT FIBER OR GEOJUTE PLUS*			ECONOJUTE*
SEED MIX	LOW GROW MIX SEE NOTE #5	NONE			LOW GROW MIX SEE NOTE #5
MAX. SLOPE	2.5H: 1V	4H: 1V TYP	FLAT BOTTOM	4H: V1	2.5H: V1

* OR AS APPROVED

NOTES:

1. REFER TO CHAPTER 4, CWS DESIGN & CONSTRUCTION STANDARDS, FOR LANDSCAPING REQUIREMENTS INCLUDING TREE PLACEMENT, TOPSOIL AND PLANTING SPECIFICATIONS.
2. PROVIDE IRRIGATION AS APPROVED BY CWS.
3. JUTE MATTING– GEOJUTE PLUS IN TREATMENT AREA, ECONOJUTE FOR ALL OTHER AREAS, OR SIMILIAR FABRICS. COCONUT FIBER IS ALSO ACCEPTABLE.
4. 12 INCHES OF AMENDED TOPSOIL SHALL BE PLACED THROUGHOUT THE WATER QUALITY FACILITY.
5. FREEBOARD AREA SEED MIX, DWARF TALL FESCUE 40%, DWARF PERENNIAL RYE 30%, CREEPING RED FESCUE 25%, COLONIAL BENT GRASS 5%. APPLY AT A RATE OF 120# / ACRE.

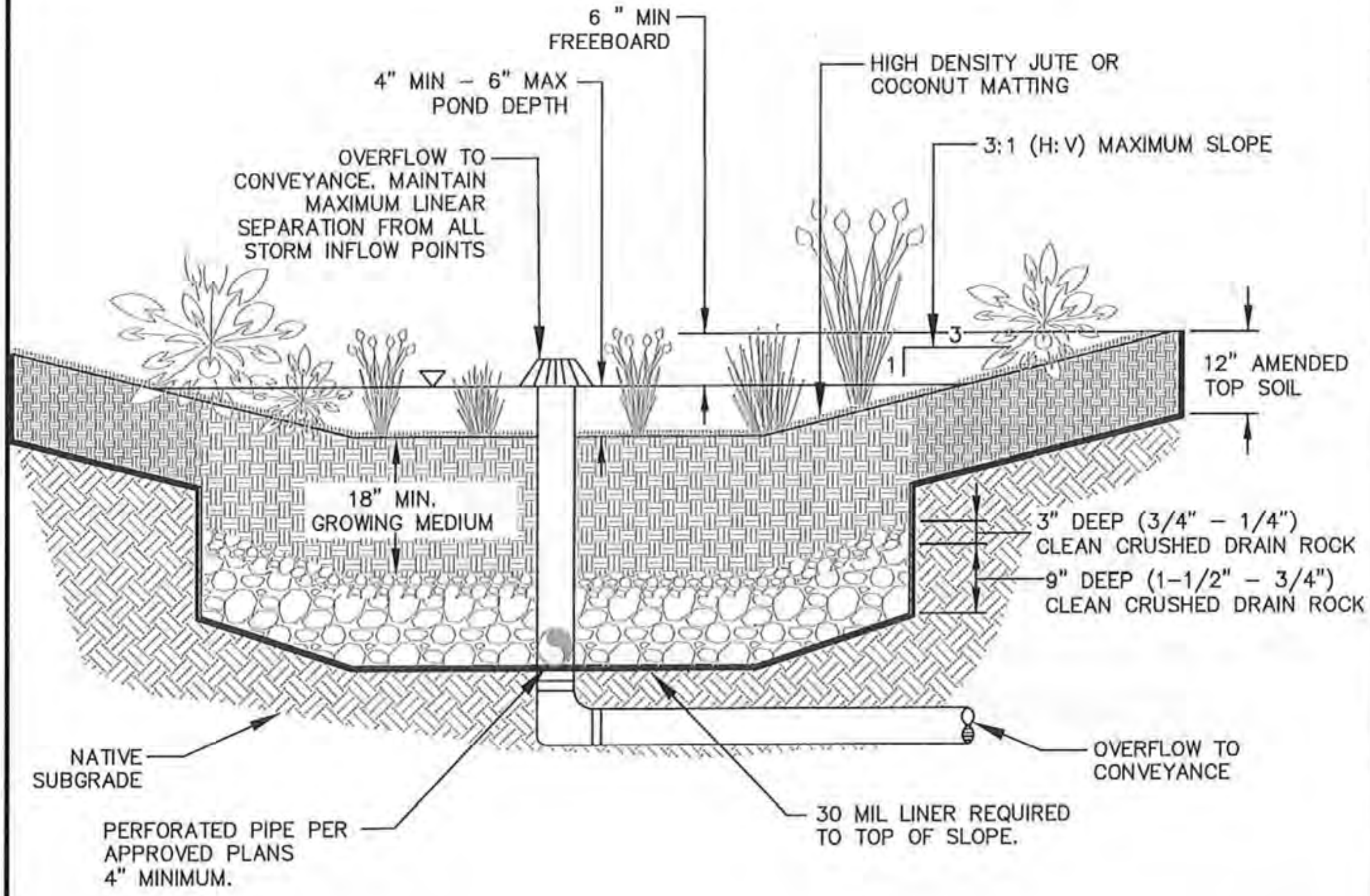
WATER QUALITY SWALE

DRAWING NO. 705

REVISED 10-31-19

Appendix H

Non-Structural Flow Through Planter Standard Detail



NOTES:

1. PROVIDE OVERFLOW CONVEYANCE SYSTEM, OVERFLOW CONVEYANCE HEIGHT TO ALLOW 4" MINIMUM – 6" MAXIMUM PONDING, PIPING TO A MINIMUM OF THE PLUMBING CODE OR CONVEY THE 25 YEAR STORM.
2. FLOW DISSIPATERS SHOULD BE USED IF ENTRY SLOPE TO THE BASIN IS GREATER THAN 3:1. FLOW DISSIPATERS SHALL BE CONSTRUCTED OUT OF ROCK OR GRAVEL PER DESIGN FLOW VELOCITY AT ENTRY OF THE FACILITY.
3. TREATMENT AREA SHALL HAVE HIGH DENSITY JUTE OR COCONUT MATTING OVER 18" MINIMUM OF GROWING MEDIUM OR BASE STABILIZATION METHOD AS APPROVED BY THE DISTRICT.
4. VEGETATION TO BE USED IN WET AREAS OF THE BASIN IS PER APPENDIX "A" FOR THE WET MOISTURE CONDITIONS.
5. VEGETATION TO BE USED IN OTHER AREAS OF BASIN CONFORMS TO PLANT LIST OF THIS HANDBOOK AS APPROVED BY DISTRICT.

NON–STRUCTURAL FLOW THROUGH PLANTER/SWALE

DRAWING NO. 735

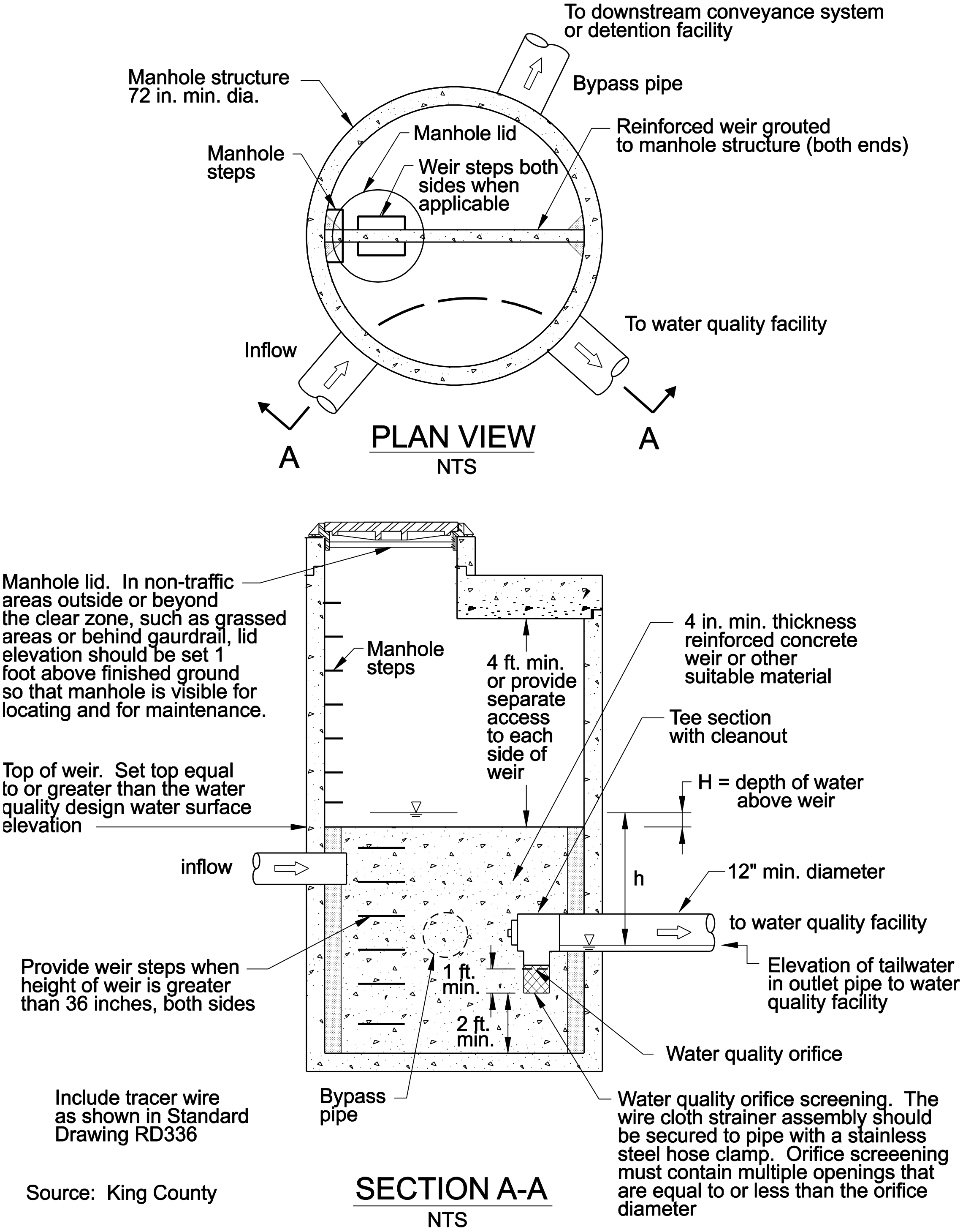
REVISED 10–31–19

Clean Water Services

Appendix I

Typical Flow Splitter Manhole Detail

b) The site must be located upstream of offline facilities.



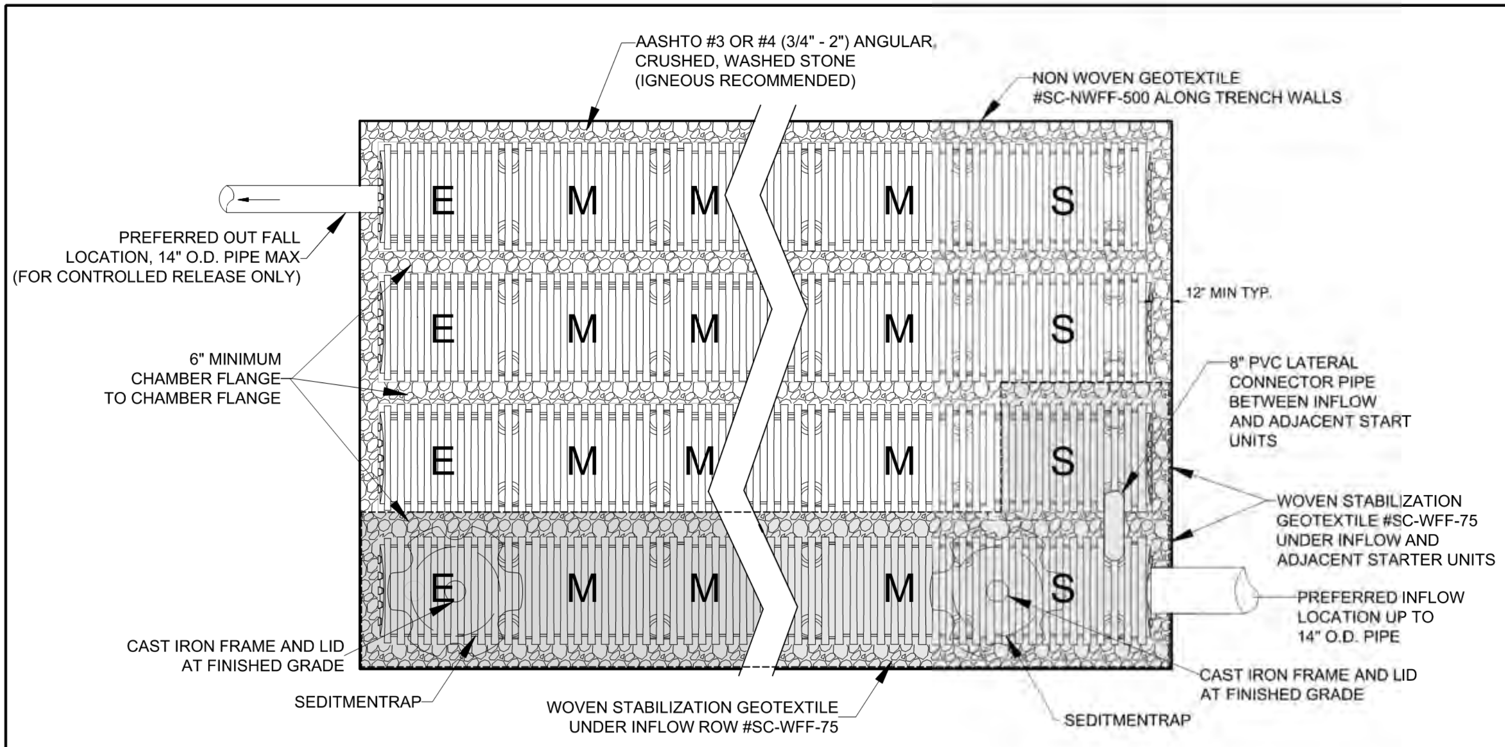
Include tracer wire as shown in Standard Drawing RD336

Source: King County

Figure 1 Weir Type Flow Splitter

Appendix J

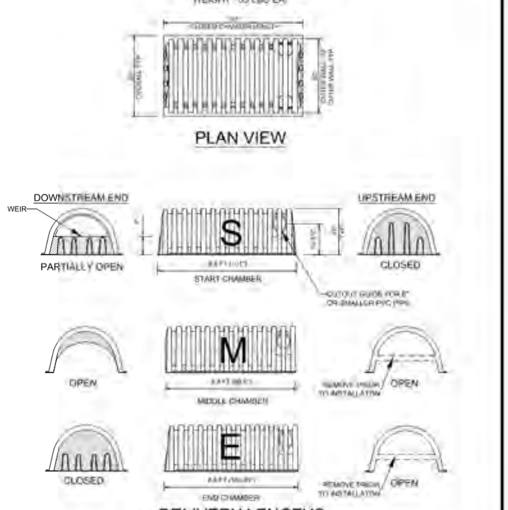
Typical Stormwater Chamber Detail



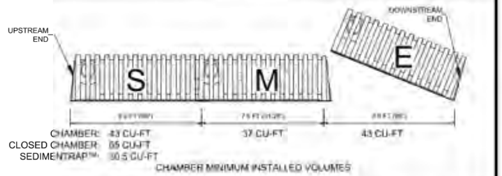
TYPICAL PLAN VIEW

SC-1820 DIMENSIONS

(DIMENSIONS MAY VARY SLIGHTLY)
WEIGHT 53 LBS EA.



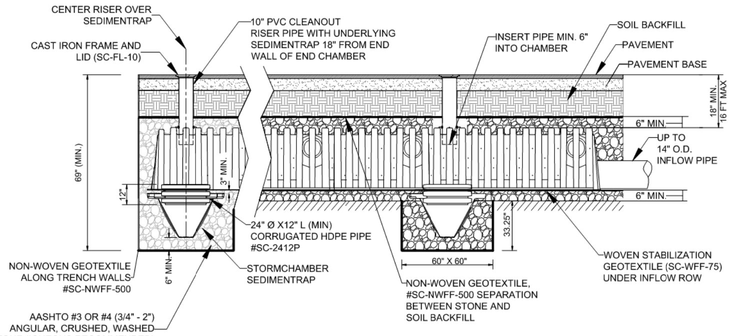
DELIVERY LENGTHS ELEVATION VIEW



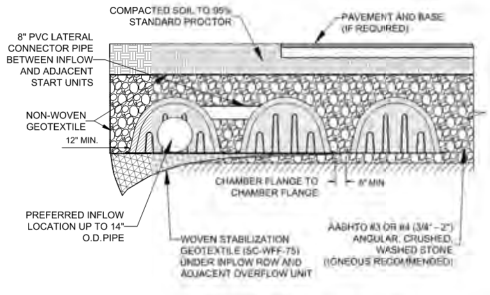
NOTES:

1. START CHAMBERS (CLOSED AT THE SIDE PORTAL END) ARE PLACED AT THE INFLOW END OF THE ROWS
2. BEGIN PLACEMENTS WITH START CHAMBERS AND END ROWS WITH END CHAMBERS.
3. PLACE FIRST RIB OF THE NEXT CHAMBER IN THE ROW OVER THE LAST RIB OF THE PREVIOUS CHAMBER

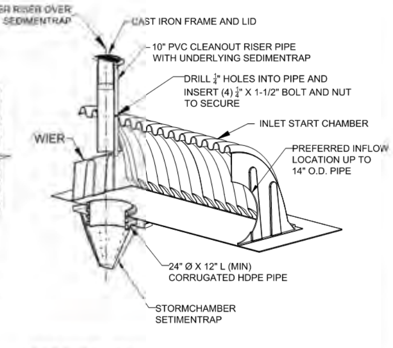
INSTALLED LENGTHS ELEVATION VIEW



TYPICAL SIDE VIEW



TYPICAL FRONT VIEW



START CHAMBER CUTAWAY

MATERIAL LIST			
DESCRIPTION	**STOCK CODE**	**QTY**	**UNITS**
CHAMBERS AND ACCESSORIES:			
START CHAMBER:	SC-1820-S-O		EACH
MIDDLE CHAMBER:	SC-1820-M-O		EACH
END CHAMBER:	SC-1820-E-O		EACH
CLOSED CHAMBER	SC-1820-C-O		EACH
SEDIMENTRAP™	SC-ST		EACH
NON-WOVEN GEOTEXTILE	SC-NWFF-500		SQ FT
WOVEN STABILIZATION GEOTEXTILE	SC-WFF-75		SQ FT
24" X 12" HDPE PIPE FOR SEDIMENTRAP™	SC-2412P		EACH
10" CAST IROM FRAME AND LID	SC-FL-10		EACH
MATERIALS BY OTHERS:			
10" DIAMETER RISER PIPE	OTHERS		EACH
8" DIAMETER LATERAL CONNECTOR PIPE	OTHERS		EACH
IN-PLACE EXCAVATION (NO BULKING FACTOR)	OTHERS		CU FT
STONE BACKFILL	OTHERS		CU FT
1/4" X 1-1/2" NUT AND BOLT	OTHERS		EACH
3" SCREWS	OTHERS		EACH

PROJECT NAME /
PROJECT LOCATION

PROJECT #
DATE:
REVISION:
DRAWN BY:

STORMCHAMBER®

NDS
Design
Worx

TYPICAL SC-1820
STORMCHAMBER LAYOUT

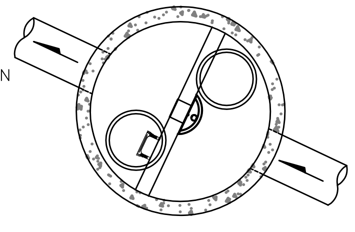
MEETS OR EXCEEDS ASTM F2922 AND ASTM F2787

Appendix K

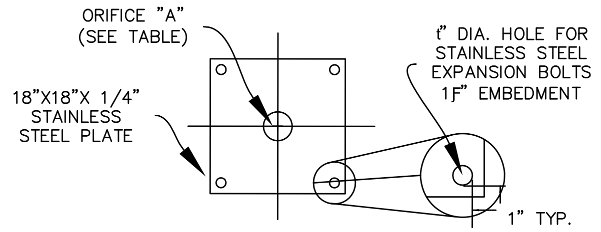
Flow Control Structure Standard Detail

NOTES:

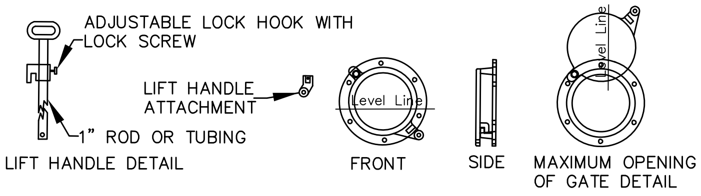
1. BAFFLE WALL SHALL HAVE #4 BAR AT 12" SPACING EACH WAY.
2. PRECAST BAFFLE SHALL BE KEYED AND GROUTED IN PLACE. JOINT BETWEEN CONCRETE BAFFLE AND MANHOLE WALL SHALL BE WATERTIGHT.
3. UPPER FLOW ORIFICE SHALL BE ALUMINUM, ALUMINIZED STEEL OR TREATMENT 1 GALVANIZED STEEL.
4. FRAME AND LADDER OR STEPS ARE TO BE OFFSET SO THAT SHEAR GATE IS VISIBLE FROM THE TOP; CLIMB-DOWN SPACE IS CLEAR OF RISER AND GATE; FRAME IS CLEAR OF CURB.
5. MULTI-ORIFICE ELBOWS SHALL BE PRE-INSTALLED TO INSURE LADDER CLEARANCE.
6. RESTRICTOR PLATE WITH ORIFICE AS SPECIFIED IN THE CONTRACT. OPENING IS TO BE CUT ROUND AND SMOOTH. NEOPRENE GASKET SHALL BE INSTALLED BETWEEN THE ORIFICE PLATE AND CONCRETE BAFFLE TO PROVIDE A WATERTIGHT SEAL.
7. SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION Zg32A OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B. LIFT HANDLE MAY BE SOLID ROD OR HOLLOW TUBING WITH ADJUSTABLE HOOK AS REQUIRED. NEOPRENE RUBBER GASKET REQUIRED BETWEEN RISER MOUNTING FLANGE AND GATE FLANGE. MATING SURFACES OF LID AND BODY SHALL BE MACHINED FOR PROPER FIT. FLANGE MOUNTING BOLTS SHALL BE....."DIAMETER STAINLESS STEEL.
8. SHEAR GATE MAXIMUM OPENING SHALL BE CONTROLLED BY LIMITED HINGE MOVEMENT, STOP TAB OR SOME OTHER DEVISE.
9. ALTERNATE SHEAR GATES DESIGNS ARE ACCEPTABLE, IF MATERIAL SPECIFICATIONS ARE MET AND FLANGE BOLT PATTERN MATCHES.
10. MANHOLE CERTIFICATION REQUIRED FOR TRAFFIC LOADING.



PLAN



RESTRICTOR PLATE, ORIFICE



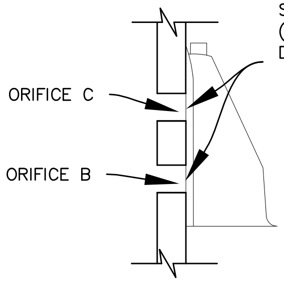
SHEAR GATE
MANUFACTURED BY KENNEDY VALVE OR EQUAL

INSTALLATION NOTE:

POSITION HOOD SUCH THAT BOTTOM FLANGE IS MIN 2" BELOW THE ORIFICE B INVERT.

ONE SNOUT MAY BE USE FOR BOTH ORIFICE C AND B.

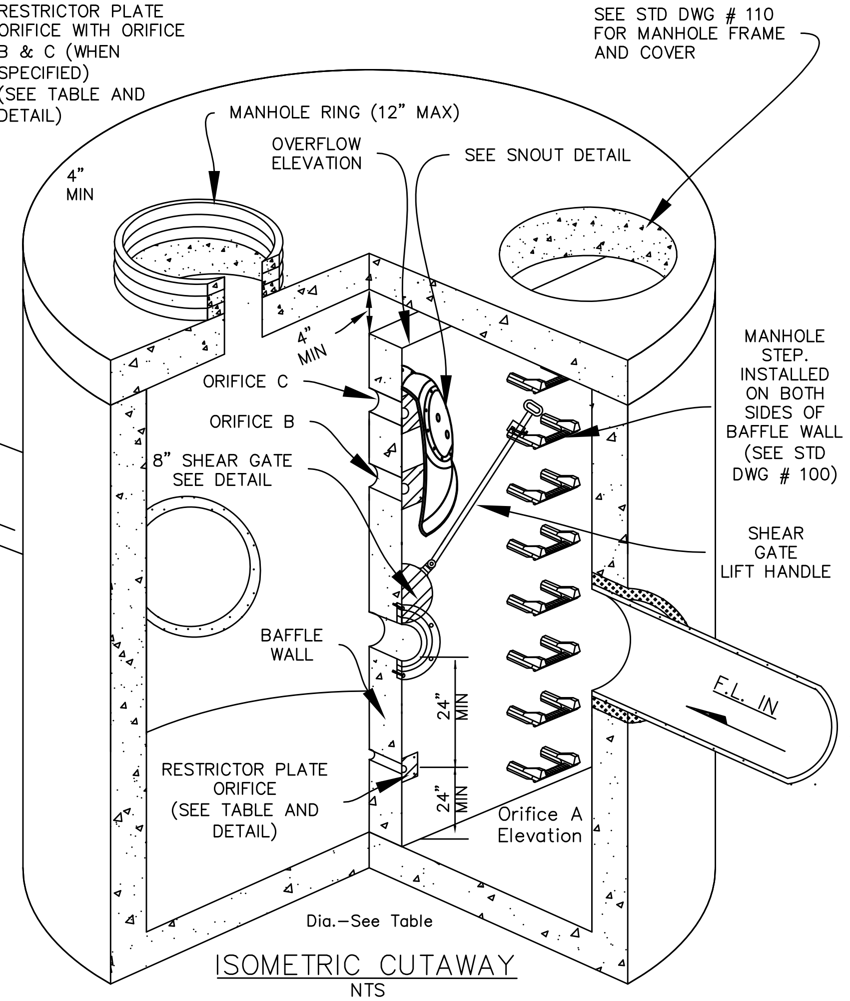
IT MAY NEED BE NECESSARY TO USE TWO SNOUTS AND OFF SET ORIFICES TO MEET PLAN ELEVATION.



SNOUT DETAIL

FLOW CONTROL STRUCTURE TABLE

Diameter Of Manhole (In.) 60" MIN	
F.L. (In)	
F.L. (Out)	
Outlet Pipe Diameter (In.)	
Number Of Orifice	
Orifice A Elevation	
Diameter Of Orifice A (In.)	
Orifice B Elevation	
Diameter Of Orifice B (In.)	
Orifice C Elevation	
Diameter Of Orifice C (In)	
Overflow Elevation	
Rim Elevation	



ISOMETRIC CUTAWAY
NTS

FLOW CONTROL STRUCTURE DETAIL

DRAWING NO. 270

REVISED 02-17

Clean Water Services

Cornelius Multi-Family Development Traffic Impact Analysis

2300 Baseline Street
Cornelius, Oregon 97113

Prepared for:

The Calida Group
5000 Carillon Point, Suite 400
Kirkland, Washington 98033

April 27, 2022
PBS Project 74217.000

REGISTERED PROFESSIONAL
ENGINEER
85811PE
OREGON
NOV. 9, 2011
JOHN ANDREW MANIX
EXPIRES: 12/31/22

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Table of Contents

Supporting Data

TABLES

FIGURES

APPENDICES

Executive Summary

Purpose and Scope

The proposed Cornelius Multi-Family Development will be approximately 344 multi-family dwelling units and 31,450 square feet of multi-tenant retail space among several buildings. The multi-tenant retail space is assumed as a conservative land use providing some flexibility on the number of trips generated by the site. Development is assumed to occur within a single phase and will be complete by the end of 2023. The approximately 15-acre site, which is currently vacant, is located northeast of 23rd Avenue/Baseline Street. See Figures 1 and 2 for vicinity map and site plan, respectively.

This traffic impact analysis (TIA) report analyzes the traffic impacts generated by the completed development as required by the City of Cornelius (City).

The following intersections were identified for evaluation in this TIA:

1. N 26th Avenue/E Baseline Street (OR 8)
2. N 23rd Avenue*/E Baseline Street (OR 8)
3. N 20th Avenue/E Baseline Street (OR 8)
4. N 23rd Avenue*/Burger King Driveway**
5. N 23rd Avenue*/N Davis Street

*N 23rd Avenue is an alias for the existing north-south driveway serving the Fred Meyer commercial site on the east side.

**The farthest south driveway on N 23rd Avenue is referred to as the "Burger King Driveway" because it is the primary access to Burger King.

Findings

The findings of this TIA are listed below.

Present 2021 peak hour volumes, collected in September and October 2021, were not adjusted for COVID-19 impacts because volumes were found to be higher than the projected 2021 volumes using the historic peak hour volumes.

A historical growth rate of 1% (geometric growth) was estimated using data from nearby Oregon Department of Transportation (ODOT) Automatic Traffic Recorder (ATR) stations.

A 2% seasonal adjustment was applied to increase all the studied intersections during the AM and PM peak hours.

Generic background growth (at 1% for 2 years) was assumed to add approximately 1% to the 2021 baseline volumes to estimate 2023 Without Project volumes.

The project will have five full movement accesses: three on Davis Street and two on 23rd Avenue.

The Cornelius Multi-Family Development is anticipated to generate a total of 283 vehicle trips during the weekday AM peak hour, including 4 internal trips, 28 pass-by trips, and 251 primary trips. During the weekday PM peak hour, the development is anticipated to generate a total of 376 vehicle trips, including 84 internal trips, 64 pass-by trips, and 228 primary trips.

All studied intersections operate within the acceptable level of service (LOS) during existing and future conditions during the PM peak hour.

Queuing issues caused by existing conditions were identified at several approach lanes at study intersections during the weekday PM peak hour.

Queuing on southbound 23rd Avenue due to the project may increase by one vehicle.

The proposed 23rd Avenue/Davis Street intersection does not meet the ODOT criteria for a southbound left-turn lane or a northbound right-turn lane.

The 2015–2019 collision history at the study intersections was reviewed; all intersections have collision rates lower than the critical rate, and no patterns of collision types or of severe collisions were identified.

Pedestrian, bicycle, and transit facilities will be readily available for future subdivision residents in the study area.

Digital review of the current conditions along 23rd Avenue and future Davis Street suggests that adequate sight distances should be achievable through design and construction of the proposed access intersections.

Recommendations

This TIA supports the following recommendations.

Remove stop sign on southbound 23rd Avenue at the Burger King Driveway.

Install “do not block intersection” signing and markings at the 23rd Avenue/Burger King Driveway for southbound 23rd Avenue approach.

Construct standard frontage improvements, including sidewalks, along 23rd Avenue and Davis Street. Assure all driveways, sidewalks, crosswalks, and curb ramps constructed with the subdivision project comply with current Americans with Disabilities Act (ADA) guidelines.

Move proposed crosswalk across the south leg of the 23rd Avenue/Burger King Driveway to the north of the intersection.

PBS recommends that the horizontal curve on Davis Street, at the northeast corner of the Fred Meyer parking lot, include the following safety enhancements due to the short radius:

- Replace existing streetlight with two streetlights that meet city standards.
- Install a double-yellow center line using raised pavement markers.
- Install advance curve ahead signs and curve signs in compliance with the Manual on Uniform Traffic Control Devices (MUTCD).

Design the proposed access points consistent with American Association of State Highway and Transportation Officials (AASHTO) guidelines for intersection sight distance. Install no objects within the sight distance triangles that would block exiting drivers’ view at the access points.

1 INTRODUCTION

The purpose of this study is to determine the traffic impacts generated by the Cornelius Multi-Family Development project on the surrounding roadway infrastructure. The project site is shown on the vicinity map (Figure 1). This study will determine if mitigation is required to keep the roadways operating safely and at capacity levels acceptable under the current level of service standards. This report documents the findings and conclusions of a traffic impact analysis (TIA) conducted for the proposed site plan (Figure 2) application for property located in Cornelius, Oregon.

1.1 Scope of Study

This study documents the existing and proposed conditions, traffic data, safety analysis, and intersection operations in accordance with the scoping letter developed in conference with the City of Cornelius (City) and the Oregon Department of Transportation (ODOT), dated August 24, 2021, with city comments received August 27, 2021.

The following intersections were identified for weekday AM and PM peak hour analysis. The N 23rd Avenue/N Davis Street intersection was limited to PM analysis only due to intersection alignment uncertainty. PM peak hour data for the vicinity of this intersection was collected via drone video footage.

1. N 26th Avenue/E Baseline Street (OR 8)
2. N 23rd Avenue*/E Baseline Street (OR 8)
3. N 20th Avenue/E Baseline Street (OR 8)
4. N 23rd Avenue*/Burger King Driveway
5. N 23rd Avenue*/N Davis Street

*N 23rd Avenue is an alias for the existing north-south driveway serving the Fred Meyer commercial site on the east side.
**The farthest south driveway on N 23rd Avenue is referred to as the “Burger King Driveway” because it is the primary access to Burger King.

This TIA includes analysis of future background conditions based on an 1% annual growth rate and the addition of traffic from three in-process projects identified by staff at the City of Cornelius.

This TIA is prepared for submission to the City of Cornelius. The traffic-related issues addressed in this report include:

- Existing traffic conditions
- Proposed site-generated traffic volumes and their distribution
- Build-out year (2023) conditions without and with the project
- Capacity analysis of the existing and future conditions during the weekday AM and PM peak hours
- Safety analysis of the existing and future conditions
- Findings and recommendations

1.2 Existing Site Conditions

The site is located at 2300 Baseline Street Cornelius, Oregon. The site consists of tax lots 1N334CD00100, 1N334CD00200, and 1N334CD00600 based on the Cornelius web mapping application (see References). The existing site is undeveloped and is zoned “GMU – Gateway Mixed Use.”

1.3 Existing Infrastructure

The existing infrastructure and operational traffic conditions in the study area were documented. Roadway conditions were studied to confirm that the roadways are currently operating in a safe and efficient manner.

1.3.1 Land Uses

The land uses surrounding the site are documented to help identify the site location and provide reference for any discussion of conditions that might impact the adjacent properties. The land uses surrounding the site are shown in Table 1.

Table 1. Land Uses Around the Site

North of Site	
Zoning	R7
Description	Single-Family Residential
Existing Uses	Single-Family Housing

West of Site		S	East of Site	
Zoning	GMU	I	**Zoning**	LI
Description	Gateway Mixed Use	T	**Description**	Light Industrial
Existing Uses	Fred Meyer	E	**Existing Uses**	Cornelius Self Storage Facility

South of Site	
Zoning	C2
Description	Highway Commercial
Existing Uses	Coffee Shop, Restaurant, Pawn Shop

1.3.2 Existing Roadways

The existing roadways providing access to the site are Baseline Street and 19th Avenue. Data were gathered on this and other roadways in the study area to inform operations analysis of the existing roadway system. The pertinent information regarding the study area roadways is tabulated in Table 2.

Table 2. Existing Roadway Information

Roadway Name	Classification^{a}	Speed Limit (mph)	Lane Configuration		
			Lanes	Sidewalks	Bike Lanes
Baseline Street	Principal Arterial	30/40^{d}	5	Yes	Yes
26th Avenue	Collector	25	2	Partial	No
23rd Avenue	Private/Local	25	2	Partial	No
20th Avenue	Arterial/Collector^{b}	25/30^{e}	2	Partial	Yes
19th Avenue	Arterial	30	2	Partial	Yes
Davis Street	Collector/Local^{c}	25	2	Partial	No

mph = miles per hour

[a] Based on the City of Cornelius' *Transportation System Plan*, Figure 8-1 – Functional Classification System (see References).

[b] Arterial classification north of Baseline Street and collector classification south of Baseline Street.

[c] Collector classification west of 19th Avenue and local street classification east of 19th Avenue.

[d] 30 mph west of 20th Avenue and 40 mph east of 20th Avenue.

[e] 30 mph north of Baseline Street and 25 mph south of Baseline Street.

1.3.3 Major Intersections and Traffic Controls

The information shown in Table 3 is relevant to the intersection operations analyses presented later in this TIA. Table 3 presents the existing lane configurations and traffic controls at the study intersections.

Table 3. Major Intersections: Existing Lanes and Traffic Controls

Intersection	***26th Avenue/Baseline Street***			
Leg	**NB**	**SB**	**WB**	**EB**
Control	Signal	Signal	Signal	Signal
Number of Lanes	2	2	4	3

Intersection	***23rd Avenue/Baseline Street***			
Leg	**NB**	**SB**	**WB**	**EB**
Control	Signal	Signal	Signal	Signal
Number of Lanes	2	2	4	3

Intersection	***20th Avenue/Baseline Street***			
Leg	**NB**	**SB**	**WB**	**EB**
Control	Signal	Signal	Signal	Signal
Number of Lanes	2	3	4	3

Intersection	***23rd Avenue/Burger King Driveway***			
Leg	**NB**	**SB**	**WB**	**EB**
Control	Unc.	Stop	N/A	Stop
Number of Lanes	2	1	N/A	1

Stop = Stop-controlled approach to intersection
Unc. = Uncontrolled leg approaching intersection – does not stop or yield

The project area is defined as the vicinity of the site encompassed by the study intersections. The operation of the intersections can be controlled by signing, roundabouts, or signals. Table 3 refers to the type of control and number of approach lanes for each leg of each intersection. The existing lane configurations and traffic controls for all intersections are shown in Figure 3.

1.4 Traffic Volumes

1.4.1 Baseline Traffic Volumes

The ongoing COVID-19 pandemic is cause for concern that traffic volumes may not represent accurate traffic conditions. The existing conditions were evaluated by comparing pre-COVID traffic volumes with current traffic counts.

1.4.1.1 Weekday AM and PM Peak Hour Data

Two adjustments were considered to estimate the 30th-highest-volume (30HV) hour required by ODOT guidelines. First consideration was COVID-19 impacts and second was a seasonal adjustment factor.

1.4.1.1.1 COVID-19 Adjustment

Pre-COVID turning movement counts (TMCs) were not available at any of the studied intersections for the weekday AM or PM peak periods. PBS sourced historic TMCs from All Traffic Data (ATD) at two intersections in the vicinity from August 8, 2018 and November 21, 2019, and these were used as the historical reference points. The two intersections were N 19th Avenue/N Davis Street (August 8, 2018) and SW 345th Avenue/E Baseline Street (November 21, 2019). Copies of the historic count data are provided in Appendix A.

Present (2021) TMCs were gathered at all existing studied intersections for the weekday AM and PM peak periods, 7:00–9:00 am and 4:00–6:00 pm, respectively. ATD collected the TMC data on September 9, 2021, for the AM and PM peak periods. Copies of the present count data are provided in Appendix A.

The 2018 and 2019 TMCs were increased by 1% per year (matching the assumed background growth rate for this study) to estimate where 2021 volumes would have been apart from COVID-19 pandemic. The actual 2021 peak hour volumes at those intersections were compared with the projected 2021 volumes. The actual 2021 peak hour volumes were higher than the projected 2021 volumes for the AM and PM peaks. Therefore, PBS did not adjust recent data for COVID-19 impacts.

1.4.1.1.2 Seasonal Adjustment

The traffic volumes at all the studied intersections were seasonally adjusted by 2% using the ODOT *Analysis Procedures Manual*, Version 2, Chapter 5.5, dated October 2020. The 2% factor is based on adjusting September data to the seasonal June peak following the on-site Automatic Traffic Recorder (ATR) method and using data from ATR station 34-009, Cornelius. Detailed calculations are provided in Appendix A.

1.4.1.2 Present Volumes

Present volumes were estimated at each of the five studied intersections according to the 2021 TMC volumes with a seasonal adjustment. The resulting existing 2021 peak hour volumes for the studied intersections are shown in Figure 4. These volumes were input to the intersection operations analyses, addressed later in this TIA.

The future 23rd Avenue/Davis Street intersection does not currently exist. The alignment of the east-west connection of Davis Street was not confirmed until late into the preparation of this TIA. The multiple Fred Meyer driveways on N 23rd Avenue were counted assuming N 23rd Avenue will be a public roadway and access to the driveways may need to be restricted to right-in and right-out. PBS staff collected video of traffic operations on N 23rd Avenue with a drone on October 4, 2021, during the PM peak hour. The drone footage covered TMCs during the PM peak hour for all existing Fred Meyer driveways and the Burger King Driveway along 23rd Avenue from Baseline Street to Davis Street. Using N 23rd Avenue/Burger King Driveway as a control point, the October 4, 2021, volumes were increased by 19% after comparing the PM peak hour volumes to the September 9, 2021, volumes. Detailed calculations are provided in Appendix A.

Findings: Present 2021 peak hour volumes, collected in September and October 2021, were not adjusted for COVID-19 impacts because volumes were found to be higher than the projected 2021 volumes using the historic peak hour volumes.

A historical growth rate of 1% (geometric growth) was estimated using data from ODOT’s nearby ATR stations.

A 2% seasonal adjustment was applied to increase all the studied intersections during the AM and PM peak hours.

1.4.2 Background Growth

Background growth is a generic increase in traffic volumes that either is not attributable to specific developments or is attributable to influences outside the study area. A background growth rate of 1% per year was applied to all 2021 existing peak hour movement volumes between public roadways at the studied intersections. This growth rate was calculated using the ODOT *Analysis Procedures Manual*, Chapter 5.6. Detailed calculations are provided in Appendix A.

1.4.3 In-Process Projects

In-process trips from approved projects were requested from city staff, and three were identified. The following three in-process projects were included in this TIA.

- Laurel Woods Development
    - Phases 1 to 6
        - Single-family housing (assumed 218 dwelling units [DU] occupied, 81 DU remaining)
        - Multi-family housing (assumed 45 DU occupied, 63 DU remaining)
    - Phases 7 to 11
        - Single-family housing (assumed 0 DU occupied, 327 DU remaining)
        - Multi-family housing (assumed 0 DU occupied, 137 DU remaining)
    - Future Phases
        - Single-family housing (assumed 3 DU occupied, 31 DU remaining)
- Council Creek Terrace
    - Single-family housing (assumed 0 DU occupied, 56 DU remaining)
- Plaza Los Amigos
    - Multi-family housing (assumed 0 DU occupied, 113 DU remaining)

Excerpts of relevant information such as the trip generation, distribution, and assignment, from the TIAs of the in-process projects are attached in Appendix B.

All the in-process projects are assumed to be completed before 2023. In-process project volumes for the studied intersections are summarized on Figure 5.

1.4.4 Future Volumes

The baseline volumes for the 2023 intersection operations analyses, termed the 2023 Without Project volumes, represent the sum of 2021 existing traffic, two years of background growth, and the in-process trips. Figure 6 presents the 2023 Without Project volumes for the weekday AM and PM peak hours.

1.4.5 Future Traffic Volumes Findings

Traffic volumes in the study area will continue to increase without or with the Cornelius Multi-Family Development project. Trips for three in-process projects were included in this analysis.

Generic background growth (at 1% for 2 years) was assumed to add approximately 1% to the 2021 baseline volumes to estimate 2023 Without Project volumes.

2 PROPOSED CONDITIONS

The proposed development will add traffic to the roadway system. Where the project is located, the size of the project, and when it will be completed are all important elements that need to be considered to determine the impacts of this development on safety and capacity. It is also important to examine how the project will operate with the existing transportation system, estimate how much new traffic it will generate, and predict where traffic generated by the site will be distributed. Furthermore, this section addresses any funded infrastructure changes planned by agencies or other developers. All these elements are important in assessing the traffic impacts of this project.

2.1 Project Description

The proposed project will have approximately 344 multi-family DU and 31,450 square feet of multi-tenant retail space among several buildings. The multi-tenant retail space is assumed as a conservative land use providing some flexibility on the number of trips generated by the site. Development is assumed to occur within a single phase and will be complete by the end of 2023. The approximately 15-acre site, which is currently vacant, is located northeast of 23rd Avenue/Baseline Street. See Figure 2 for the site plan.

2.2 Access and Circulation

All trips entering and exiting the site will use the five proposed site accesses: three on Davis Street and two on 23rd Avenue. Davis Street will terminate at the eastern boundary of the project site and will be extended to connect to 26th Avenue with future development to the east of the site.

One of the site accesses on Davis Street is along the north side of the Fred Meyer parking lot. This site access is assumed to permit all movements and will not align with any Fred Meyer driveways.

The other two site accesses on Davis Street will be aligned directly across from each other: one on the north and the other on the south; both will be on the future Davis Street through the site.

The two site accesses on 23rd Avenue are assumed to align with the Fred Meyer and Burger King driveways, respectively. It is assumed all movements are permitted at these site accesses. See Figure 2 for the site plan and the future connections within the Cornelius Multi-Family Development.

Findings: The project proposes five full movement accesses: three on Davis Street and two on 23rd Avenue.

2.3 Trip Generation and Distribution

The following sections rely on data provided in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* and the ITE *Trip Generation Handbook* (see References). Detailed trip generation calculations are provided in Appendix C.

2.3.1 Proposed Trip Generation

Trip generation estimates for the Cornelius Multi-Family Development are based on the ITE regression equations for 344 multi-family DU and 31,450 square feet of multi-tenant retail space based on the ITE *Manual* data for land use codes 221 and 820, respectively.

Following the ITE *Handbook*, National Cooperative Highway Research Program (NCHRP) 684 method, internal trips were calculated between the retail and residential uses on site. The *Handbook* suggests 1% and 10% internal capture rates during the AM and PM peak hours, respectively.

Following the ITE *Handbook* data, a 34% pass-by trip rate was applied to the weekday PM peak hour shopping center (ITE 820) trips. For the weekday AM peak hour, a 17% pass-by trip rate, or half of the PM rate, is assumed.

As a conservative approach, no trips were assumed to go to and from the site to Fred Meyer on the east of the site. There were no adjustments made for transit, pedestrian, or diverted linked trips. Table 4 presents the trip generation estimates.

Table 4. Peak Hour Trip Generation for Cornelius Multi-Family Development

Land Use (ITE Code)	**Multifamily Housing Mid-Rise (221)**			**Shopping Center (820)**			**Total**		
Independent Variable	Dwelling Units			1,000 Square Feet			N/A		
Size	344			31.45			N/A		
Peak Hour Trips	**ADT**	**AM**	**PM**	**ADT**	**AM**	**PM**	**ADT**	**AM**	**PM**
Entering	936	30	88	1,369	104	111	2,305	134	199
Exiting	937	85	57	1,369	64	120	2,306	149	177
Total Trips	1,873	115	145	2,738	168	231	4,611	283	376
Internal Trips	*(446)*	*(2)*	*(42)*	*(446)*	*(2)*	*(42)*	*(892)*	*(4)*	*(84)*
External Trips	1,427	113	103	2,292	166	189	3,719	279	292
Pass-by Trips	*(0)*	*(0)*	*(0)*	*(688)*	*(28)*	*(64)*	*(688)*	*(28)*	*(64)*
Primary Trips	1,427	113	103	1,604	138	125	3,031	251	228

Note: negative values are shown in parentheses.

Findings: The Cornelius Multi-Family Development is anticipated to generate a total of 283 vehicle trips during the weekday AM peak hour, including 4 internal trips, 28 pass-by trips, and 251 primary trips. During the weekday PM peak hour, the development is anticipated to generate a total of 376 vehicle trips, including 84 internal trips, 64 pass-by trips, and 228 primary trips.

2.3.2 Proposed Trip Distributions

The pass-by trip distribution is based on the proportionate volumes traveling past the site accesses in the 2023 Without Project conditions. For the weekday PM peak hour, these proportions are as follows:

- 45% from eastbound Baseline Street
- 55% from westbound Baseline Street

For the weekday AM peak hour, the proportions are as follows:

- 55% from eastbound Baseline Street

- 45% from westbound Baseline Street

Pass-by trips are assumed to choose the site accesses based on the location of the parking of the commercial uses. The distribution and assignment of the pass-by trips for the Cornelius Multi-Family Development are shown on Figure 7.

The primary trip distribution is based on the Oregon Metro Planning, Research, and Development select zone distribution model and are rounded to the nearest 5%. Copies of the transportation model outputs are provided in Appendix C.

Trip distribution and trip generation are applied together to assign trips to access points and the studied intersections. Site-generated trips are estimated to distribute as follows:

- 55% to and from Baseline Street, east of 26th Avenue
- 5% to and from 20th Avenue, south of Baseline Street
- 15% to and from Adair Street and Baseline Street, west of 20th Avenue
- 10% to and from Davis Street, west of 19th Avenue
- 15% to and from 19th Avenue, north of Davis Street

The site-generated trips distributed to the studied intersections are assigned to specific turning movements both approaching and departing from the site. This is referred to as trip assignment.

The proposed site plan layout was reviewed to estimate the access preference to and from the site.

Figure 8 provides a graphic representation of the proposed primary trip distribution and assignment.

2.3.3 Future Volumes with Project

Figure 9 presents the 2023 With Project volumes, or the sum of the 2023 Without Project volumes and the site-generated trips, for the weekday AM and PM peak hours.

3 INTERSECTION OPERATIONS ANALYSES

3.1 Operations Description

Traffic operations are assessed in terms of level of service (LOS), a concept developed by transportation engineers to qualify the level of operation of intersections and roadways (*Highway Capacity Manual*, see References). LOS measures are classified in grades "A" through "F," indicating a range of operation, with LOS "A" signifying the best level of operation and LOS "F" representing the worst level.

LOS at intersections is quantified in terms of average delay per vehicle. LOS "A" reflects full freedom of operation for a driver, while LOS "F" represents operational failure. At unsignalized intersections, the criteria are based on the theory of gap acceptance for the stop-controlled approaches. At signalized intersections, the criteria are based on the average delay for all entering vehicles, and the LOS thresholds are based on observed driver behavior and tolerance for delays.

The volume-to-capacity (v/c) ratio quantifies the portion of the theoretical capacity consumed by traffic demand volume. A v/c ratio of zero (0.00) reflects none of the capacity is consumed and all the capacity is fully available. A v/c ratio of one (1.00) reflects all the capacity is consumed and represents operational failure. The v/c ratio typically is calculated for the critical stop-controlled intersection approach lane.

3.2 Operation Standards

Intersection mobility targets vary by jurisdiction of the roadways. All intersections under state jurisdiction in Cornelius must comply with the v/c ratios in the Oregon Highway Plan (OHP). The ODOT maximum v/c of intersection standard is 0.99 for the studied intersections on Baseline Street. LOS D is the minimum performance standard during the peak-hour operations at intersections under city jurisdiction.

3.3 Analysis Methodology

Traffic impacts were estimated to determine the changes in traffic conditions caused by the project's development. To make these determinations, the following assumptions were employed:

- The individual peak hour volumes were analyzed for 2021 and 2023.
- The peak hour factor (PHF) for the overall intersection, as calculated from the count data, was applied for the 2021 baseline analysis scenario and the future 2023 conditions. The PHF at the 23rd Avenue/Davis Street intersection was assumed to be 0.94 during the PM peak hour, similar to the 23rd Avenue/Burger King Driveway.
- A minimum heavy vehicle percentage (HV%) of 2% was assumed for each movement for all analysis scenarios (2021 and 2023). The HV% calculated from the count data was applied if it was greater than 2%.
- Baseline traffic volumes on the surrounding street system were determined prior to adding the traffic impacts of the proposed project. This was done to establish a baseline for measuring the project impacts at the time of its development. Baseline traffic volume estimates were prepared for year of buildout (2023 Without Project) volumes.
- As noted previously, trip generation estimates for the project were prepared for the weekday AM and PM peak hours on the surrounding street system.
- Cumulative traffic impacts of the proposed project were determined by adding the project-generated traffic to the baseline weekday AM and PM peak traffic at all studied intersections. This is termed the 2023 With Project conditions.

- The LOS for stop-controlled intersections was calculated with Trafficware's Synchro software, Version 10, based on *Highway Capacity Manual*, 6th Edition (see References), methodologies.
- The LOS for all signalized intersections was calculated with Trafficware's Synchro software, Version 10, based on the Transportation Research Board's *Highway Capacity Manual*, 6th Edition (2016), methodologies and with the critical intersection v/c ratio reported following the ODOT *Analysis Procedures Manual*, Chapter 13.4.4.
- Intersection results are reported differently depending on the control type.
    - Two-way stop-controlled (TWSC) intersection results report the critical approach LOS and critical movement delay and v/c ratio.
    - All-way stop-controlled, roundabout, and signalized intersection results report the overall intersection LOS, delay, and v/c ratio.

3.4 Level of Service Analyses

LOS calculation reports are provided in Appendix D. The key analysis findings are listed in the following tables.

3.4.1 2021 Existing Conditions

Table 5 describes the existing LOS for each intersection within the study area for the 2021 existing volumes during the weekday AM and PM peak hours.

Table 5. Estimated 2021 Level of Service for Existing Conditions for Study Area Intersections

Int. #	INTERSECTION	JURISDICTION *(Operating Standard)*	2021 Existing Conditions					
			AM Peak Hour			PM Peak Hour		
			LOS	*Delay (sec/veh)*	*v/c*	*LOS*	*Delay (sec/veh)*	*v/c*
1	N 26th Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	C	22.2	0.61	C	20.1	0.67
2	N 23rd Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	B	15.8	0.55	D	47.8	0.79
3	N 20th Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	B	14.9	0.62	B	17.4	0.76
4	N 23rd Avenue/Burger King Driveway[1]	*NA*	A	8.8	0.038 *(EB)*	B	10.2	0.117 *(EB)*
5	N 23rd Avenue/Davis Street	*City (LOS D minimum for approach)*	NA	NA	NA	NA	NA	NA

[1] Intersection analyzed as a one-way stop due to limitation with Synchro software.

As shown in Table 5, all studied intersections currently operate at an acceptable LOS during the weekday AM and PM peak hours.

3.4.2 2023 Future Conditions Without Project

Table 6 describes the LOS for each intersection within the study area for the 2023 Without Project conditions during the weekday AM and PM peak hours.

Table 6. Estimated 2023 Level of Service Without Project for Study Area Intersections

Int. #	**INTERSECTION**	**JURISDICTION *(Operating Standard)***	**2023 Without Project Conditions**					
			AM Peak Hour			**PM Peak Hour**		
			LOS	***Delay (sec/veh)***	***v/c***	***LOS***	***Delay (sec/veh)***	***v/c***
1	N 26th Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	C	25.9	0.68	C	23.7	0.72
2	N 23rd Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	B	14.4	0.59	D	44.9	0.82
3	N 20th Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	C	23.8	0.70	C	27.8	0.83
4	N 23rd Avenue/Burger King Driveway	*NA*	A	8.8	0.038 *(EB)*	B	10.2	0.117 *(EB)*
5	N 23rd Avenue/Davis Street	*City (LOS D minimum for approach)*	NA	NA	NA	NA	NA	NA

As shown in Table 6, all studied intersections will operate at an acceptable LOS in the 2023 year of opening Without Project conditions during the weekday AM and PM peak hours.

3.4.3 2023 Future Conditions With Project

Table 7 describes the LOS for each intersection within the study area for the 2023 With Project conditions during the weekday AM and PM peak hours.

Table 7. Estimated 2023 Level of Service With Project for Study Area Intersections

Int. #	**INTERSECTION**	**JURISDICTION *(Operating Standard)***	**2023 With Project Conditions**					
			AM Peak Hour			**PM Peak Hour**		
			LOS	***Delay (sec/veh)***	***v/c***	***LOS***	***Delay (sec/veh)***	***v/c***
1	N 26th Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	C	26.4	0.72	C	27.6	0.74
2	N 23rd Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	E	58.7	0.67	F	90.5	0.91
3	N 20th Avenue/E Baseline Street (OR 8)	ODOT *(v/c ≤ 0.99)*	C	25.2	0.71	C	28.8	0.84
4	N 23rd Avenue/Burger King Driveway	*NA*	B	14.0	0.053 *(WB)*	D	25.8	0.147 *(WB)*
5	N 23rd Avenue/Davis Street	*City (LOS D minimum for approach)*	A	8.9	0.039 *(WB)*	A	9.4	0.026 *(WB)*

As shown in Table 7, all studied intersections will operate at an acceptable LOS in the 2023 year of opening With Project conditions during the weekday AM and PM peak hours.

Findings: All studied intersections operate within the acceptable LOS during existing and future conditions during the PM peak hour.

3.5 Queuing Analysis

Queuing analysis was performed to evaluate queue storage adequacy at the studied intersections. The 95th percentile queues were estimated using simulation models in Trafficware's SimTraffic software (Version 10). The queue lengths are based on the average of 10 simulations. Because of the random simulations, some with project queue lengths are reported shorter than Without Project queue lengths. Queue demand was rounded to the nearest 25 feet, the average length of a queued vehicle. Available storage was measured from aerial photography and was rounded to the nearest 5 feet.

The following tables summarize queuing analysis results for each peak hour. Queues that exceed the available storage are shown with bold text. Data output sheets from all queuing calculations are included in Appendix E.

Table 8. AM Peak Hour Intersection Queueing Analysis

Intersection	Approach	Movement(s)	*Available Storage (Feet)*	95th Percentile Queue (Feet)		
				2021 Existing	*2023 Without Project*	*2023 With Project*
26th Avenue/Baseline Street	EB	L	315	50	75	75
		T	855	225	350	350
		T/R	855	250	400	400
	WB	L	250	100	150	125
		T	890	200	250	250
		T	890	225	300	300
		R	200	50	100	75
	NB	L/T	200	**250**	**350**	**375**
		R	55	**100**	**100**	**100**
	SB	L/T	1,000+	100	100	125
		R	85	50	50	50
23rd Avenue/Baseline Street	EB	L	250	125	175	200
		T	785	175	200	300
		T/R	785	175	225	300
	WB	L	185	50	50	75
		T	840	175	225	250
		T	840	200	250	275
		R	200	50	75	150
	NB	L/T	30	**75**	**75**	**75**
		R	30	**50**	**50**	**25**
	SB	L/T	100	**125**	**125**	**200**
		R	100	50	50	100
20th Avenue/Baseline Street	EB	L	180	175	150	150
		T	1,000+	275	325	300
		T/R	1,000+	275	300	300
	WB	L	200	100	125	125
		T	790	250	300	300
		T	790	250	300	300
		R	200	75	125	100
	NB	L	100	**125**	**175**	**175**
		T/R	280	200	275	**300**
	SB	L	165	100	150	125
		T	1,000+	100	100	100
		R	125	100	100	100
23rd Avenue/Burger King Driveway*	EB	L/T/R	125	50	50	75
	WB	L/T/R	NA	-	-	50
	NB	L	100	50	50	50
		T	100	-	-	-
		R	NA	-	-	-
	SB	L/T/R	150	-	25	50

Intersection	**Approach**	**Movement(s)**	***Available Storage (Feet)***	**95th Percentile Queue (Feet)**		
				2021 Existing	***2023 Without Project***	***2023 With Project***
23rd Avenue/ Davis Street	WB	L/R	NA	-	-	55
	NB	T/R	400	-	-	-
	SB	L/T	350	-	-	25

*The westbound approach will be constructed as part of the Cornelius Multi-Family Development, along with a northbound right-turn lane.

Queueing issues are discussed after Table 9.

Table 9. PM Peak Hour Intersection Queueing Analysis

Intersection	**Approach**	**Movement(s)**	***Available Storage (Feet)***	**95th Percentile Queue (Feet)**		
				2021 Existing	***2023 Without Project***	***2023 With Project***
26th Avenue/Baseline Street	EB	L	315	125	150	150
		T	855	175	250	250
		T/R	855	200	250	275
	WB	L	250	200	**325**	**275**
		T	890	525	625	750
		T	890	550	775	800
		R	200	200	**275**	**250**
	NB	L/T	200	150	200	175
		R	55	**100**	**100**	**100**
	SB	L/T	1,000+	75	100	100
		R	85	**100**	**100**	**100**
23rd Avenue/Baseline Street	EB	L	250	**300**	**300**	**375**
		T	785	425	475	500
		T/R	785	450	475	475
	WB	L	185	50	75	75
		T	840	450	600	775
		T	840	450	625	800
		R	200	**250**	**300**	**375**
	NB	L/T	30	**50**	**75**	**75**
		R	30	25	25	25
	SB	L/T	100	**225**	**225**	**225**
		R	100	**175**	**200**	**225**

Intersection	**Approach**	**Movement(s)**	***Available Storage (Feet)***	**95th Percentile Queue (Feet)**		
				2021 Existing	***2023 Without Project***	***2023 With Project***
20th Avenue/Baseline Street	EB	L	180	**300**	**325**	**325**
		T	1,000+	450	550	650
		T/R	1,000+	400	500	600
	WB	L	200	**325**	**400**	**425**
		T	790	775	**850**	**850**
		T	790	**800**	**875**	**875**
		R	200	**275**	**350**	**375**
	NB	L	100	**175**	**200**	**200**
		T/R	280	225	**425**	**500**
	SB	L	165	125	**200**	**200**
		T	1,000+	200	300	300
		R	125	**175**	**200**	**200**
23rd Avenue/Burger King Driveway*	EB	L/T/R	125	55	75	100
	WB	L/T/R	NA	-	-	150
	NB	L	100	75	75	100
		T	100	25	-	50
		R	NA	-	-	-
	SB	L/T/R	150	100	125	**375**
23rd Avenue/ Davis Street	WB	L/R	NA	-	-	50
	NB	T/R	400	-	-	-
	SB	L/T	350	-	-	25

*The westbound approach will be constructed as part of the Cornelius Multi-Family Development, along with a northbound right-turn lane.

Queue lengths at several intersections were noted as longer than the existing storage capacity. Some are due to background traffic associated with long queues on Baseline Street and some are related to in-process trips that the project adds to the queue length:

- At the 26th Avenue/Baseline Street intersection, the westbound left- and right-turn lanes and northbound and southbound right-turn lanes have queuing issues during either the weekday AM or PM peak hour. The development does not contribute trips to these movements.
- At the 23rd Avenue/Baseline Street intersection, the eastbound left-turn lane, westbound right-turn lane, northbound and southbound approaches have queuing issues during either the weekday AM or PM peak hour.

  The westbound right-turn queue is related to the westbound through lane queues extended beyond the right-turn lane and blocking access. The project does not add trips to the westbound through lane at 23rd Avenue/Baseline Street or contribute to the queue length.

  The eastbound left-turn queue is related to the eastbound through lane queues extending beyond the left-turn lane and blocking access. The project does not add trips to the eastbound through lane at 23rd Avenue/Baseline Street or contribute to the queue length.

  The northbound storage is substantially too small to address queueing. The build-out of the site is anticipated to increase the queue by one vehicle but will not significantly disrupt operation.

- At the 20th Avenue/Baseline Street intersection, the eastbound left-turn lane, all the westbound and northbound approach lanes, and southbound left- and right-turn lanes have queuing issues during the weekday AM and PM peak hours.

Project-related queueing:
The southbound queue on 23rd Avenue at Baseline Street extends into the 23rd Avenue/Burger King intersection. With the project, the queue will extend past the 23rd Avenue/Burger King intersection. This can be addressed with the following mitigation:

- Remove stop sign on southbound 23rd Avenue at the Burger King Driveway.
- Install "do not block intersection" signing and markings at the 23rd Avenue/Burger King Driveway for southbound 23rd Avenue approach.

Findings: Queuing issues caused by existing conditions were identified at several approach lanes at study intersections during the weekday PM peak hour.

Queuing on southbound 23rd Avenue due to the project may increase by one vehicle.

Recommendations: Remove stop sign on southbound 23rd Avenue at the Burger King Driveway. Install "do not block intersection" signing and markings at the 23rd Avenue/Burger King Driveway for southbound 23rd Avenue approach.

4 SAFETY ANALYSIS

4.1 Left- and Right-Turn Lane Storage Analysis

The criteria for the provision of left-turn lanes at uncontrolled intersection approaches are based on the ODOT *Analysis Procedure Manual*, Exhibit 12-1, Left-Turn Lane Criterion, Texas Transportation Institute Curves. The exhibit provides guideline curves for posted speeds of less than or equal to 35, 45, and greater than or equal to 55 mph. Appendix F presents the evaluation for 2023 With Project conditions at the proposed 23rd Avenue/Davis Street intersection. The assumed speed limit along Davis Street is 25 mph.

The criteria for the analysis of right-turn lanes at uncontrolled intersection legs are based on the ODOT *Analysis Procedure Manual*, Right-Turn Lane Criterion (Exhibit 12-2). Appendix F presents the evaluation for 2023 With Project conditions at the proposed 23rd Avenue/Davis Street intersection.

Findings: The proposed 23rd Avenue/Davis Street intersection does not meet the ODOT criteria for a southbound left-turn lane or a northbound right-turn lane.

4.2 Collision Analysis

Collision data from the study area were obtained from ODOT for the five-year period spanning from January 1, 2015 through December 31, 2019. This analysis assumes that a collision rate less than the critical collision rate for the intersection is typically considered to be within acceptable parameters. A collision rate above the critical rate is worthy of further examination. The detailed collision data is provided in Appendix G. Table 10 presents the results of the collision analysis.

Table 10. Collision Analysis for Study Area Intersections (January 2015 through December 2019)

Intersection	Angle	Rear-End	Left-Turn	Right-Turn	Pedestrian	Bike	Total Collisions	Collison Rate	Critical Rate
26th Avenue/Baseline Street	1	11	14	3	2	-	31	0.50	0.75
23rd Avenue/Baseline Street	1	1	2	-	1	-	5	0.08	0.76
20th Avenue/Baseline Street	3	7	5	-	2	1	18	0.27	0.75

To calculate the collision rate, the PM peak hour total entering volumes from the existing turning movement counts were multiplied by 10 to provide an approximation of the average daily trips (ADT). Detailed calculations of critical rates and collision rates are provided in Appendix G.

As shown in Table 10, all the calculated collision rates are lower than the critical rates. At 26th Avenue/Baseline Street, two serious injuries were reported: one pedestrian related and the other was a vehicle making a left turn. At 20th Avenue/Baseline Street, one serious injury due to a rear-end collision was reported. Because of the low number of crashes and lack of serious injuries at the intersections within the study area, no significant pattern or concerns were identified. This finding is in-line with the safety analysis presented in the City's Transportation System Plan that included similar study intersections.

Findings: The 2015–2019 collision history at the study intersections was reviewed; all intersections have collision rates lower than the critical rate, and no patterns of collision types or of severe collisions were identified.

4.3 Pedestrian, Bicycle, and Transit Facilities

Pedestrian facilities will be available at most locations throughout the vicinity of the proposed site. All driveways, sidewalks, crosswalks, and curb ramps constructed or modified with the development should be compliant with the current Americans with Disabilities Act (ADA) guidelines.

The site plan has a planned crosswalk across the south leg of the 23rd Avenue/Burger King Driveway. PBS proposes moving the crosswalk to the north of the intersection. This will shorten the pedestrian crossing distance through 23rd Avenue (uncontrolled roadway), making it safer for pedestrians to cross. Any marked crosswalk will require an ADA-compliant ramp at each end of the crosswalk.

There is a proposed multi-use path on Davis Street along with the development. There are planned bike lanes on several roadways in the vicinity, including bike lanes on 19th Avenue and 26th Avenue, according to Figure 6-1 in the City’s Transportation System Plan.

The nearest bus stop is available on Baseline Street, approximately 300 feet to the west of the site. TriMet bus route 57 provides eastbound and westbound service along Baseline Street on 15-minute service intervals every day.

Finding: Pedestrian, bicycle, and transit facilities will be readily available for future subdivision residents in the study area.

Recommendation: Construct standard frontage improvements, including sidewalks, along 23rd Avenue and Davis Street. Assure all driveways, sidewalks, crosswalks, and curb ramps constructed with the subdivision project comply with current ADA guidelines.

Recommendation: Move proposed crosswalk across the south leg of the 23rd Avenue/Burger King Driveway to the north of the intersection.

4.4 Roadway Alignment

Davis Street will be a public street and the development will construct the portion of Davis Street that is within the site. The Davis Street roadway is proposed to follow the roadway alignment along the north and east of the Fred Meyer parking lot. The development will construct Davis Street with a “T” intersection that is approximately 150 feet to the south of the existing horizontal curve along Davis Street. The future Davis Street intersects 23rd Avenue and will not to be aligned with any of the Fred Meyer driveways along the east of the Fred Meyer parking lot.

The existing Davis Street horizontal curve, at the northeast corner of the Fred Meyer parking lot, is below the American Association of State Highway and Transportation Officials (AASHTO) minimum curve radius for a 25-mph design speed. The following enhancements are recommended to minimize safety risk:

- Replace existing streetlight with two streetlights that meet city standards.
- Install a double-yellow center line using raised pavement markers.
- Install advance curve ahead signs and curve signs in compliance with the Manual on Uniform Traffic Control Devices (MUTCD).

Recommendation: PBS recommends that the horizontal curve on Davis Street, at the northeast corner of the Fred Meyer parking lot, include the following safety enhancements due to the short radius:

- Replace existing streetlight with two streetlights that meet city standards.
- Install a double-yellow center line using raised pavement markers.
- Install advance curve ahead signs and curve signs in compliance with MUTCD.

4.5 Sight Distance at Site Access Locations

The Cornelius Multi-Family Development proposed site accesses do not currently exist, and sight distances were evaluated digitally. The generally flat terrain and moderately curved alignment of 23rd Avenue and Davis Street suggest that adequate sight distances should be achievable through design and construction of the proposed intersections on 23rd Avenue and future Davis Street.

No other physical limitations exist such as vertical curves or steep embankments to obstruct existing or future sight distance. It is recommended to design the proposed access points in accordance with Chapter 9.5.3 of the AASHTO *A Policy on the Geometric Design of Highways and Streets*, 7th Edition (2018), based on the accessed roadways' respective posted speeds. Install no objects within the sight distance triangles that would block exiting drivers' view of approaching traffic.

From the drone footage, PBS noticed vehicles cutting into the opposing vehicle lane when making a corner along the curved roadway on the northeast corner of the Fred Meyer parking lot. PBS recommends adding a median along that curve to improve safety along that curved roadway.

Finding: Digital review of the current conditions along 23rd Avenue and future Davis Street suggests that adequate sight distances should be achievable through design and construction of the proposed access intersections.

Recommendation: Design the proposed access points consistent with AASHTO guidelines for intersection sight distance. Install no objects within the sight distance triangles that would block exiting drivers' view at the access points.

5 FINDINGS SUMMARY

The findings of this TIA are summarized below from the foregoing narrative.

5.1 Present Traffic Volumes

Present 2021 peak hour volumes, collected in September and October 2021, were not adjusted for COVID-19 impacts because volumes were found to be higher than the projected 2021 volumes using the historic peak hour volumes.

A historical growth rate of 1% (geometric growth) was estimated using data from ODOT's nearby ATR stations.

A 2% seasonal adjustment was applied to increase all the studied intersections during the AM and PM peak hours.

5.2 Future Traffic Volumes

Generic background growth (at 1% for 2 years) was assumed to add approximately 1% to the 2021 baseline volumes to estimate 2023 Without Project volumes.

5.3 Access and Circulation

The project proposes five full movement accesses: three on Davis Street and two on 23rd Avenue.

5.4 Trip Generation

The Cornelius Multi-Family Development is anticipated to generate a total of 283 vehicle trips during the weekday AM peak hour, including 4 internal trips, 28 pass-by trips, and 251 primary trips. During the weekday PM peak hour, the development is anticipated to generate a total of 376 vehicle trips, including 84 internal trips, 64 pass-by trips, and 228 primary trips.

5.5 Intersection Performance

All studied intersections operate within the acceptable LOS during existing and future conditions during the PM peak hour.

5.6 Queueing Analysis

Queuing issues caused by existing conditions were identified at several approach lanes at study intersections during the weekday PM peak hour.

Queuing on southbound 23rd Avenue due to the project may increase by one vehicle.

5.7 Turn Lane Evaluations

The proposed 23rd Avenue/Davis Street intersection does not meet the ODOT criteria for a southbound left-turn lane or a northbound right-turn lane.

5.8 Collision Analysis

The 2015–2019 collision history at the study intersections was reviewed; all intersections have collision rates lower than the critical rate, and no patterns of collision types or of severe collisions were identified.

5.9 Transit, Pedestrian, and Bicycle Facilities

Pedestrian, bicycle, and transit facilities will be readily available for future subdivision residents in the study area.

5.10 Access Intersection Sight Distance

Digital review of the current conditions along 23rd Avenue and future Davis Street suggests that adequate sight distances should be achievable through design and construction of the proposed access intersections.

6 RECOMMENDATIONS SUMMARY

The traffic impact analysis supports the following recommendations, which are summarized from the above narrative.

6.1 Queueing Analysis

Remove stop sign on southbound 23rd Avenue at the Burger King Driveway.

Install "do not block intersection" signing and markings at the 23rd Street/Burger King Driveway for southbound 23rd Avenue approach.

6.2 Accessible Pedestrian Facilities

Construct standard frontage improvements, including sidewalks, along 23rd Avenue and Davis Street. Assure all driveways, sidewalks, crosswalks, and curb ramps constructed with the subdivision project comply with current ADA guidelines.

Move proposed crosswalk across the south leg of the 23rd Avenue/Burger King Driveway to the north of the intersection.

6.3 Roadway Alignment

PBS recommends that the horizontal curve on Davis Street, at the northeast corner of the Fred Meyer parking lot, include the following safety enhancements due to the short radius:

- Replace existing streetlight with two streetlights that meet city standards.
- Install a double-yellow center line using raised pavement markers.
- Install advance curve ahead signs and curve signs in compliance with MUTCD.

6.4 Access Intersection Sight Lines

Design the proposed access points consistent with AASHTO guidelines for intersection sight distance. Install no objects within the sight distance triangles that would block exiting drivers' view at the access points.

7 REFERENCES

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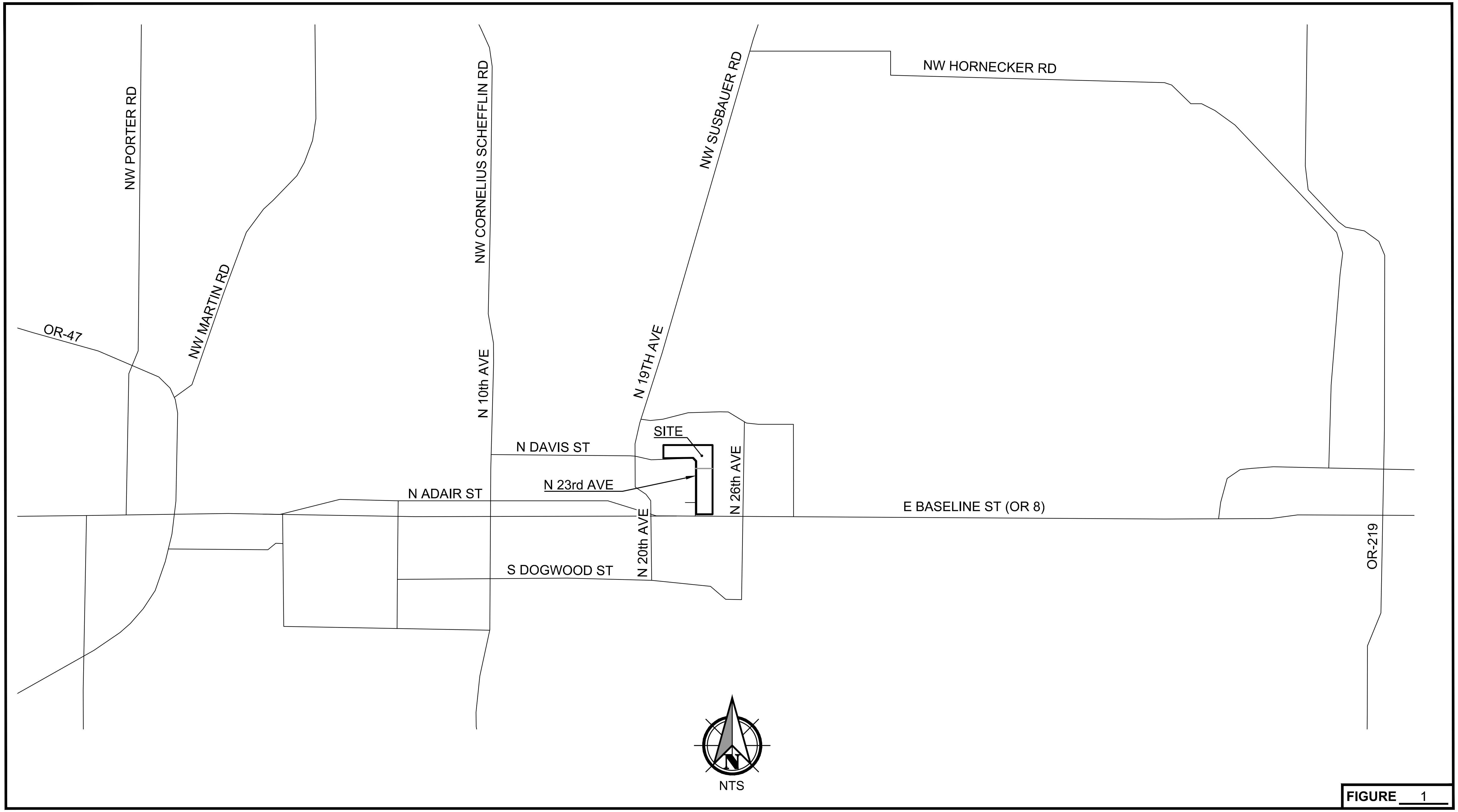
Figures



Vicinity Map

Cornelius Multi-Family Development

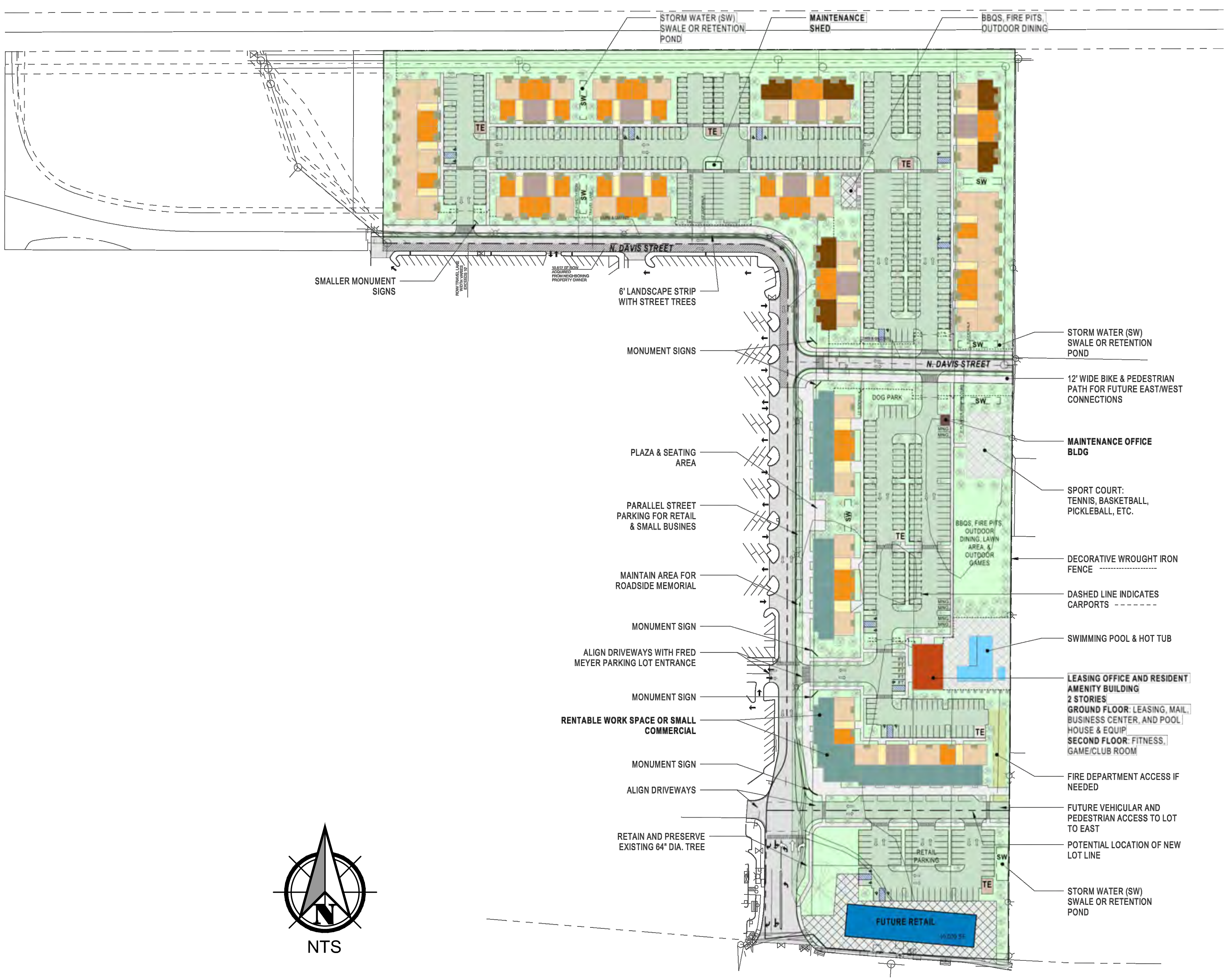


FIGURE 2

Site Plan

Cornelius Multi-Family Development

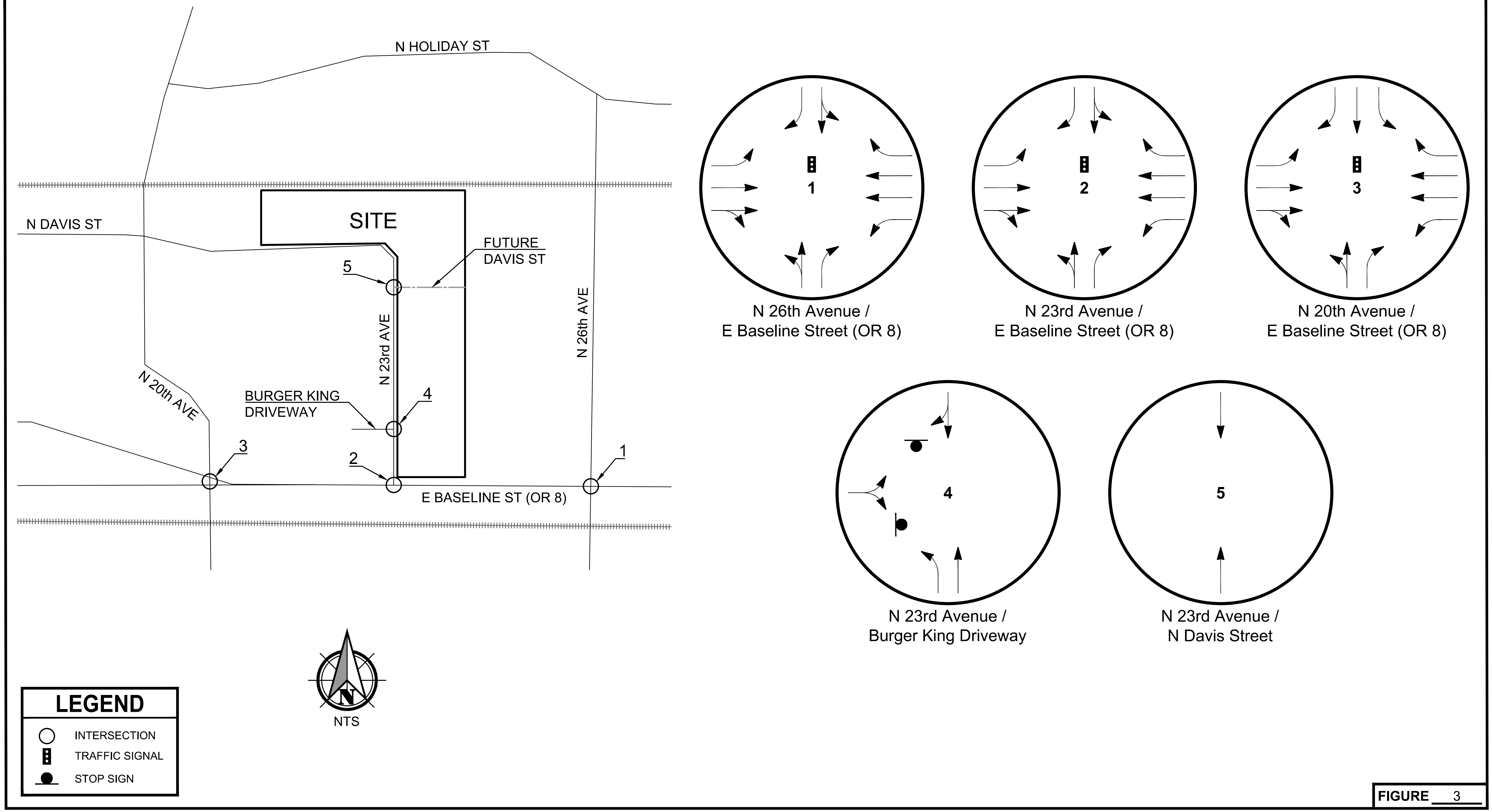


FIGURE 3

Existing Traffic Control and Lane Configuration

Cornelius Multi-Family Development

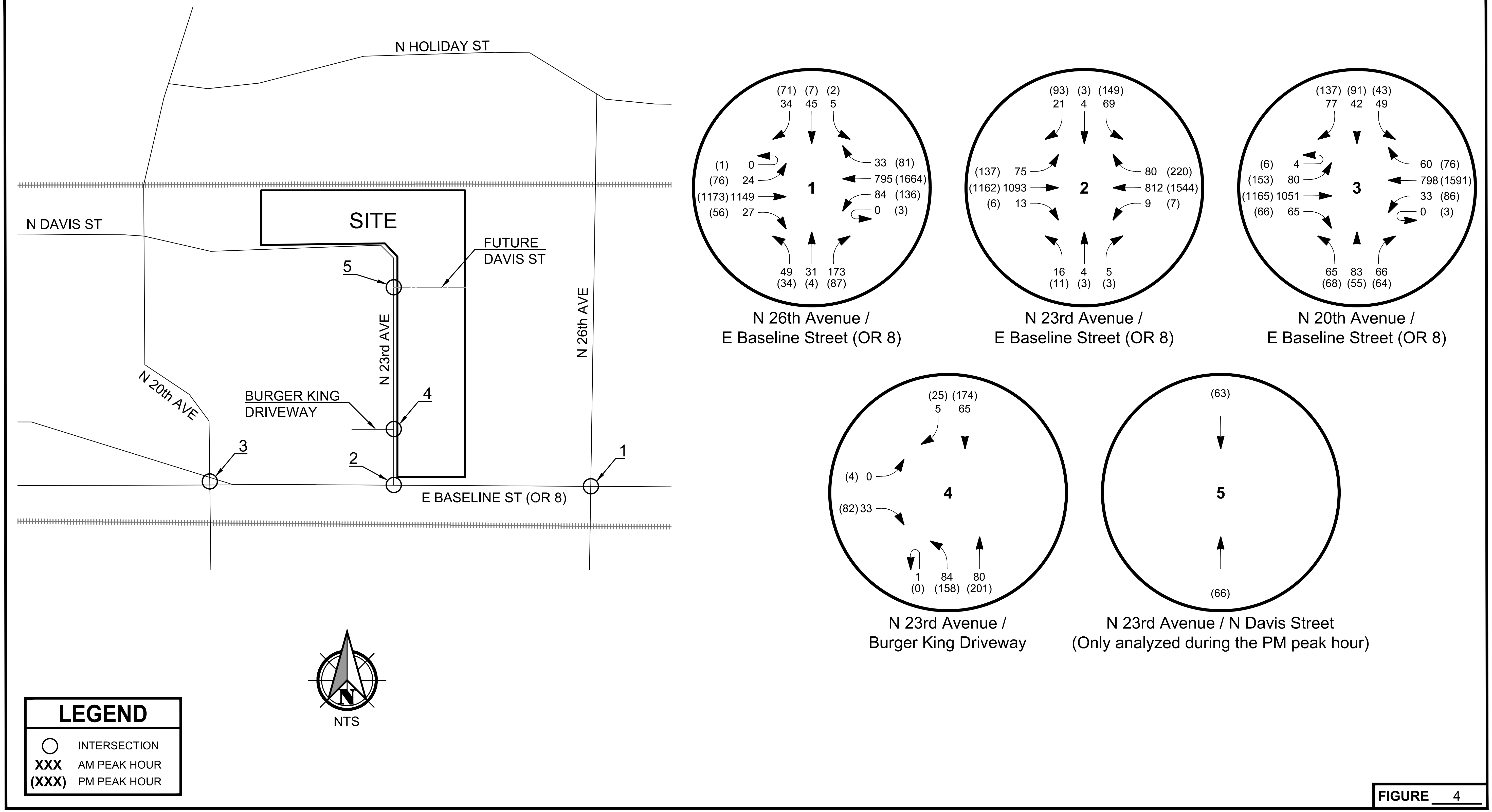


FIGURE 4

2021 Existing Volumes

Cornelius Multi-Family Development

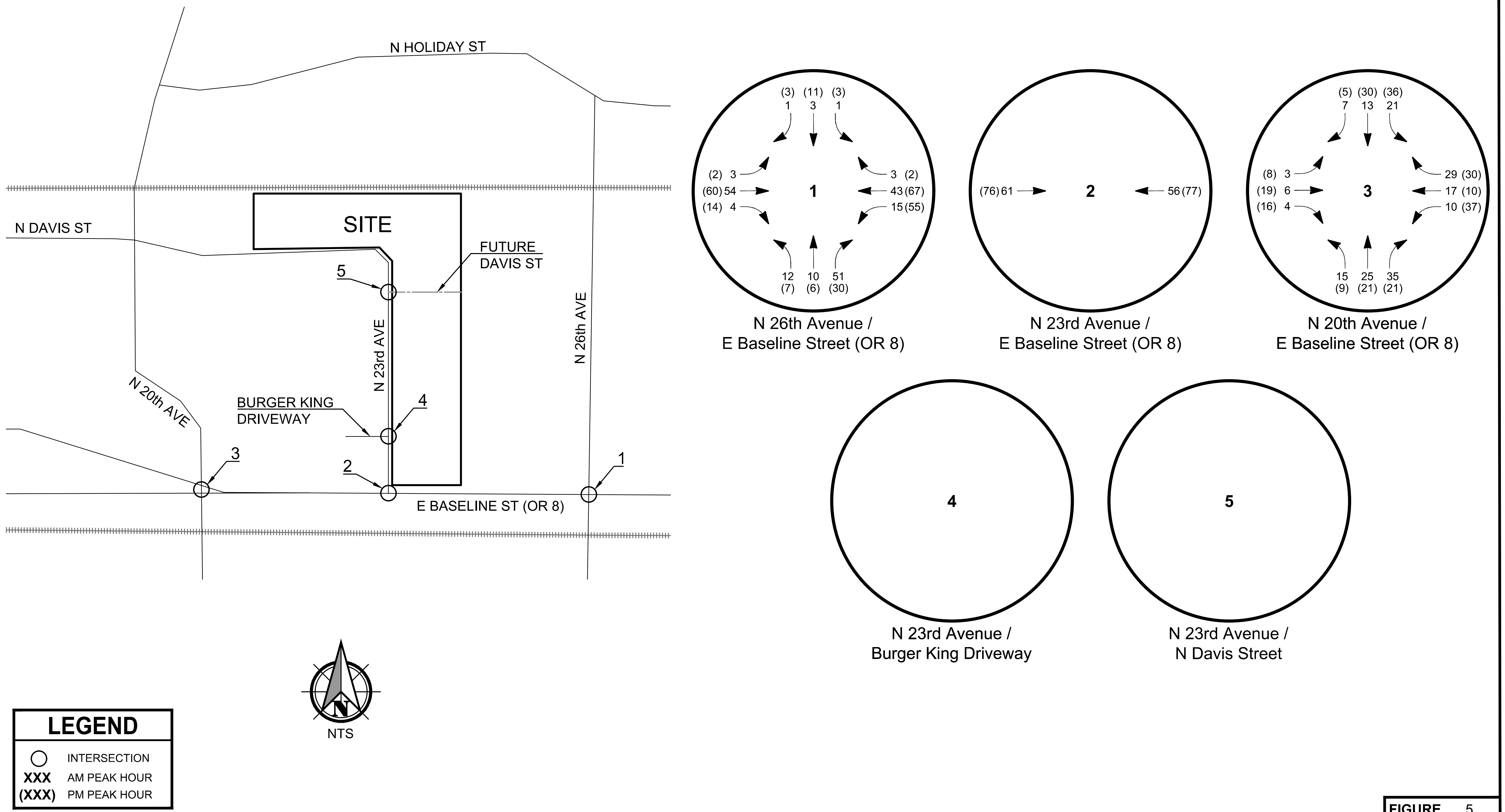


FIGURE 5

In-process Project Trips

Cornelius Multi-Family Development

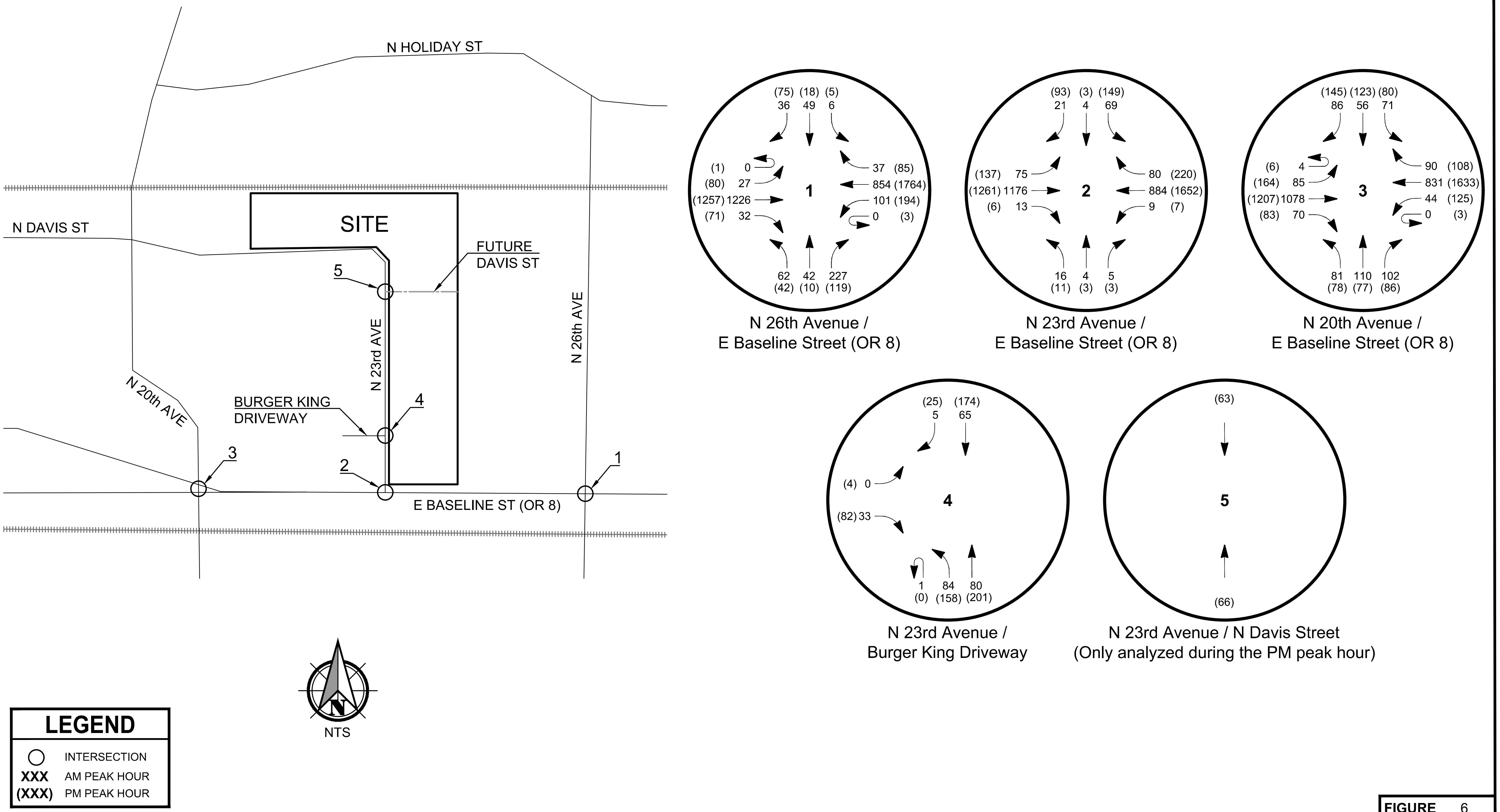
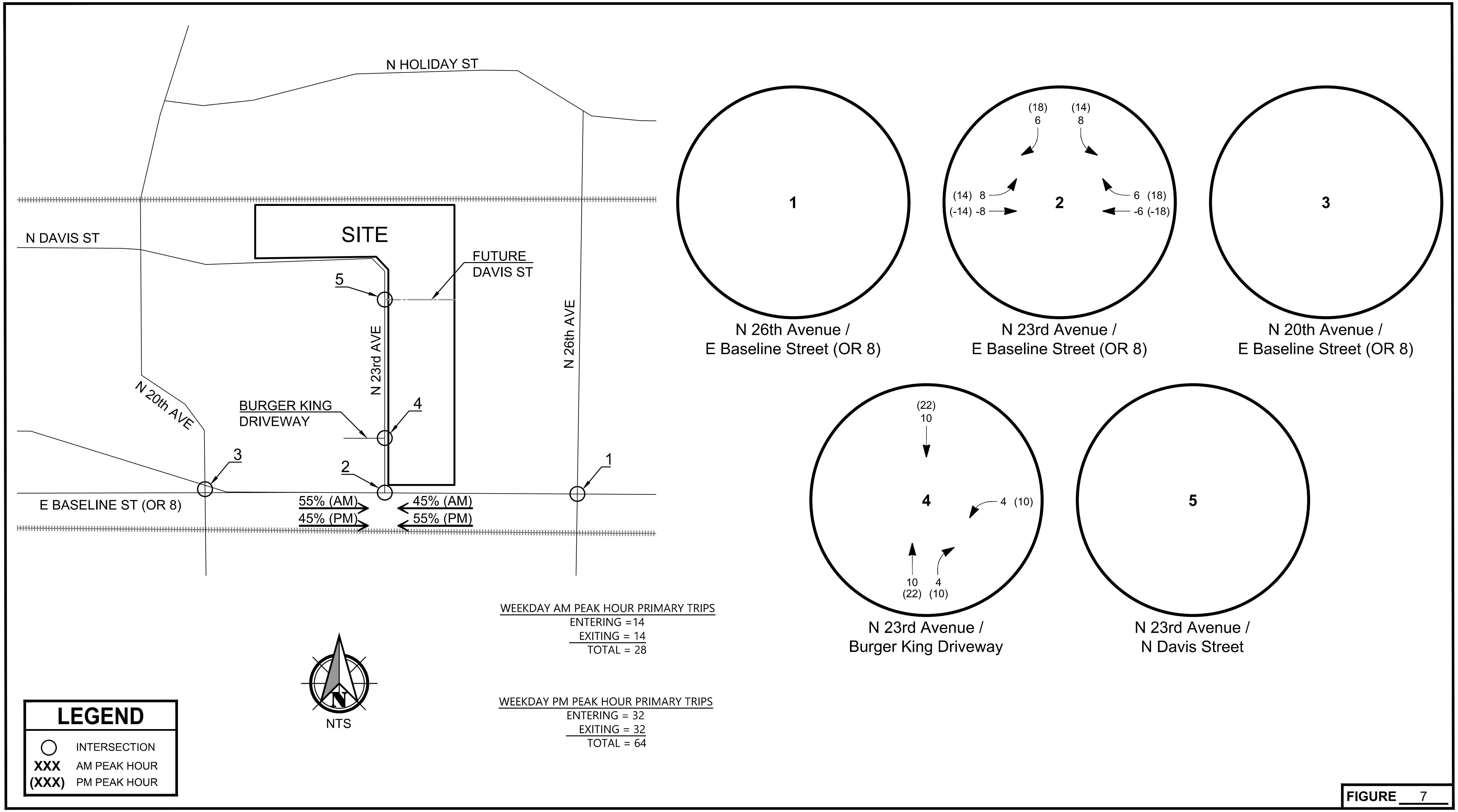


FIGURE 6

2023 Without Project

Cornelius Multi-Family Development



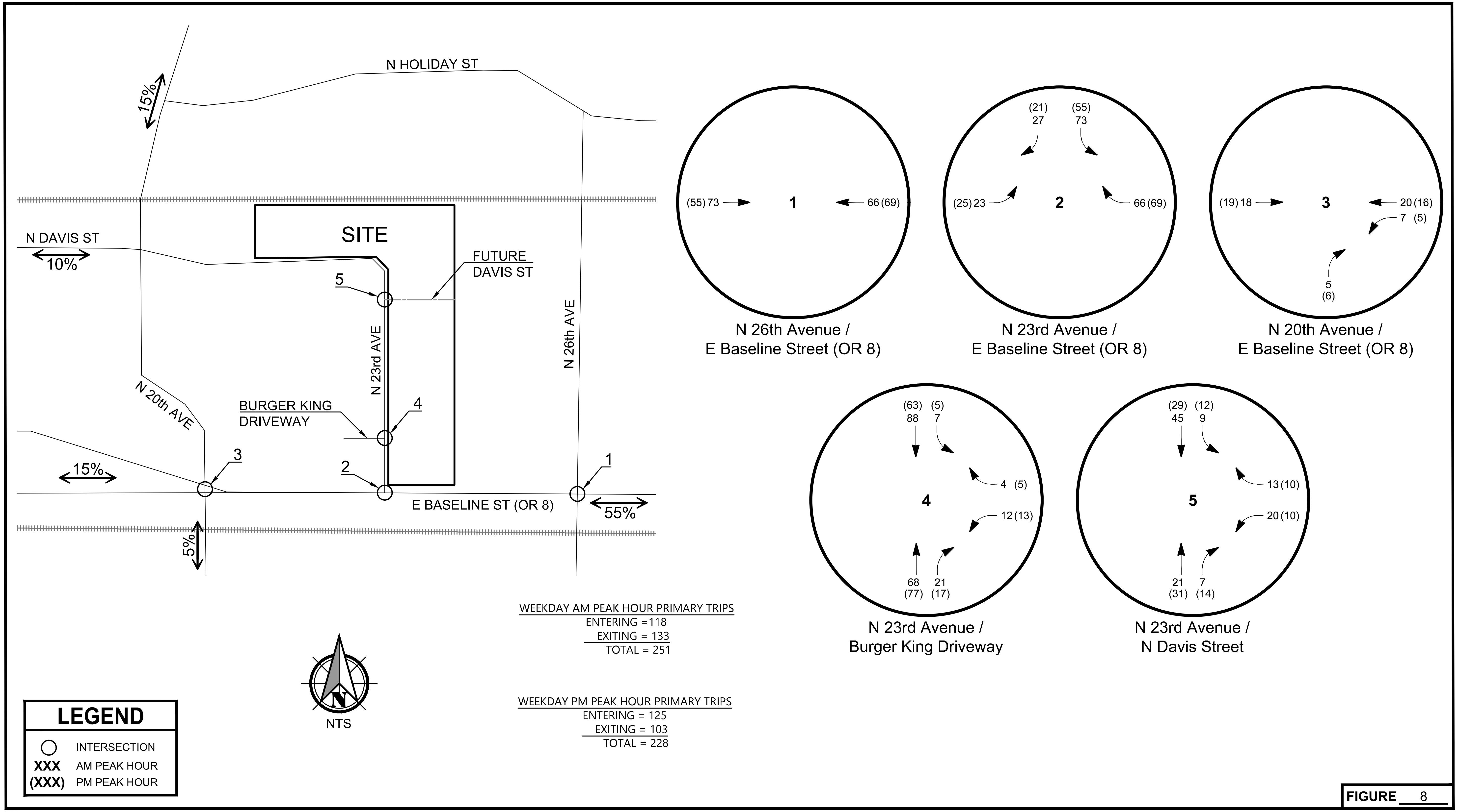
WEEKDAY AM PEAK HOUR PRIMARY TRIPS
ENTERING =14
EXITING = 14
TOTAL = 28

WEEKDAY PM PEAK HOUR PRIMARY TRIPS
ENTERING = 32
EXITING = 32
TOTAL = 64

FIGURE 7

Pass-By Trip Distribution and Assignment

Cornelius Multi-Family Development



WEEKDAY AM PEAK HOUR PRIMARY TRIPS
ENTERING =118
EXITING = 133
TOTAL = 251

WEEKDAY PM PEAK HOUR PRIMARY TRIPS
ENTERING = 125
EXITING = 103
TOTAL = 228

Primary Trip Distribution and Assignment

Cornelius Multi-Family Development

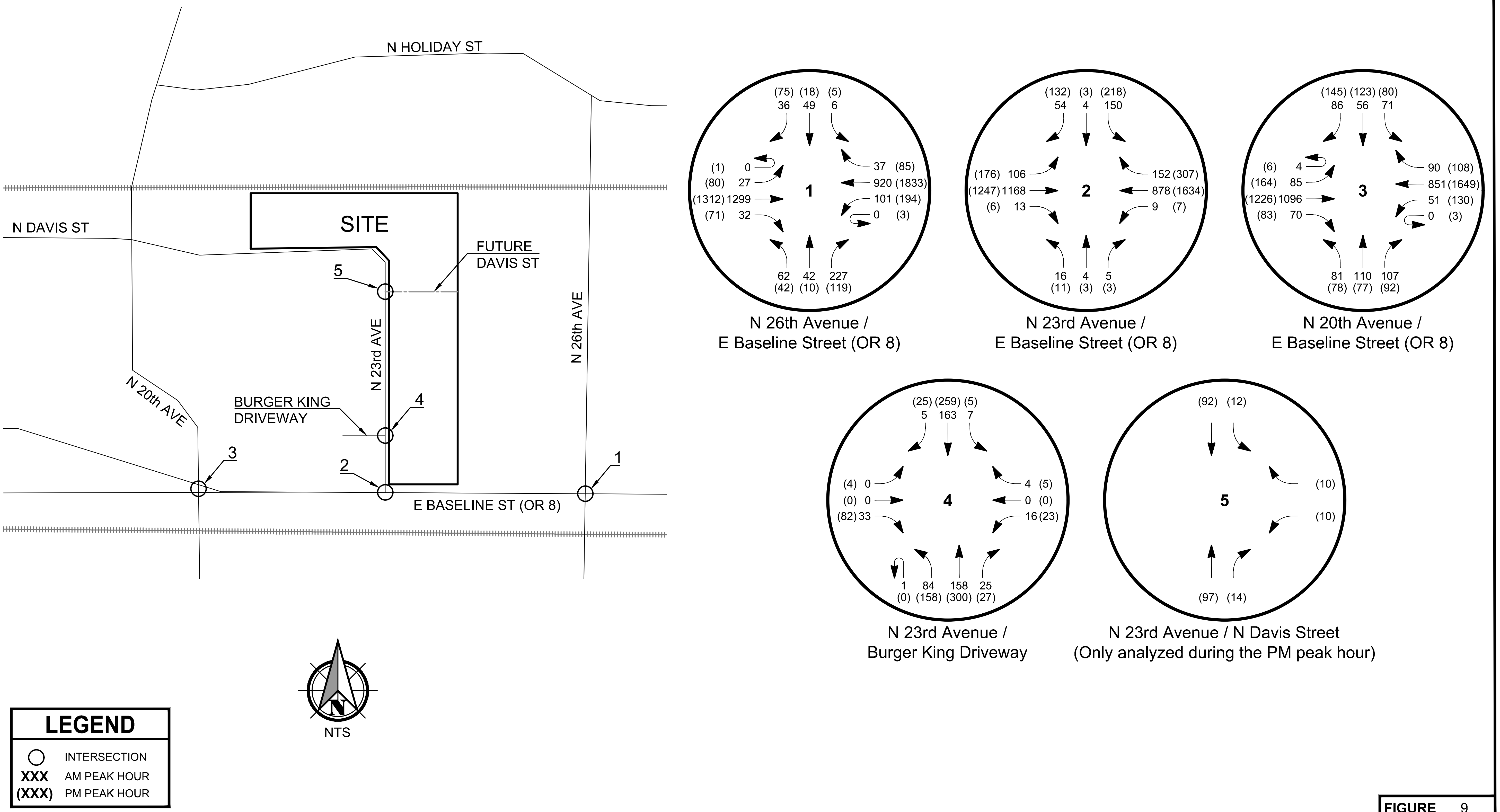


FIGURE 9

2023 With Project Volumes

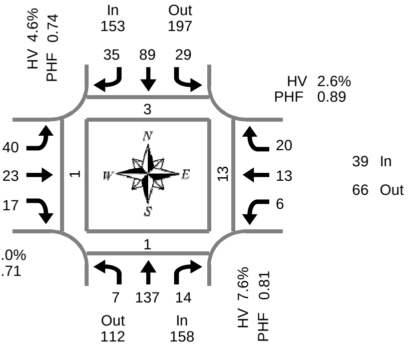
Cornelius Multi-Family Development

Appendix A

Traffic Counts

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:10 AM to 8:10 AM

N 19th Ave & NE Davis St

Wednesday, August 08, 2018
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Interval
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total
7:00 AM	0	11	1	0	4	5	4	0	3	1	2	0	0	1	1	0	33
7:05 AM	1	9	0	0	1	5	0	0	6	1	1	0	0	1	1	0	26
7:10 AM	1	9	0	0	6	6	3	0	2	1	1	0	0	0	3	0	32
7:15 AM	2	14	0	0	6	5	1	0	5	1	1	0	0	2	1	0	38
7:20 AM	0	8	0	0	0	5	0	0	2	3	3	0	1	1	3	0	26
7:25 AM	0	15	1	0	3	12	1	0	5	3	5	0	0	2	0	0	47
7:30 AM	0	13	0	0	1	4	5	0	6	0	0	0	0	1	1	0	31
7:35 AM	1	10	1	0	1	10	5	0	3	2	2	0	2	0	2	0	39
7:40 AM	0	15	4	0	2	6	2	0	1	2	0	0	0	0	2	0	34
7:45 AM	0	7	2	0	2	6	4	0	4	2	0	0	0	3	1	0	31
7:50 AM	1	17	3	0	2	15	3	0	5	2	1	0	1	0	2	0	52
7:55 AM	0	10	1	0	2	8	10	0	2	2	2	0	1	0	1	0	39
8:00 AM	2	9	2	0	1	5	0	0	2	1	0	0	0	1	1	0	24
8:05 AM	0	10	0	0	3	7	1	0	3	4	2	0	1	3	3	0	37
8:10 AM	0	10	1	0	1	8	2	0	2	0	1	0	1	0	1	0	27
8:15 AM	0	7	2	0	5	4	3	0	2	2	0	0	0	3	0	0	28
8:20 AM	0	6	0	0	2	7	3	0	2	2	4	0	1	1	0	0	28
8:25 AM	0	16	0	0	0	6	2	0	3	1	0	0	1	2	3	0	34
8:30 AM	1	12	3	0	2	9	6	0	3	5	2	0	2	1	0	0	46
8:35 AM	2	11	0	0	4	3	0	0	2	1	1	0	1	0	1	0	26
8:40 AM	1	7	1	0	2	6	1	0	1	4	1	0	0	0	2	0	26
8:45 AM	0	10	0	0	3	9	5	0	3	2	2	0	0	2	2	0	38
8:50 AM	0	8	3	0	0	8	3	0	2	2	3	0	0	1	4	0	34
8:55 AM	0	7	1	0	2	7	2	0	1	2	2	0	0	3	3	0	30
Total Survey	12	251	26	0	55	166	66	0	70	46	36	0	12	28	38	0	806

Pedestrians			
Crosswalk			
North	South	East	West
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	2	0
0	0	0	0
0	0	2	0
0	0	0	0
0	0	2	0
1	1	0	1
0	0	2	0
0	0	2	0
2	0	3	0
0	0	0	0
0	0	1	0
1	0	1	0
0	0	0	0
0	0	0	0
1	0	1	0
1	0	0	0
0	0	0	0
1	0	1	0
0	0	0	0
7	1	17	1

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Interval
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total
7:00 AM	2	29	1	0	11	16	7	0	11	3	4	0	0	2	5	0	91
7:15 AM	2	37	1	0	9	22	2	0	12	7	9	0	1	5	4	0	111
7:30 AM	1	38	5	0	4	20	12	0	10	4	2	0	2	1	5	0	104
7:45 AM	1	34	6	0	6	29	17	0	11	6	3	0	2	3	4	0	122
8:00 AM	2	29	3	0	5	20	3	0	7	5	3	0	2	4	5	0	88
8:15 AM	0	29	2	0	7	17	8	0	7	5	4	0	2	6	3	0	90
8:30 AM	4	30	4	0	8	18	7	0	6	10	4	0	3	1	3	0	98
8:45 AM	0	25	4	0	5	24	10	0	6	6	7	0	0	6	9	0	102
Total Survey	12	251	26	0	55	166	66	0	70	46	36	0	12	28	38	0	806

Pedestrians			
Crosswalk			
North	South	East	West
0	0	0	0
0	0	2	0
0	0	2	0
1	1	4	1
2	0	5	0
1	0	2	0
2	0	1	0
1	0	1	0
7	1	17	1

Peak Hour Summary
7:10 AM to 8:10 AM

By	Northbound				Southbound				Eastbound				Westbound				
Approach	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	158	112	270	0	153	197	350	0	80	55	135	0	39	66	105	0	430
%HV	7.6%				4.6%				0.0%				2.6%				4.7%
PHF	0.81				0.74				0.71				0.89				0.88

Pedestrians			
Crosswalk			
North	South	East	West
3	1	13	1

By	Northbound				Southbound				Eastbound				Westbound				
Movement	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	7	137	14	158	29	89	35	153	40	23	17	80	6	13	20	39	430
%HV	0.0%	7.3%	14.3%	7.6%	3.4%	6.7%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	2.6%	4.7%
PHF	0.58	0.88	0.39	0.81	0.60	0.77	0.51	0.74	0.71	0.82	0.47	0.71	0.75	0.65	0.71	0.89	0.88

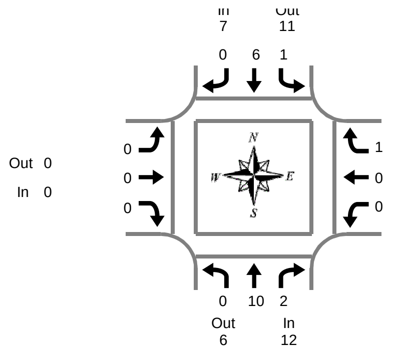
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval	Northbound				Southbound				Eastbound				Westbound				
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Interval
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total
7:00 AM	6	138	13	0	30	87	38	0	44	20	18	0	5	11	18	0	428
7:15 AM	6	138	15	0	24	91	34	0	40	22	17	0	7	13	18	0	425
7:30 AM	4	130	16	0	22	86	40	0	35	20	12	0	8	14	17	0	404
7:45 AM	7	122	15	0	26	84	35	0	31	26	14	0	9	14	15	0	398
8:00 AM	6	113	13	0	25	79	28	0	26	26	18	0	7	17	20	0	378

Pedestrians			
Crosswalk			
North	South	East	West
1	1	8	1
3	1	13	1
4	1	13	1
6	1	12	1
6	0	9	0

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
7:10 AM to 8:10 AM

N 19th Ave & NE Davis St

Wednesday, August 08, 2018
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound N 19th Ave				Southbound N 19th Ave				Eastbound N Davis St				Westbound NE Davis St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:10 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
7:15 AM	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:25 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:35 AM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
7:50 AM	0	2	1	3	0	2	0	2	0	0	0	0	0	0	0	0	5
7:55 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
8:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:05 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:10 AM	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
8:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:20 AM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
8:25 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	4
8:30 AM	1	0	0	1	0	1	0	1	0	0	0	0	2	0	0	2	4
8:35 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:40 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:45 AM	0	2	0	2	1	0	0	1	0	0	0	0	0	0	0	0	3
8:50 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
8:55 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Survey	1	14	2	17	2	19	0	21	0	0	0	0	3	0	1	4	42

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound N 19th Ave				Southbound N 19th Ave				Eastbound N Davis St				Westbound NE Davis St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2
7:15 AM	0	4	0	4	0	1	0	1	0	0	0	0	0	0	0	0	5
7:30 AM	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	3
7:45 AM	0	4	1	5	1	2	0	3	0	0	0	0	0	0	0	0	8
8:00 AM	0	2	0	2	0	1	0	1	0	0	0	0	1	0	0	1	4
8:15 AM	0	0	0	0	0	8	0	8	0	0	0	0	0	0	0	0	8
8:30 AM	1	1	0	2	0	2	0	2	0	0	0	0	2	0	0	2	6
8:45 AM	0	2	0	2	1	3	0	4	0	0	0	0	0	0	0	0	6
Total Survey	1	14	2	17	2	19	0	21	0	0	0	0	3	0	1	4	42

Heavy Vehicle Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound N 19th Ave			Southbound N 19th Ave			Eastbound N Davis St			Westbound NE Davis St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	12	6	18	7	11	18	0	0	0	1	3	4	20
PHF	0.60			0.58			0.00			0.25			0.63

By Movement	Northbound N 19th Ave				Southbound N 19th Ave				Eastbound N Davis St				Westbound NE Davis St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	10	2	12	1	6	0	7	0	0	0	0	0	0	1	1	20
PHF	0.00	0.63	0.50	0.60	0.25	0.75	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.63

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

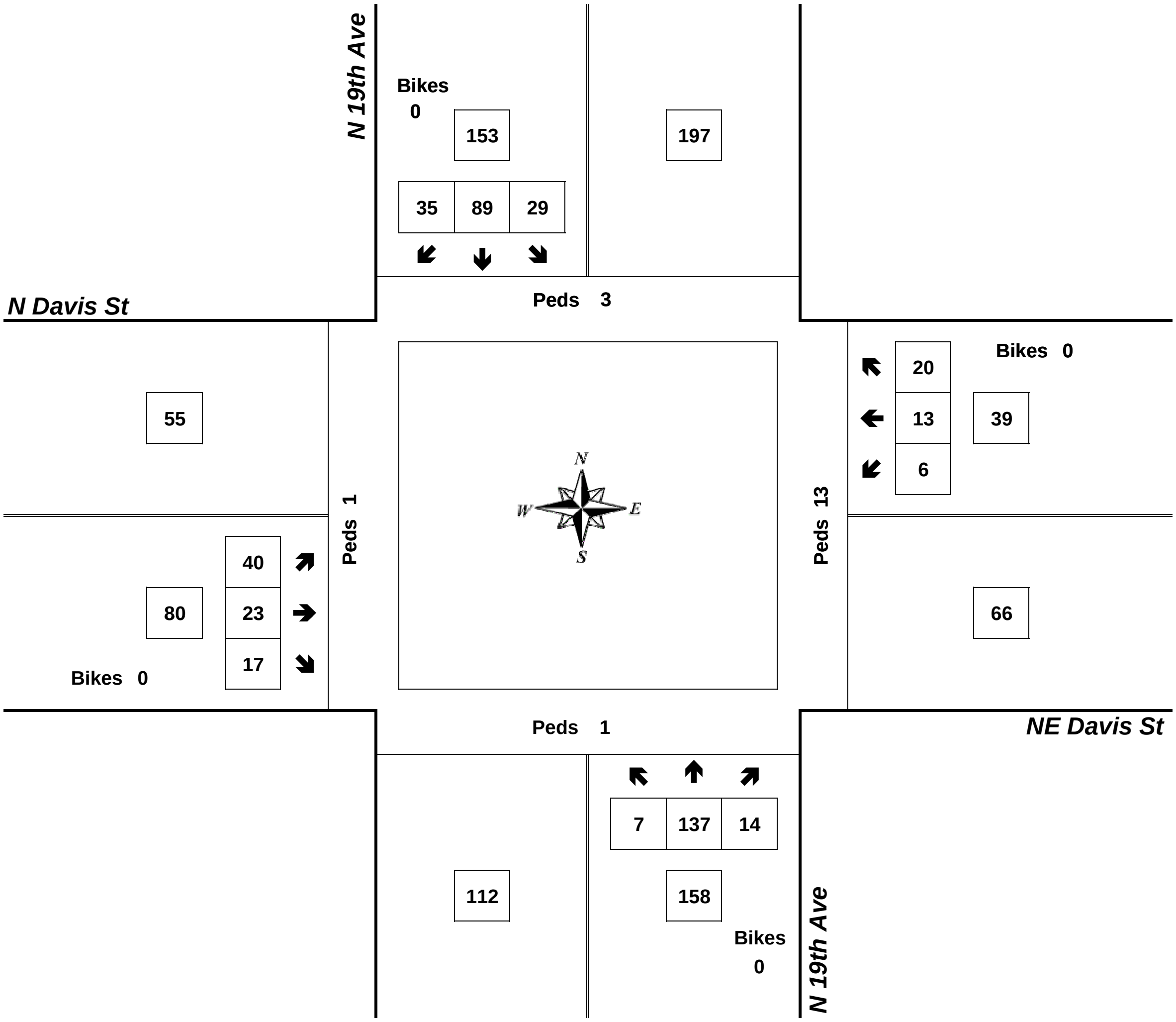
Interval Start Time	Northbound N 19th Ave				Southbound N 19th Ave				Eastbound N Davis St				Westbound NE Davis St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	9	2	11	1	5	0	6	0	0	0	0	0	0	1	1	18
7:15 AM	0	11	2	13	1	5	0	6	0	0	0	0	1	0	0	1	20
7:30 AM	0	7	2	9	1	12	0	13	0	0	0	0	1	0	0	1	23
7:45 AM	1	7	1	9	1	13	0	14	0	0	0	0	3	0	0	3	26
8:00 AM	1	5	0	6	1	14	0	15	0	0	0	0	3	0	0	3	24

Peak Hour Summary

Clay Carney
(503) 833-2740

N 19th Ave & NE Davis St

7:10 AM to 8:10 AM
Wednesday, August 08, 2018

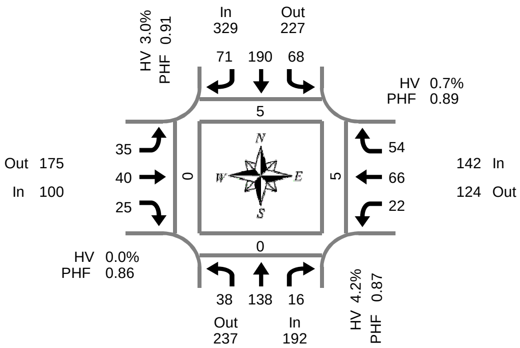


Approach	PHF	HV%	Volume
EB	0.71	0.0%	80
WB	0.89	2.6%	39
NB	0.81	7.6%	158
SB	0.74	4.6%	153
Intersection	0.88	4.7%	430

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

Clay Carney
(503) 833-2740



Peak Hour Summary
4:20 PM to 5:20 PM

N 19th Ave & NE Davis St

Wednesday, August 08, 2018
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound					Pedestrians			
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Interval	Crosswalk			
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total	North	South	East	West
4:00 PM	1	16	0	0	3	11	2	0	4	3	1	0	1	2	6	0	50	0	0	0	0
4:05 PM	3	13	1	0	4	22	3	0	3	1	0	0	0	2	5	0	57	0	0	0	0
4:10 PM	2	8	2	0	3	17	11	0	2	1	2	0	4	5	7	0	64	2	1	3	0
4:15 PM	2	15	3	0	8	13	4	0	4	7	1	0	3	4	4	0	68	0	0	0	0
4:20 PM	5	5	2	0	5	14	9	0	1	4	4	0	1	6	6	0	62	0	0	0	0
4:25 PM	2	11	2	0	5	18	5	0	4	3	1	0	2	9	6	0	68	0	0	0	0
4:30 PM	3	17	1	0	9	16	3	0	2	4	2	0	1	3	6	0	67	1	0	0	0
4:35 PM	4	12	2	0	7	9	9	0	4	3	0	0	2	5	5	0	62	1	0	1	0
4:40 PM	2	6	0	0	2	14	5	0	5	3	1	0	3	4	7	0	52	0	0	0	0
4:45 PM	3	15	1	0	4	24	5	0	1	3	2	0	2	6	5	0	71	0	0	0	0
4:50 PM	5	13	1	0	3	23	5	0	2	5	1	0	1	6	3	0	68	2	0	2	0
4:55 PM	4	8	1	0	4	15	7	0	1	6	1	0	1	4	2	0	54	1	0	1	0
5:00 PM	1	9	2	0	7	14	5	0	7	3	3	0	2	3	3	0	59	0	0	0	0
5:05 PM	3	15	2	0	7	13	4	0	3	1	3	0	2	7	5	0	65	0	0	0	0
5:10 PM	1	14	0	0	8	13	7	0	4	3	2	0	3	5	5	0	65	0	0	0	0
5:15 PM	5	13	2	0	7	17	7	0	1	2	5	0	2	8	1	0	70	0	0	1	0
5:20 PM	3	9	6	0	3	12	3	0	4	2	1	0	1	3	1	0	48	0	0	0	0
5:25 PM	5	16	1	0	5	18	5	0	7	4	3	0	3	2	4	0	73	0	0	0	0
5:30 PM	3	19	0	0	7	13	4	0	0	5	3	0	2	3	6	0	65	0	0	0	0
5:35 PM	2	11	2	0	4	16	5	0	0	6	4	0	1	5	8	0	64	0	0	0	0
5:40 PM	5	10	1	0	5	6	1	0	3	2	2	0	2	4	3	0	44	1	0	0	0
5:45 PM	2	12	0	0	3	10	8	0	2	1	4	1	2	3	8	0	55	0	0	0	0
5:50 PM	2	13	2	0	7	15	4	0	4	1	0	0	1	3	4	0	56	0	0	0	0
5:55 PM	4	6	0	0	5	14	4	0	1	5	0	0	6	4	6	0	55	0	0	0	0
Total Survey	72	286	34	0	125	357	125	0	69	78	46	1	48	106	116	0	1,462	8	1	8	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound					Pedestrians			
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Interval	Crosswalk			
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total	North	South	East	West
4:00 PM	6	37	3	0	10	50	16	0	9	5	3	0	5	9	18	0	171	2	1	3	0
4:15 PM	9	31	7	0	18	45	18	0	9	14	6	0	6	19	16	0	198	0	0	0	0
4:30 PM	9	35	3	0	18	39	17	0	11	10	3	0	6	12	18	0	181	2	0	1	0
4:45 PM	12	36	3	0	11	62	17	0	4	14	4	0	4	16	10	0	193	3	0	3	0
5:00 PM	5	38	4	0	22	40	16	0	14	7	8	0	7	15	13	0	189	0	0	0	0
5:15 PM	13	38	9	0	15	47	15	0	12	8	9	0	6	13	6	0	191	0	0	1	0
5:30 PM	10	40	3	0	16	35	10	0	3	13	9	0	5	12	17	0	173	1	0	0	0
5:45 PM	8	31	2	0	15	39	16	0	7	7	4	1	9	10	18	0	166	0	0	0	0
Total Survey	72	286	34	0	125	357	125	0	69	78	46	1	48	106	116	0	1,462	8	1	8	0

Peak Hour Summary
4:20 PM to 5:20 PM

By Approach	Northbound				Southbound				Eastbound				Westbound				Total	Pedestrians			
	N 19th Ave				N 19th Ave				N Davis St				NE Davis St					Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	192	237	429	0	329	227	556	0	100	175	275	0	142	124	266	0	763	5	0	5	0
%HV	4.2%				3.0%				0.0%				0.7%				2.5%				
PHF	0.87				0.91				0.86				0.89				0.95				

By Movement	Northbound				Southbound				Eastbound				Westbound				Total
	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	38	138	16	192	68	190	71	329	35	40	25	100	22	66	54	142	763
%HV	0.0%	5.1%	6.3%	4.2%	1.5%	4.2%	1.4%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%	0.7%	2.5%
PHF	0.79	0.82	0.80	0.87	0.77	0.77	0.93	0.91	0.63	0.71	0.63	0.86	0.79	0.83	0.75	0.89	0.95

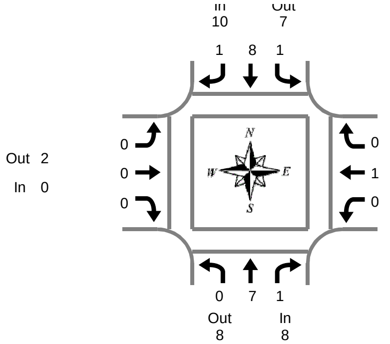
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval	Northbound				Southbound				Eastbound				Westbound					Pedestrians			
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				Interval	Crosswalk			
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total	North	South	East	West
4:00 PM	36	139	16	0	57	196	68	0	33	43	16	0	21	56	62	0	743	7	1	7	0
4:15 PM	35	140	17	0	69	186	68	0	38	45	21	0	23	62	57	0	761	5	0	4	0
4:30 PM	39	147	19	0	66	188	65	0	41	39	24	0	23	56	47	0	754	5	0	5	0
4:45 PM	40	152	19	0	64	184	58	0	33	42	30	0	22	56	46	0	746	4	0	4	0
5:00 PM	36	147	18	0	68	161	57	0	36	35	30	1	27	50	54	0	719	1	0	1	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:20 PM to 5:20 PM

N 19th Ave & NE Davis St

Wednesday, August 08, 2018
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	**Northbound**				**Southbound**				**Eastbound**				**Westbound**				
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				**Interval**
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	**Total**
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:10 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
4:20 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
4:25 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:30 PM	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:35 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
4:40 PM	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:50 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
5:05 PM	0	2	0	2	1	0	0	1	0	0	0	0	0	0	0	0	3
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:20 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
5:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:50 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	10	1	11	3	12	1	16	0	0	0	0	0	1	1	2	29

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval	**Northbound**				**Southbound**				**Eastbound**				**Westbound**				
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				**Interval**
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	**Total**
4:00 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
4:15 PM	0	1	0	1	1	4	0	5	0	0	0	0	0	0	0	0	6
4:30 PM	0	2	1	3	0	3	1	4	0	0	0	0	0	0	0	0	7
4:45 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:00 PM	0	3	0	3	1	1	0	2	0	0	0	0	0	1	0	1	6
5:15 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	2
5:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
Total Survey	0	10	1	11	3	12	1	16	0	0	0	0	0	1	1	2	29

Heavy Vehicle Peak Hour Summary
4:20 PM to 5:20 PM

By Approach	**Northbound**			**Southbound**			**Eastbound**			**Westbound**			**Total**
	N 19th Ave			N 19th Ave			N Davis St			NE Davis St			
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	8	8	16	10	7	17	0	2	2	1	2	3	19
PHF	0.67			0.50			0.00			0.25			0.68

By Movement	**Northbound**				**Southbound**				**Eastbound**				**Westbound**				**Total**
	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	7	1	8	1	8	1	10	0	0	0	0	0	1	0	1	19
PHF	0.00	0.58	0.25	0.67	0.25	0.50	0.25	0.50	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25	0.68

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

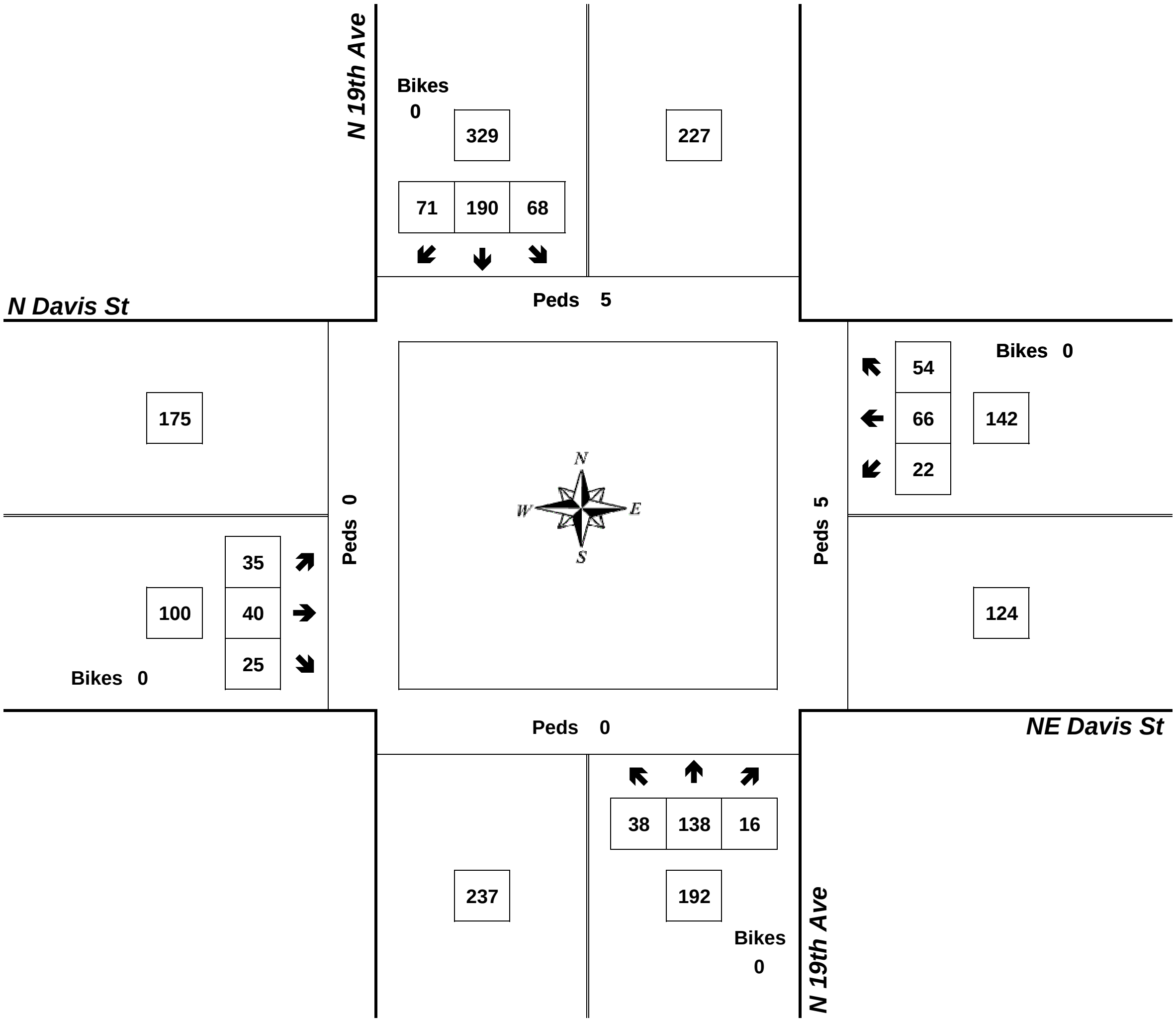
Interval	**Northbound**				**Southbound**				**Eastbound**				**Westbound**				
Start	N 19th Ave				N 19th Ave				N Davis St				NE Davis St				**Interval**
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	**Total**
4:00 PM	0	5	1	6	1	9	1	11	0	0	0	0	0	0	0	0	17
4:15 PM	0	7	1	8	2	9	1	12	0	0	0	0	0	1	0	1	21
4:30 PM	0	6	1	7	2	5	1	8	0	0	0	0	0	1	1	2	17
4:45 PM	0	5	0	5	2	3	0	5	0	0	0	0	0	1	1	2	12
5:00 PM	0	5	0	5	2	3	0	5	0	0	0	0	0	1	1	2	12

Peak Hour Summary

Clay Carney
(503) 833-2740

N 19th Ave & NE Davis St

4:20 PM to 5:20 PM
Wednesday, August 08, 2018



Approach	PHF	HV%	Volume
EB	0.86	0.0%	100
WB	0.89	0.7%	142
NB	0.87	4.2%	192
SB	0.91	3.0%	329
Intersection	0.95	2.5%	763

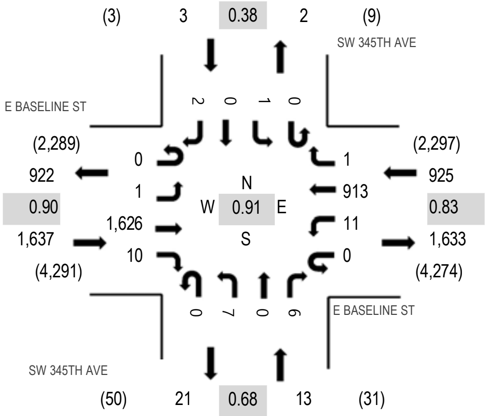
Count Period: 4:00 PM to 6:00 PM

All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: SW 345TH AVE & E BASELINE ST AM
Date: Thursday, November 21, 2019
Peak Hour: 07:10 AM - 08:10 AM
Peak 15-Minutes: 07:40 AM - 07:55 AM

Peak Hour

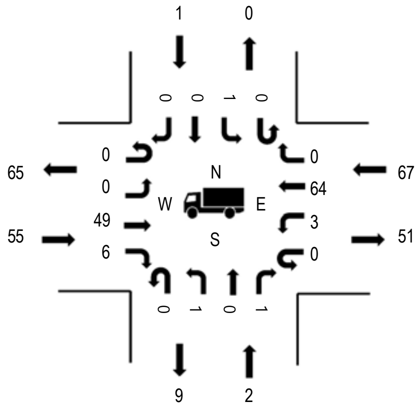
All Vehicles



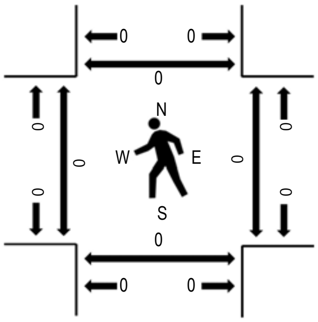
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.4%	0.90
WB	7.2%	0.83
NB	15.4%	0.68
SB	33.3%	0.38
All	4.8%	0.91

Heavy Vehicles



Pedestrians



Traffic Counts - All Vehicles

Interval Start Time	E BASELINE ST Eastbound U-Turn	Left	Thru	Right	E BASELINE ST Westbound U-Turn	Left	Thru	Right	SW 345TH AVE Northbound U-Turn	Left	Thru	Right	SW 345TH AVE Southbound U-Turn	Left	Thru	Right	Total	Rolling Hour
6:00 AM	0	1	88	1	0	0	36	0	0	0	0	0	0	0	0	0	126	1,915
6:05 AM	0	0	89	1	0	0	35	0	0	0	0	1	0	0	0	0	126	1,962
6:10 AM	0	0	105	0	0	0	43	0	0	0	0	0	0	0	0	0	148	2,032
6:15 AM	0	0	115	0	0	0	48	0	0	0	0	0	0	0	0	0	163	2,087
6:20 AM	0	0	71	3	0	1	53	0	0	1	0	0	0	0	0	0	129	2,127
6:25 AM	0	0	99	0	0	0	38	0	0	0	0	1	0	0	0	0	138	2,178
6:30 AM	0	0	106	0	0	1	51	0	0	0	0	0	0	0	0	0	158	2,266
6:35 AM	0	0	121	1	0	1	29	0	0	0	0	0	0	0	0	0	152	2,321
6:40 AM	0	0	126	1	0	0	73	0	0	0	0	0	0	0	0	0	200	2,425
6:45 AM	0	0	121	0	0	1	78	0	0	0	0	0	0	0	0	0	200	2,447
6:50 AM	0	0	145	2	0	0	51	1	0	0	0	0	0	0	0	0	199	2,480
6:55 AM	0	1	123	1	0	1	49	0	0	1	0	0	0	0	0	0	176	2,538
7:00 AM	0	2	119	0	0	1	50	0	0	0	0	1	0	0	0	0	173	2,573
7:05 AM	0	0	116	0	0	2	77	0	0	0	0	1	0	0	0	0	196	2,574
7:10 AM	0	0	133	0	0	1	68	0	0	0	0	1	0	0	0	0	203	2,578
7:15 AM	0	0	132	0	0	0	71	0	0	0	0	0	0	0	0	0	203	2,553
7:20 AM	0	0	141	0	0	2	37	0	0	0	0	0	0	0	0	0	180	2,510
7:25 AM	0	0	124	0	0	1	99	0	0	1	0	1	0	0	0	0	226	2,507
7:30 AM	0	0	136	0	0	1	74	0	0	1	0	0	0	0	0	1	213	2,448
7:35 AM	0	0	146	1	0	1	106	0	0	1	0	1	0	0	0	0	256	2,421
7:40 AM	0	1	146	1	0	0	74	0	0	0	0	0	0	0	0	0	222	2,351
7:45 AM	0	0	141	1	0	2	89	0	0	0	0	0	0	0	0	0	233	2,315
7:50 AM	0	0	167	1	0	0	89	0	0	0	0	0	0	0	0	0	257	2,257
7:55 AM	0	0	136	2	0	0	68	1	0	1	0	2	0	0	0	1	211	2,192
8:00 AM	0	0	99	2	0	2	68	0	0	2	0	1	0	0	0	0	174	2,134
8:05 AM	0	0	125	2	0	1	70	0	0	1	0	0	0	1	0	0	200	
8:10 AM	0	0	109	2	0	1	65	0	0	1	0	0	0	0	0	0	178	
8:15 AM	0	0	110	1	0	0	48	0	0	0	0	1	0	0	0	0	160	

8:20 AM	0	0	112	0	0	0	64	0	0	1	0	0	0	0	0	0	177
8:25 AM	0	0	101	1	0	1	60	0	0	2	0	2	0	0	0	0	167
8:30 AM	0	0	106	0	0	0	79	0	0	1	0	0	0	0	0	0	186
8:35 AM	0	0	126	0	0	0	59	0	0	1	0	0	0	0	0	0	186
8:40 AM	0	0	106	3	0	1	75	0	0	1	0	0	0	0	0	0	186
8:45 AM	0	0	98	0	1	0	73	1	0	0	0	2	0	0	0	0	175
8:50 AM	0	0	115	1	0	0	76	0	0	0	0	0	0	0	0	0	192
8:55 AM	0	1	104	0	0	0	48	0	0	0	0	0	0	0	0	0	153
Count Total	0	6	4,257	28	1	22	2,271	3	0	16	0	15	0	1	0	2	6,622
Peak Hour	0	1	1,626	10	0	11	913	1	0	7	0	6	0	1	0	2	2,578

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
6:00 AM	12	0	3	0	15	6:00 AM	0	0	0	0	0	6:00 AM	0	0	0	0	0
6:05 AM	11	0	0	0	11	6:05 AM	0	0	0	0	0	6:05 AM	0	0	0	0	0
6:10 AM	3	0	2	0	5	6:10 AM	0	0	0	0	0	6:10 AM	0	0	0	0	0
6:15 AM	5	0	2	0	7	6:15 AM	0	0	0	0	0	6:15 AM	0	0	0	0	0
6:20 AM	4	0	2	0	6	6:20 AM	0	0	0	0	0	6:20 AM	0	0	0	0	0
6:25 AM	3	0	1	0	4	6:25 AM	0	0	0	0	0	6:25 AM	0	0	0	0	0
6:30 AM	5	0	2	0	7	6:30 AM	0	0	0	0	0	6:30 AM	0	0	0	0	0
6:35 AM	3	0	3	0	6	6:35 AM	0	0	0	0	0	6:35 AM	0	0	0	0	0
6:40 AM	2	0	4	0	6	6:40 AM	0	0	0	0	0	6:40 AM	0	0	0	0	0
6:45 AM	3	0	4	0	7	6:45 AM	0	0	0	0	0	6:45 AM	0	0	0	0	0
6:50 AM	4	0	5	0	9	6:50 AM	0	0	0	0	0	6:50 AM	0	0	0	0	0
6:55 AM	2	0	5	0	7	6:55 AM	0	0	1	0	1	6:55 AM	0	0	0	0	0
7:00 AM	3	0	4	0	7	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	2	0	6	0	8	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	3	0	3	0	6	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	5	0	8	0	13	7:15 AM	0	0	1	0	1	7:15 AM	0	0	0	0	0
7:20 AM	4	0	2	0	6	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	1	0	9	0	10	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	7	0	4	0	11	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	6	0	9	0	15	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	6	0	2	0	8	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	6	0	8	0	14	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	3	0	7	0	10	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	5	2	7	0	14	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	4	0	3	0	7	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	5	0	5	1	11	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	5	0	2	0	7	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	10	0	0	0	10	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	7	0	8	0	15	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	4	1	2	0	7	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	2	1	5	0	8	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	6	0	2	0	8	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	6	1	7	0	14	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	6	0	7	0	13	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	8	0	2	0	10	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	6	0	3	0	9	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	177	5	148	1	331	Count Total	0	0	2	0	2	Count Total	0	0	0	0	0
Peak Hour	55	2	67	1	125	Peak Hour	0	0	1	0	1	Peak Hour	0	0	0	0	0

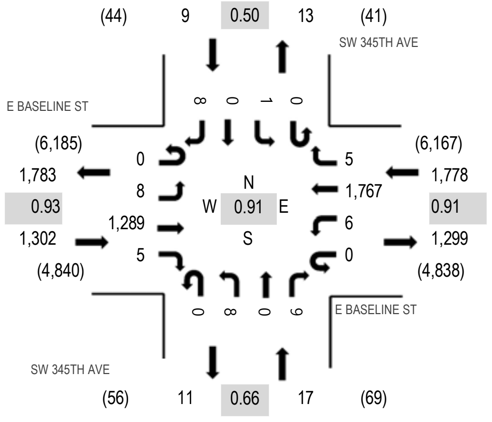
All Traffic Data Services Inc.

(303) 216-2439
www.alltrafficdata.net

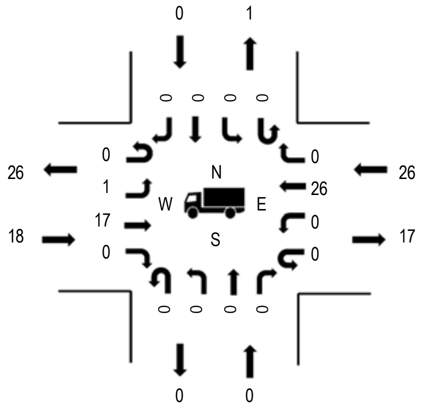
Location: SW 345TH AVE & E BASELINE ST PM
Date: Thursday, November 21, 2019
Peak Hour: 04:40 PM - 05:40 PM
Peak 15-Minutes: 05:05 PM - 05:20 PM

Peak Hour

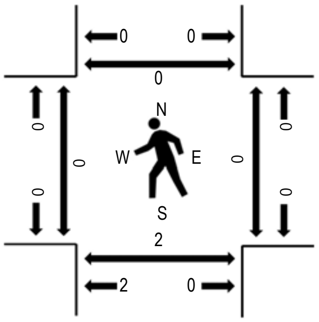
All Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.4%	0.93
WB	1.5%	0.91
NB	0.0%	0.66
SB	0.0%	0.50
All	1.4%	0.91

Traffic Counts - All Vehicles

Interval Start Time	E BASELINE ST Eastbound				E BASELINE ST Westbound				SW 345TH AVE Northbound				SW 345TH AVE Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
2:00 PM	0	0	88	0	0	1	100	0	0	0	0	0	0	0	0	1	190	2,443
2:05 PM	0	0	84	4	1	0	93	1	0	3	0	0	0	0	0	0	186	2,435
2:10 PM	0	0	81	0	0	0	100	0	0	1	0	2	0	0	0	0	184	2,450
2:15 PM	0	0	88	0	0	0	115	0	0	0	0	2	0	1	0	0	206	2,489
2:20 PM	0	0	85	1	0	0	96	1	0	1	0	0	0	0	0	0	184	2,497
2:25 PM	0	0	83	0	0	0	91	0	0	0	0	0	0	1	0	0	175	2,533
2:30 PM	0	3	101	1	0	2	95	2	0	2	0	0	0	0	0	0	206	2,572
2:35 PM	0	1	108	1	0	2	127	0	0	0	0	0	0	0	0	4	243	2,583
2:40 PM	0	0	103	1	0	2	112	0	0	0	0	2	0	0	0	0	220	2,582
2:45 PM	0	0	89	1	0	2	96	0	0	0	0	0	0	0	0	0	188	2,610
2:50 PM	0	0	94	0	0	2	142	2	0	2	0	0	0	0	0	1	243	2,669
2:55 PM	0	1	95	1	0	0	119	0	0	0	0	0	0	1	0	1	218	2,643
3:00 PM	0	0	80	0	0	1	100	0	0	1	0	0	0	0	0	0	182	2,671
3:05 PM	0	0	93	0	0	2	102	0	0	0	0	2	0	0	0	2	201	2,726
3:10 PM	0	1	83	0	0	0	137	0	0	0	0	1	0	0	0	1	223	2,791
3:15 PM	0	0	109	0	0	0	102	1	0	1	0	1	0	0	0	0	214	2,822
3:20 PM	0	1	83	2	0	0	132	0	0	1	0	0	0	0	0	1	220	2,895
3:25 PM	0	0	108	0	0	0	103	1	0	0	0	1	0	0	0	1	214	2,924
3:30 PM	0	0	114	0	0	0	102	0	0	0	0	1	0	0	0	0	217	2,965
3:35 PM	0	0	116	1	0	1	121	1	0	2	0	0	0	0	0	0	242	2,987
3:40 PM	0	2	119	0	0	0	127	0	0	0	0	0	0	0	0	0	248	2,958
3:45 PM	0	1	111	1	0	1	132	1	0	0	0	0	0	0	0	0	247	2,958
3:50 PM	0	1	88	3	0	1	117	0	0	2	0	2	0	0	0	3	217	2,967
3:55 PM	0	0	117	0	0	0	128	0	0	0	0	0	0	0	0	1	246	3,006
4:00 PM	0	0	86	0	0	0	148	0	0	2	0	0	0	0	0	1	237	3,025
4:05 PM	0	0	105	1	0	1	153	2	0	2	0	1	0	0	0	1	266	3,018
4:10 PM	0	1	107	0	0	2	138	1	0	0	0	3	0	0	0	2	254	3,049
4:15 PM	0	0	132	0	0	1	150	1	0	1	0	1	0	0	0	1	287	3,060

4:20 PM	0	1	86	0	0	1	155	0	0	2	0	3	0	1	0	0	249	3,063
4:25 PM	0	0	112	1	0	0	137	0	0	2	0	2	0	1	0	0	255	3,092
4:30 PM	0	0	100	0	0	0	139	0	0	0	0	0	0	0	0	0	239	3,083
4:35 PM	0	0	89	0	0	0	123	0	0	1	0	0	0	0	0	0	213	3,075
4:40 PM	0	0	98	0	0	0	149	0	0	1	0	0	0	0	0	0	248	3,106
4:45 PM	0	0	110	0	0	0	143	0	0	0	0	3	0	0	0	0	256	3,081
4:50 PM	0	0	124	1	0	0	129	0	0	1	0	1	0	0	0	0	256	3,069
4:55 PM	0	1	99	1	0	0	161	0	0	0	0	3	0	0	0	0	265	3,057
5:00 PM	0	0	89	0	0	1	137	0	0	1	0	0	0	0	0	2	230	2,981
5:05 PM	0	0	119	0	0	1	170	2	0	2	0	0	0	0	0	3	297	
5:10 PM	0	0	111	1	0	1	151	1	0	0	0	0	0	0	0	0	265	
5:15 PM	0	0	123	0	0	2	160	2	0	0	0	0	0	0	0	3	290	
5:20 PM	0	1	115	0	0	0	162	0	0	0	0	0	0	0	0	0	278	
5:25 PM	0	6	104	0	0	1	132	0	0	1	0	1	0	1	0	0	246	
5:30 PM	0	0	106	1	0	0	121	0	0	2	0	1	0	0	0	0	231	
5:35 PM	0	0	91	1	0	0	152	0	0	0	0	0	0	0	0	0	244	
5:40 PM	0	1	70	2	0	0	149	0	0	0	0	1	0	0	0	0	223	
5:45 PM	0	0	111	0	0	1	127	0	0	0	0	0	0	3	0	2	244	
5:50 PM	0	0	109	1	0	0	133	0	0	0	0	0	0	0	0	1	244	
5:55 PM	0	0	75	0	1	0	109	0	0	0	0	1	0	1	0	2	189	
Count Total	0	22	4,791	27	2	29	6,117	19	0	34	0	35	0	10	0	34	11,120	
Peak Hour	0	8	1,289	5	0	6	1,767	5	0	8	0	9	0	1	0	8	3,106	

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

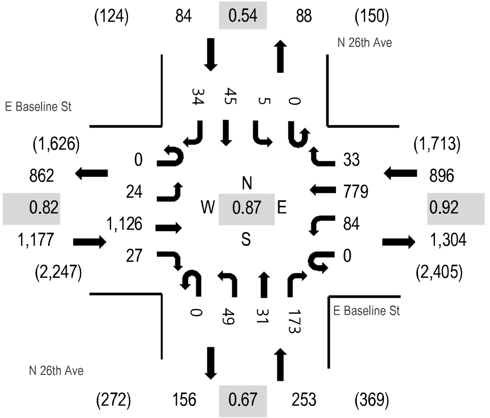
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	6	0	6	0	12	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	4	2	4	0	10	2:05 PM	1	0	0	0	1	2:05 PM	0	0	0	2	2
2:10 PM	4	1	4	0	9	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	1	1
2:15 PM	5	0	5	0	10	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:20 PM	6	1	2	0	9	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	7	0	3	0	10	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	1	1
2:30 PM	5	0	5	0	10	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	5	0	2	1	8	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	3	0	1	0	4	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	5	0	5	0	10	2:45 PM	0	0	0	0	0	2:45 PM	1	1	0	0	2
2:50 PM	3	1	3	0	7	2:50 PM	0	0	1	0	1	2:50 PM	2	2	0	0	4
2:55 PM	7	0	7	0	14	2:55 PM	0	0	0	0	0	2:55 PM	0	1	0	0	1
3:00 PM	0	1	2	0	3	3:00 PM	0	0	0	0	0	3:00 PM	1	0	0	0	1
3:05 PM	2	0	3	0	5	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	3	0	4	0	7	3:10 PM	0	0	0	0	0	3:10 PM	0	1	0	0	1
3:15 PM	2	1	1	0	4	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	2	1	4	0	7	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	5	1	5	0	11	3:25 PM	0	0	2	0	2	3:25 PM	0	0	0	0	0
3:30 PM	3	1	3	0	7	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	4	0	2	0	6	3:35 PM	0	0	0	0	0	3:35 PM	0	1	0	0	1
3:40 PM	1	0	5	0	6	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	1	0	4	0	5	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	5	0	6	0	11	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	7	0	3	0	10	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	4	0	0	0	4	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	5	0	4	0	9	4:05 PM	0	0	1	0	1	4:05 PM	0	1	0	0	1
4:10 PM	3	0	1	0	4	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	6	0	3	0	9	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	2	2	0	5	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	4	0	3	0	7	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	2	0	2	0	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	3	0	3	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	2	0	2	0	4	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	3	0	3	4:45 PM	0	0	0	0	0	4:45 PM	0	1	0	0	1
4:50 PM	1	0	3	0	4	4:50 PM	0	0	0	0	0	4:50 PM	0	1	0	0	1
4:55 PM	2	0	2	0	4	4:55 PM	3	0	0	0	3	4:55 PM	0	0	0	0	0
5:00 PM	2	0	2	0	4	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	3	0	3	0	6	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	0	3	0	4	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	2	0	1	0	3	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	1	0	1	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	2	0	1	0	3	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	2	0	4	0	6	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	1	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	1	0	3	1	5	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	1	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	2	0	0	1	3	5:55 PM	0	0	0	0	0	5:55 PM	0	1	0	0	1
Count Total	141	12	137	3	293	Count Total	4	0	4	0	8	Count Total	4	10	0	4	18
Peak Hour	18	0	26	0	44	Peak Hour	3	0	0	0	3	Peak Hour	0	2	0	0	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

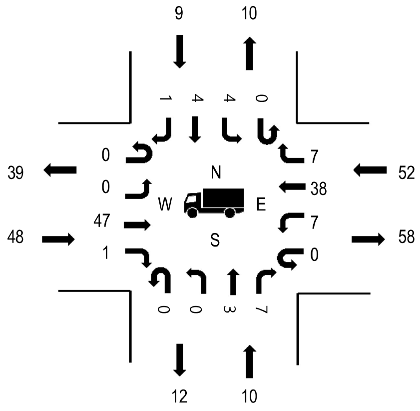
Location: 1 N 26th Ave & E Baseline St AM
Date: Thursday, September 9, 2021
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:50 AM - 08:05 AM

Peak Hour

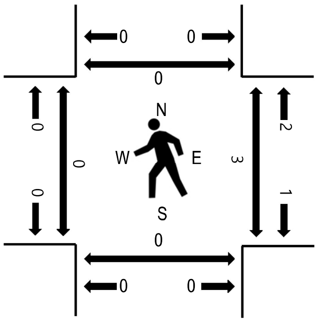
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.1%	0.82
WB	5.8%	0.92
NB	4.0%	0.67
SB	10.7%	0.54
All	4.9%	0.87

Traffic Counts - Motorized Vehicles

Interval	E Baseline St Eastbound				E Baseline St Westbound				N 26th Ave Northbound				N 26th Ave Southbound					Rolling
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	Hour
7:00 AM	0	2	72	1	0	5	51	1	0	1	1	5	0	0	0	2	141	2,279
7:05 AM	0	1	82	3	0	6	61	6	0	4	0	9	0	0	1	1	174	2,358
7:10 AM	0	5	95	0	0	9	36	1	0	5	0	8	0	0	0	2	161	2,369
7:15 AM	0	2	94	2	0	11	47	1	0	0	0	15	0	1	1	2	176	2,405
7:20 AM	0	0	88	2	0	10	53	0	0	1	0	4	0	1	2	3	164	2,384
7:25 AM	0	1	92	1	0	18	63	0	0	3	0	10	0	0	3	4	195	2,395
7:30 AM	0	0	88	3	0	9	43	3	0	5	0	11	0	0	2	3	167	2,410
7:35 AM	0	0	100	3	0	9	78	1	0	7	2	18	0	1	12	6	237	2,395
7:40 AM	0	0	81	4	0	10	62	1	0	2	3	21	0	0	8	1	193	2,345
7:45 AM	0	2	79	2	0	12	64	3	0	4	6	14	0	0	12	2	200	2,330
7:50 AM	0	5	129	5	0	7	62	3	0	2	4	10	0	0	7	2	236	2,300
7:55 AM	0	2	116	2	0	6	67	1	0	9	4	24	0	0	1	3	235	2,233
8:00 AM	0	2	107	3	0	4	65	2	0	8	5	20	0	1	1	2	220	2,174
8:05 AM	0	3	96	0	0	9	46	3	0	1	4	20	0	1	0	2	185	
8:10 AM	0	2	81	2	0	3	81	2	0	5	2	12	0	1	1	5	197	
8:15 AM	0	1	71	1	0	6	59	3	0	3	0	9	0	0	0	2	155	
8:20 AM	0	3	70	1	0	6	80	6	0	2	0	4	0	0	0	3	175	
8:25 AM	0	4	108	1	0	3	72	5	0	1	1	10	0	1	1	3	210	
8:30 AM	0	1	65	2	0	4	71	2	0	0	0	6	0	0	0	1	152	
8:35 AM	0	6	97	4	0	7	59	4	0	2	1	6	0	0	0	1	187	
8:40 AM	0	4	80	5	0	5	69	4	0	1	1	5	0	0	1	3	178	
8:45 AM	0	5	76	1	0	1	71	4	0	1	0	4	0	0	0	7	170	
8:50 AM	0	4	87	2	0	2	63	2	0	3	0	4	0	0	0	2	169	
8:55 AM	0	1	85	2	0	4	65	1	0	5	1	10	0	0	1	1	176	
Count Total	0	56	2,139	52	0	166	1,488	59	0	75	35	259	0	7	54	63	4,453	
Peak Hour	0	24	1,126	27	0	84	779	33	0	49	31	173	0	5	45	34	2,410	

Location: 1 N 26th Ave & E Baseline St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

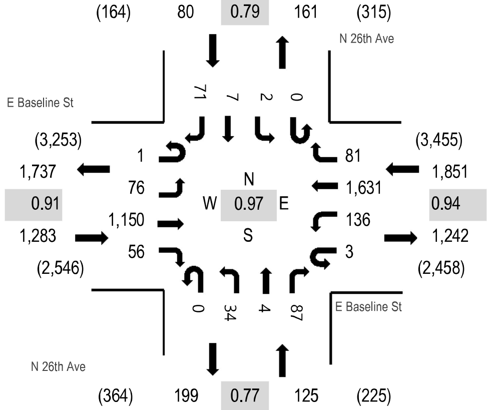
Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	1	0	2	1	4	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	3	0	8	0	11	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	3	1	4	0	8	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	5	1	4	1	11	7:15 AM	1	0	0	0	1	7:15 AM	0	0	0	0	0
7:20 AM	4	0	4	2	10	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	2	0	7	1	10	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	5	0	2	1	8	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	4	1	5	4	14	7:35 AM	0	0	0	0	0	7:35 AM	0	0	1	0	1
7:40 AM	3	2	4	1	10	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	4	0	8	0	12	7:45 AM	0	0	1	0	1	7:45 AM	0	0	0	0	0
7:50 AM	4	3	4	0	11	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	6	2	3	0	11	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	3	0	1	1	5	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	2	1	5	1	9	8:05 AM	0	1	0	0	1	8:05 AM	0	0	0	0	0
8:10 AM	2	0	12	1	15	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	2	0	1	0	3	8:15 AM	0	0	0	0	0	8:15 AM	0	0	2	0	2
8:20 AM	6	0	4	0	10	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	7	1	3	0	11	8:25 AM	1	0	0	0	1	8:25 AM	0	0	0	0	0
8:30 AM	4	1	2	0	7	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	2	0	4	0	6	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	2	0	2	0	4	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	4	0	3	0	7	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	4	0	4	0	8	8:50 AM	0	0	1	0	1	8:50 AM	0	0	0	3	3
8:55 AM	7	0	4	0	11	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	89	13	100	14	216	Count Total	2	1	2	0	5	Count Total	0	0	3	3	6
Peak Hour	48	10	52	9	119	Peak Hour	1	1	1	0	3	Peak Hour	0	0	3	0	3

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 N 26th Ave & E Baseline St PM
Date: Thursday, September 9, 2021
Peak Hour: 04:20 PM - 05:20 PM
Peak 15-Minutes: 04:20 PM - 04:35 PM

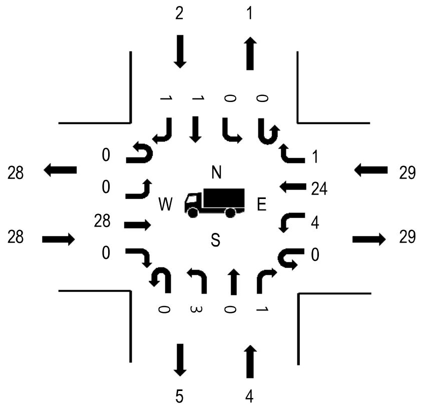
Peak Hour

Motorized Vehicles

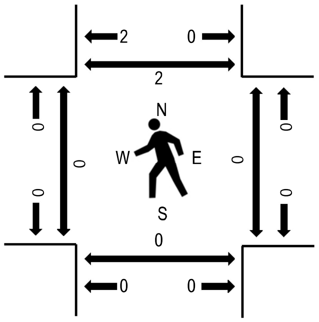


Note: Total study counts contained in parentheses.

Heavy Vehicles



Pedestrians



	HV%	PHF
EB	2.2%	0.91
WB	1.6%	0.94
NB	3.2%	0.77
SB	2.5%	0.79
All	1.9%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	E Baseline St Eastbound				E Baseline St Westbound				N 26th Ave Northbound				N 26th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	2	69	3	0	6	119	8	0	2	2	6	0	0	0	8	225	3,230
4:05 PM	0	5	110	2	0	8	123	7	0	2	0	6	0	1	2	4	270	3,275
4:10 PM	0	4	117	5	0	8	117	4	0	1	1	6	0	1	0	5	269	3,301
4:15 PM	0	7	98	4	0	10	104	7	0	1	1	7	0	0	0	9	248	3,298
4:20 PM	0	8	111	9	0	13	149	6	0	2	1	6	0	0	0	4	309	3,339
4:25 PM	0	9	89	3	0	9	124	6	0	3	0	7	0	0	0	15	265	3,308
4:30 PM	0	3	98	9	0	19	141	6	0	2	0	8	0	0	1	4	291	3,301
4:35 PM	0	9	95	3	0	5	112	5	0	4	0	12	0	0	2	5	252	3,265
4:40 PM	0	7	92	3	0	10	142	4	0	2	2	2	0	1	0	6	271	3,283
4:45 PM	0	11	107	0	0	12	120	8	0	5	0	6	0	0	0	6	275	3,242
4:50 PM	0	5	106	3	1	12	134	8	0	4	0	5	0	0	0	7	285	3,247
4:55 PM	0	11	85	4	0	14	136	6	0	2	0	8	0	0	0	4	270	3,181
5:00 PM	0	2	81	2	1	13	145	12	0	2	0	6	0	0	1	5	270	3,160
5:05 PM	1	2	104	10	1	10	148	7	0	2	0	6	0	0	2	3	296	
5:10 PM	0	4	75	5	0	10	137	7	0	4	1	10	0	1	1	11	266	
5:15 PM	0	5	107	5	0	9	143	6	0	2	0	11	0	0	0	1	289	
5:20 PM	0	5	97	5	0	9	130	11	0	3	2	9	0	0	4	3	278	
5:25 PM	0	11	88	4	0	12	125	6	0	1	1	4	0	0	2	4	258	
5:30 PM	0	5	89	6	0	7	129	7	0	2	0	3	0	0	1	6	255	
5:35 PM	0	4	97	3	0	9	133	7	0	3	0	6	0	0	1	7	270	
5:40 PM	0	0	83	4	0	13	114	6	0	3	0	3	0	0	0	4	230	
5:45 PM	0	11	130	3	0	13	102	6	0	3	0	3	0	0	2	7	280	
5:50 PM	0	7	74	5	0	8	106	3	0	5	1	3	0	0	0	7	219	
5:55 PM	0	4	101	1	0	4	115	8	0	4	1	5	0	0	1	5	249	
Count Total	1	141	2,303	101	3	243	3,048	161	0	64	13	148	0	4	20	140	6,390	
Peak Hour	1	76	1,150	56	3	136	1,631	81	0	34	4	87	0	2	7	71	3,339	

Location: 1 N 26th Ave & E Baseline St PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
4:00 PM	5	0	3	0	8	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	0	3	0	4	4:05 PM	1	0	0	0	1	4:05 PM	0	0	0	0	0
4:10 PM	1	1	4	0	6	4:10 PM	1	0	0	0	1	4:10 PM	0	0	0	0	0
4:15 PM	3	0	3	0	6	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	6	0	4	0	10	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	5	1	6	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	2	0	3	4:30 PM	0	0	1	0	1	4:30 PM	0	0	0	0	0
4:35 PM	1	0	3	0	4	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	1	5	0	7	4:40 PM	1	0	0	0	1	4:40 PM	0	0	0	0	0
4:45 PM	3	1	1	0	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	5	0	1	0	6	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	3	1	1	0	5	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	4	0	5	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	2	0	2	1	5	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	2	1	0	0	3	5:10 PM	1	0	0	0	1	5:10 PM	0	0	0	0	0
5:15 PM	3	0	1	0	4	5:15 PM	0	0	2	0	2	5:15 PM	0	0	0	2	2
5:20 PM	0	1	1	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	1	1	5	0	7	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	4	1	4	0	9	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	1	0	1	0	2	5:35 PM	0	0	0	0	0	5:35 PM	0	0	1	0	1
5:40 PM	1	0	0	0	1	5:40 PM	0	0	1	0	1	5:40 PM	0	0	1	0	1
5:45 PM	1	0	1	0	2	5:45 PM	0	0	0	0	0	5:45 PM	1	0	3	0	4
5:50 PM	0	0	1	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	4	0	2	0	6	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	50	8	57	2	117	Count Total	4	0	4	0	8	Count Total	1	0	5	2	8
Peak Hour	28	4	29	2	63	Peak Hour	2	0	3	0	5	Peak Hour	0	0	0	2	2

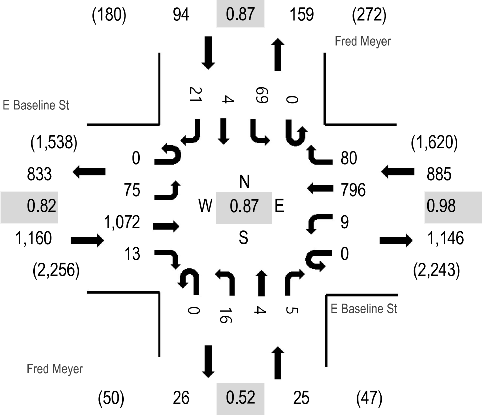
Location: 2 Fred Meyer & E Baseline St AM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

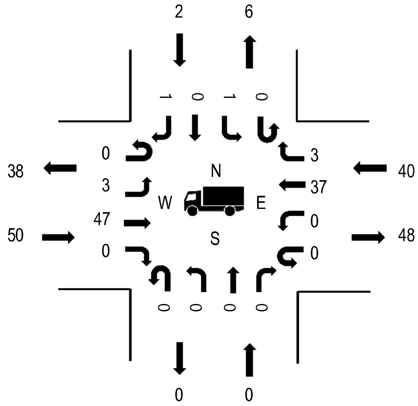
Location: 2 Fred Meyer & E Baseline St AM
Date: Thursday, September 9, 2021
Peak Hour: 07:50 AM - 08:50 AM
Peak 15-Minutes: 07:50 AM - 08:05 AM

Peak Hour

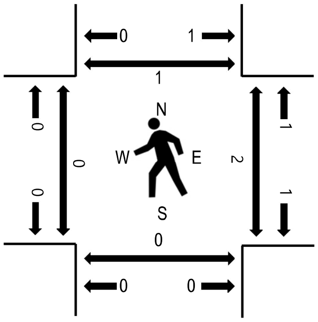
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.3%	0.82
WB	4.5%	0.98
NB	0.0%	0.52
SB	2.1%	0.87
All	4.3%	0.87

Traffic Counts - Motorized Vehicles

Interval Start Time	E Baseline St Eastbound				E Baseline St Westbound				Fred Meyer Northbound				Fred Meyer Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	9	69	0	0	1	50	3	0	0	0	1	0	5	0	0	138	2,022
7:05 AM	0	5	72	3	1	1	60	5	0	0	0	3	0	3	0	1	154	2,097
7:10 AM	0	5	102	0	0	0	41	2	0	0	1	0	0	4	0	1	156	2,100
7:15 AM	0	4	91	1	0	1	39	3	0	1	0	0	0	5	0	1	146	2,116
7:20 AM	1	4	94	1	0	1	60	4	0	1	0	0	0	6	0	3	175	2,116
7:25 AM	0	4	78	0	1	0	67	3	0	1	0	0	0	4	1	1	160	2,107
7:30 AM	0	8	89	2	0	1	48	1	0	1	0	1	0	4	0	1	156	2,163
7:35 AM	0	4	100	0	0	1	81	8	0	3	0	0	0	6	0	0	203	2,160
7:40 AM	0	1	71	1	0	2	53	5	0	2	0	2	0	9	0	1	147	2,138
7:45 AM	1	3	84	2	0	2	68	5	0	1	0	0	0	7	0	3	176	2,161
7:50 AM	0	6	127	2	0	2	50	2	0	2	0	0	0	8	0	1	200	2,164
7:55 AM	0	10	106	0	0	1	80	3	0	2	0	0	0	7	0	2	211	2,144
8:00 AM	0	9	112	1	0	0	76	8	0	0	0	0	0	7	0	0	213	2,081
8:05 AM	0	3	88	1	0	0	51	4	0	1	1	0	0	3	1	4	157	
8:10 AM	0	5	77	0	0	0	74	9	0	0	0	0	0	6	0	1	172	
8:15 AM	0	4	68	2	0	0	61	7	0	0	0	0	0	4	0	0	146	
8:20 AM	0	7	70	1	0	1	69	5	0	3	0	0	0	7	1	2	166	
8:25 AM	0	9	109	1	0	1	80	7	0	1	0	2	0	4	0	2	216	
8:30 AM	0	6	67	2	0	1	59	3	0	3	1	0	0	8	0	3	153	
8:35 AM	0	3	90	1	0	0	56	15	0	3	0	3	0	5	1	4	181	
8:40 AM	0	5	83	1	0	1	68	7	0	0	0	0	0	4	0	1	170	
8:45 AM	0	8	75	1	0	2	72	10	0	1	2	0	0	6	1	1	179	
8:50 AM	0	8	83	2	0	0	64	6	0	1	0	2	0	11	1	2	180	
8:55 AM	0	8	86	0	0	0	44	3	0	0	1	0	0	3	0	3	148	
Count Total	2	138	2,091	25	2	19	1,471	128	0	27	6	14	0	136	6	38	4,103	
Peak Hour	0	75	1,072	13	0	9	796	80	0	16	4	5	0	69	4	21	2,164	

Location: 2 Fred Meyer & E Baseline St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	1	0	6	0	7	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	3	0	7	0	10	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	3	0	4	0	7	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	4	0	6	0	10	7:15 AM	1	0	0	0	1	7:15 AM	0	0	0	0	0
7:20 AM	6	0	4	1	11	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	3	0	11	0	14	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	6	0	2	0	8	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	1	1
7:35 AM	3	0	5	0	8	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	3	0	2	0	5	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	4	0	5	0	9	7:45 AM	0	0	1	0	1	7:45 AM	0	0	0	0	0
7:50 AM	4	0	5	0	9	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	6	0	1	0	7	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	4	0	5	1	10	8:00 AM	0	0	0	0	0	8:00 AM	0	0	1	0	1
8:05 AM	1	0	3	1	5	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	3	0	9	0	12	8:10 AM	0	0	0	0	0	8:10 AM	0	0	1	1	2
8:15 AM	2	0	2	0	4	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	7	0	2	0	9	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	6	0	1	0	7	8:25 AM	1	0	0	0	1	8:25 AM	0	0	0	0	0
8:30 AM	4	0	2	0	6	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	4	0	2	0	6	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	4	0	4	0	8	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	5	0	4	0	9	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	6	0	4	0	10	8:50 AM	0	0	1	0	1	8:50 AM	0	0	0	0	0
8:55 AM	7	0	2	1	10	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	1	1
Count Total	99	0	98	4	201	Count Total	2	0	2	0	4	Count Total	0	0	2	3	5
Peak Hour	50	0	40	2	92	Peak Hour	1	0	0	0	1	Peak Hour	0	0	2	1	3

ALL TRAFFIC DATA SERVICES
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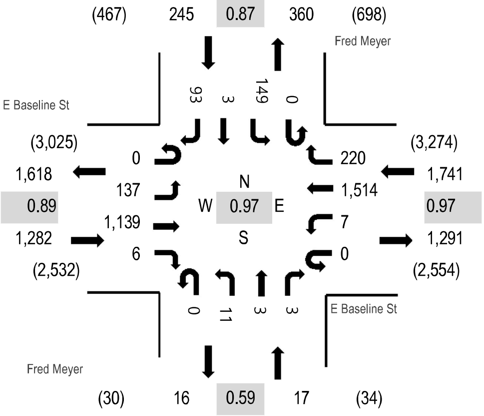
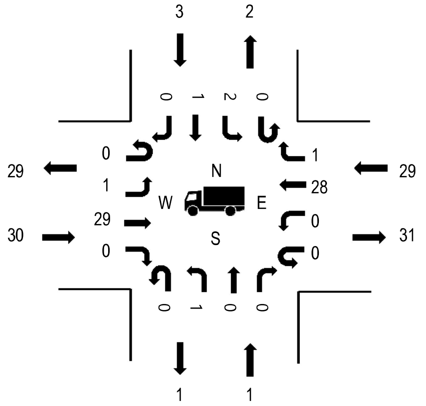
Location: 2 Fred Meyer & E Baseline St PM
Date: Thursday, September 9, 2021
Peak Hour: 04:20 PM - 05:20 PM
Peak 15-Minutes: 04:20 PM - 04:35 PM

Peak Hour

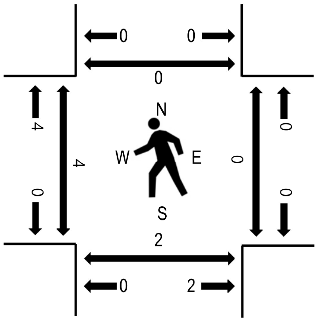
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.3%	0.89
WB	1.7%	0.97
NB	5.9%	0.59
SB	1.2%	0.87
All	1.9%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	E Baseline St Eastbound				E Baseline St Westbound				Fred Meyer Northbound				Fred Meyer Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	13	78	1	0	1	96	27	0	0	0	0	0	6	0	8	230	3,181
4:05 PM	0	7	95	0	0	0	110	26	0	2	0	0	0	17	0	10	267	3,211
4:10 PM	0	9	118	1	0	1	91	16	0	0	0	0	0	14	1	3	254	3,220
4:15 PM	0	10	91	0	0	1	114	15	0	1	1	0	0	10	1	8	252	3,254
4:20 PM	0	17	117	0	0	0	129	12	0	3	0	0	0	19	0	6	303	3,285
4:25 PM	0	6	84	1	0	1	145	15	0	0	0	0	0	12	0	3	267	3,238
4:30 PM	0	8	105	1	0	0	117	21	0	0	0	0	0	17	2	7	278	3,219
4:35 PM	0	6	91	0	0	0	117	22	0	0	1	0	0	12	0	8	257	3,201
4:40 PM	0	8	96	1	0	1	122	20	0	1	1	1	0	9	0	5	265	3,213
4:45 PM	0	12	100	0	0	2	112	18	0	1	0	0	0	9	0	4	258	3,191
4:50 PM	0	11	118	0	0	0	119	19	0	2	1	0	0	17	0	7	294	3,199
4:55 PM	0	11	66	0	0	0	134	23	0	0	0	0	0	13	0	9	256	3,132
5:00 PM	0	11	76	1	0	1	128	16	0	0	0	0	0	13	0	14	260	3,126
5:05 PM	0	13	100	1	0	0	119	14	0	3	0	1	0	14	1	10	276	
5:10 PM	0	15	94	0	0	1	149	16	0	1	0	1	0	5	0	6	288	
5:15 PM	0	19	92	1	0	1	123	24	0	0	0	0	0	9	0	14	283	
5:20 PM	0	5	94	0	0	0	109	16	0	1	1	2	0	17	0	11	256	
5:25 PM	0	10	82	0	0	0	124	14	0	0	0	0	0	13	0	5	248	
5:30 PM	0	14	94	0	0	0	116	11	0	1	0	0	0	16	0	8	260	
5:35 PM	0	10	85	0	0	0	130	25	0	0	0	0	0	10	0	9	269	
5:40 PM	0	10	95	0	0	0	102	15	0	0	0	0	0	13	0	8	243	
5:45 PM	0	6	114	1	0	2	113	13	0	2	0	0	0	11	0	4	266	
5:50 PM	0	13	89	1	0	1	96	19	0	2	0	1	0	2	0	3	227	
5:55 PM	1	12	89	2	0	0	109	20	0	2	0	1	0	6	0	8	250	
Count Total	1	256	2,263	12	0	13	2,824	437	0	22	5	7	0	284	5	178	6,307	
Peak Hour	0	137	1,139	6	0	7	1,514	220	0	11	3	3	0	149	3	93	3,285	

Location: 2 Fred Meyer & E Baseline St PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	5	0	5	0	10	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	0	2	0	3	4:05 PM	1	0	0	0	1	4:05 PM	1	0	0	0	1
4:10 PM	2	0	2	0	4	4:10 PM	1	0	0	0	1	4:10 PM	1	1	0	2	4
4:15 PM	2	0	3	0	5	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	5	0	3	1	9	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	5	0	5	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	3	0	3	0	6	4:30 PM	0	0	1	0	1	4:30 PM	1	0	0	0	1
4:35 PM	1	0	2	0	3	4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0
4:40 PM	1	0	6	0	7	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	0	3	0	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	7	0	1	0	8	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	2	0	1	1	4	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	0	3	0	4	5:00 PM	0	0	0	0	0	5:00 PM	0	2	0	0	2
5:05 PM	3	0	0	1	4	5:05 PM	0	0	0	0	0	5:05 PM	2	0	0	0	2
5:10 PM	2	1	0	0	3	5:10 PM	1	0	0	0	1	5:10 PM	0	0	0	0	0
5:15 PM	3	0	2	0	5	5:15 PM	0	0	1	0	1	5:15 PM	1	0	0	0	1
5:20 PM	1	0	1	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	2	0	4	0	6	5:25 PM	0	0	0	0	0	5:25 PM	2	0	0	0	2
5:30 PM	3	0	4	1	8	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	3	0	3	5:35 PM	0	0	0	0	0	5:35 PM	2	2	0	0	4
5:40 PM	2	0	0	0	2	5:40 PM	0	0	1	0	1	5:40 PM	0	1	0	0	1
5:45 PM	3	0	1	1	5	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	1	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	4	0	1	0	5	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	55	1	56	5	117	Count Total	4	0	3	0	7	Count Total	10	6	0	2	18
Peak Hour	30	1	29	3	63	Peak Hour	2	0	2	0	4	Peak Hour	4	2	0	0	6

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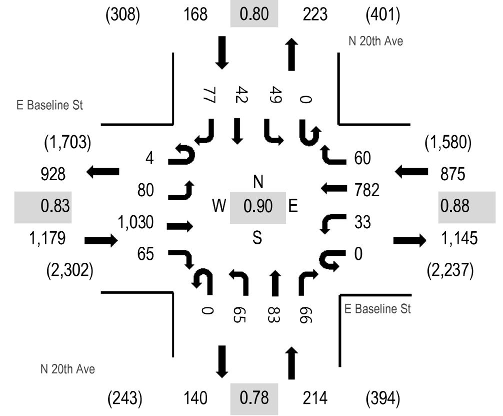
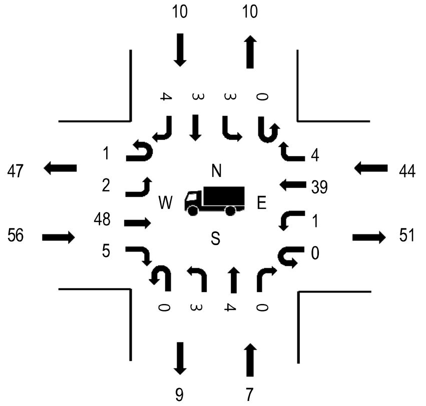
Location: 3 N 20th Ave & E Baseline St AM
Date: Thursday, September 9, 2021
Peak Hour: 07:35 AM - 08:35 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour

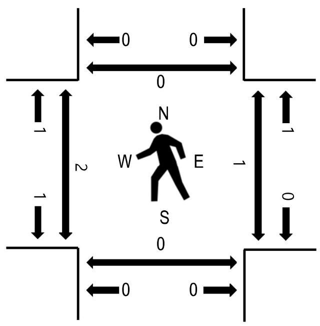
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.7%	0.83
WB	5.0%	0.88
NB	3.3%	0.78
SB	6.0%	0.80
All	4.8%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	E Baseline St Eastbound				E Baseline St Westbound				N 20th Ave Northbound				N 20th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	4	70	1	0	1	43	2	0	2	8	3	0	4	4	3	145	2,311
7:05 AM	0	8	70	4	0	1	58	6	0	5	14	6	0	1	5	6	184	2,382
7:10 AM	0	6	102	4	0	2	48	1	0	5	12	10	0	2	2	3	197	2,381
7:15 AM	0	8	87	5	0	0	35	5	0	5	4	5	0	1	2	5	162	2,382
7:20 AM	1	4	85	2	0	2	60	3	0	6	7	6	0	1	7	4	188	2,381
7:25 AM	0	9	81	2	0	4	61	5	0	6	3	2	0	0	3	6	182	2,408
7:30 AM	0	3	88	5	0	0	48	2	0	4	6	6	0	7	6	8	183	2,426
7:35 AM	1	8	88	7	0	1	77	6	0	8	12	12	0	2	3	4	229	2,436
7:40 AM	0	6	63	3	0	3	51	2	0	7	7	5	0	4	10	3	164	2,402
7:45 AM	0	6	88	9	0	6	61	4	0	7	12	10	0	7	5	10	225	2,404
7:50 AM	0	8	105	9	0	3	50	4	0	4	5	4	0	7	1	8	208	2,365
7:55 AM	1	11	110	8	0	3	67	11	0	8	12	5	0	5	3	0	244	2,351
8:00 AM	0	4	113	2	0	1	59	8	0	4	10	4	0	3	2	6	216	2,273
8:05 AM	0	10	67	6	0	2	64	4	0	8	3	5	0	4	2	8	183	
8:10 AM	0	8	77	7	0	5	65	10	0	6	3	3	0	3	4	7	198	
8:15 AM	0	3	58	4	0	1	57	0	0	6	6	10	0	2	5	9	161	
8:20 AM	0	6	98	4	0	2	79	4	0	1	7	2	0	0	2	10	215	
8:25 AM	1	6	88	3	0	5	73	4	0	4	3	2	0	5	1	5	200	
8:30 AM	1	4	75	3	0	1	79	3	0	2	3	4	0	7	4	7	193	
8:35 AM	0	13	95	3	0	1	55	2	0	3	2	5	0	1	5	10	195	
8:40 AM	3	5	70	2	0	2	53	4	0	6	3	4	0	5	3	6	166	
8:45 AM	0	7	88	3	0	5	69	1	0	1	1	3	0	3	2	3	186	
8:50 AM	2	4	78	2	0	1	72	3	0	7	5	6	0	3	5	6	194	
8:55 AM	1	6	89	3	0	1	48	1	0	5	1	3	0	2	3	3	166	
Count Total	11	157	2,033	101	0	53	1,432	95	0	120	149	125	0	79	89	140	4,584	
Peak Hour	4	80	1,030	65	0	33	782	60	0	65	83	66	0	49	42	77	2,436	

Location: 3 N 20th Ave & E Baseline St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
7:00 AM	2	0	5	3	10	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	1	2	8	0	11	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	2	4	6	2	14	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	2	1	5	0	8	7:15 AM	0	1	0	0	1	7:15 AM	0	0	0	0	0
7:20 AM	7	1	3	1	12	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	5	0	14	2	21	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	4	0	2	4	10	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	4	0	8	0	12	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	4	1	2	1	8	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	4	2	5	0	11	7:45 AM	0	0	1	0	1	7:45 AM	1	0	0	0	1
7:50 AM	7	0	8	1	16	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	6	1	0	1	8	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	4	0	3	0	7	8:00 AM	0	0	0	0	0	8:00 AM	1	0	0	0	1
8:05 AM	3	1	2	2	8	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	3	1	8	2	14	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	2	1	3	1	7	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	9	0	2	1	12	8:20 AM	0	0	0	0	0	8:20 AM	1	0	0	0	1
8:25 AM	5	0	1	0	6	8:25 AM	1	0	0	0	1	8:25 AM	0	0	0	0	0
8:30 AM	5	0	2	1	8	8:30 AM	0	0	0	0	0	8:30 AM	0	0	1	0	1
8:35 AM	6	0	2	1	9	8:35 AM	0	0	0	0	0	8:35 AM	0	0	1	0	1
8:40 AM	3	0	3	1	7	8:40 AM	0	0	0	0	0	8:40 AM	1	0	0	0	1
8:45 AM	5	0	5	0	10	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	5	2	1	1	9	8:50 AM	0	0	1	0	1	8:50 AM	0	1	0	2	3
8:55 AM	6	0	2	1	9	8:55 AM	0	0	0	0	0	8:55 AM	3	0	1	2	6
Count Total	104	17	100	26	247	Count Total	1	1	2	0	4	Count Total	7	1	3	4	15
Peak Hour	56	7	44	10	117	Peak Hour	1	0	1	0	2	Peak Hour	3	0	1	0	4

Location: 3 N 20th Ave & E Baseline St PM

ALL TRAFFIC DATA SERVICES
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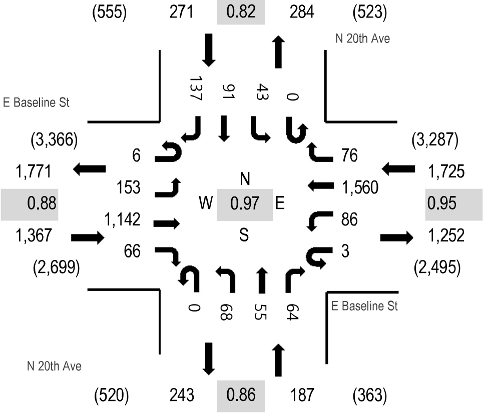
Location: 3 N 20th Ave & E Baseline St PM
Date: Thursday, September 9, 2021
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour

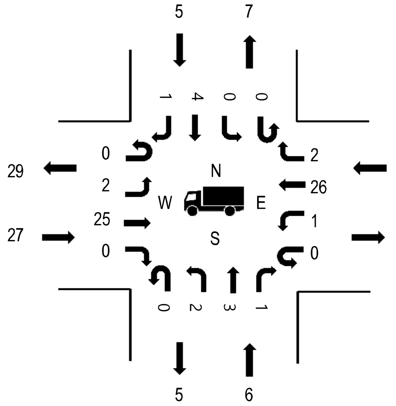
Motorized Vehicles



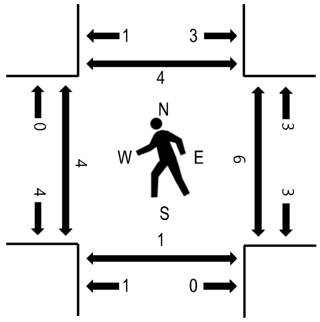
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.0%	0.88
WB	1.7%	0.95
NB	3.2%	0.86
SB	1.8%	0.82
All	1.9%	0.97

Heavy Vehicles



Pedestrians



Traffic Counts - Motorized Vehicles

Interval	E Baseline St Eastbound				E Baseline St Westbound				N 20th Ave Northbound				N 20th Ave Southbound					Rolling
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	Hour
4:00 PM	1	11	83	8	0	12	105	7	0	3	2	9	0	4	13	10	268	3,457
4:05 PM	0	2	93	6	0	8	122	6	0	1	3	7	0	3	9	14	274	3,492
4:10 PM	1	12	116	13	0	5	90	2	0	6	6	7	0	4	5	9	276	3,515
4:15 PM	1	12	114	4	2	7	120	6	0	6	5	6	0	2	11	17	313	3,550
4:20 PM	0	18	100	4	0	9	127	5	0	5	3	4	0	5	7	12	299	3,536
4:25 PM	0	9	76	4	0	12	148	7	0	4	7	6	0	4	11	4	292	3,536
4:30 PM	0	13	108	5	0	8	127	7	0	4	4	3	0	5	6	12	302	3,509
4:35 PM	1	10	82	7	0	3	126	2	0	3	6	8	0	0	12	11	271	3,511
4:40 PM	2	13	87	5	0	9	125	6	0	7	5	5	0	5	10	8	287	3,509
4:45 PM	0	6	112	4	1	4	116	8	0	5	5	6	0	5	5	10	287	3,497
4:50 PM	1	18	110	8	0	5	127	6	0	9	5	4	0	2	7	14	316	3,517
4:55 PM	1	12	67	4	0	8	136	4	0	4	4	7	0	4	6	15	272	3,471
5:00 PM	0	13	90	10	0	13	141	4	0	13	2	3	0	3	4	7	303	3,447
5:05 PM	0	13	101	5	0	0	130	9	0	0	6	7	0	4	7	15	297	
5:10 PM	0	16	95	6	0	8	137	12	0	8	3	5	0	4	5	12	311	
5:15 PM	0	7	95	8	0	9	127	7	0	10	5	6	0	4	8	13	299	
5:20 PM	0	13	99	8	0	9	112	9	0	11	3	7	0	5	11	12	299	
5:25 PM	1	6	72	3	0	4	126	8	0	4	7	4	0	6	11	13	265	
5:30 PM	0	13	106	5	0	11	127	4	0	1	4	4	0	8	7	14	304	
5:35 PM	0	12	81	8	0	5	140	4	0	2	3	1	0	3	2	8	269	
5:40 PM	1	9	91	9	0	7	113	4	0	5	9	4	0	6	10	7	275	
5:45 PM	0	9	115	8	0	8	115	10	0	5	6	5	0	5	10	11	307	
5:50 PM	1	15	93	7	1	7	107	5	0	6	2	2	0	6	12	6	270	
5:55 PM	0	7	79	5	0	5	118	3	0	6	4	6	0	3	1	11	248	
Count Total	11	269	2,265	154	4	176	2,962	145	0	128	109	126	0	100	190	265	6,904	
Peak Hour	6	153	1,142	66	3	86	1,560	76	0	68	55	64	0	43	91	137	3,550	

Location: 3 N 20th Ave & E Baseline St PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

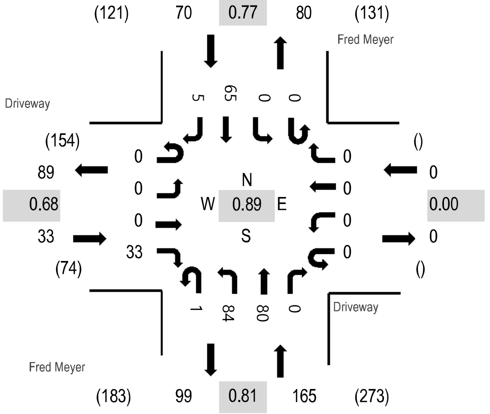
Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
4:00 PM	4	1	3	1	9	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	3	0	2	2	7	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	3	1	2	2	8	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	4	2	1	1	8	4:15 PM	0	0	0	0	0	4:15 PM	0	1	3	1	5
4:20 PM	2	1	4	1	8	4:20 PM	0	0	0	0	0	4:20 PM	1	0	1	0	2
4:25 PM	1	0	4	1	6	4:25 PM	0	0	0	0	0	4:25 PM	1	0	0	0	1
4:30 PM	1	0	3	0	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	2	0	3	4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0
4:40 PM	1	1	6	1	9	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	3	0	2	0	5	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	5	0	1	1	7	4:50 PM	0	0	0	0	0	4:50 PM	2	0	0	0	2
4:55 PM	1	1	1	0	3	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	1	1
5:00 PM	3	0	3	0	6	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	3	1	1	0	5	5:05 PM	0	0	0	0	0	5:05 PM	0	0	1	1	2
5:10 PM	2	0	1	0	3	5:10 PM	0	0	0	0	0	5:10 PM	0	0	1	1	2
5:15 PM	3	0	2	0	5	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	1	1
5:20 PM	1	0	0	1	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	3	0	3
5:25 PM	1	1	4	0	6	5:25 PM	0	0	0	0	0	5:25 PM	0	0	1	1	2
5:30 PM	2	0	5	2	9	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	2	0	2	5:35 PM	0	0	0	0	0	5:35 PM	1	0	1	0	2
5:40 PM	0	1	1	1	3	5:40 PM	0	0	0	1	1	5:40 PM	0	0	1	0	1
5:45 PM	1	0	3	0	4	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	1	1
5:50 PM	1	0	2	0	3	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	3	3
5:55 PM	3	0	1	0	4	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	49	10	56	14	129	Count Total	1	0	0	1	2	Count Total	5	1	12	10	28
Peak Hour	27	6	29	5	67	Peak Hour	1	0	0	0	1	Peak Hour	4	1	6	4	15

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

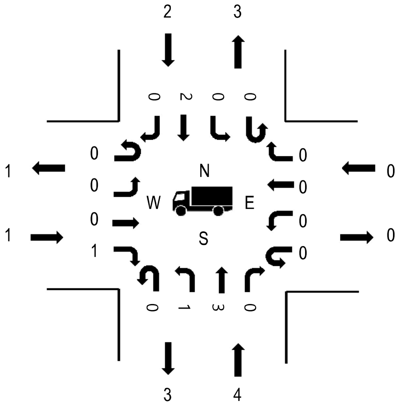
Location: 4 Fred Meyer & Driveway AM
Date: Thursday, September 9, 2021
Peak Hour: 07:55 AM - 08:55 AM
Peak 15-Minutes: 08:35 AM - 08:50 AM

Peak Hour

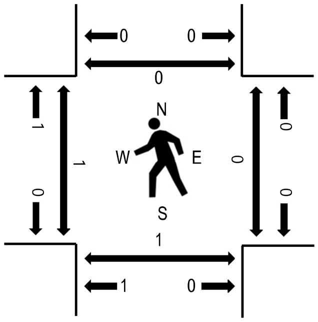
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.0%	0.68
WB	0.0%	0.00
NB	2.4%	0.81
SB	2.9%	0.77
All	2.6%	0.89

Traffic Counts - Motorized Vehicles

Interval Start Time	Driveway Eastbound				Driveway Westbound				Fred Meyer Northbound				Fred Meyer Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	0	4	0	0	0	0	0	8	4	0	0	0	2	0	18	200
7:05 AM	0	0	0	1	0	0	0	0	0	6	5	0	0	0	2	1	15	209
7:10 AM	0	0	0	4	0	0	0	0	0	5	2	0	0	0	2	0	13	211
7:15 AM	0	1	0	1	0	0	0	0	0	5	3	0	0	0	5	1	16	218
7:20 AM	0	0	0	4	0	0	0	0	0	5	3	0	0	0	4	0	16	217
7:25 AM	0	0	0	4	0	0	0	0	0	3	4	0	0	0	2	0	13	222
7:30 AM	0	0	0	2	0	0	0	0	0	5	1	0	0	0	3	1	12	234
7:35 AM	0	1	0	5	0	0	0	0	0	9	6	0	0	0	1	1	23	244
7:40 AM	0	0	0	4	0	0	0	0	0	2	3	0	0	0	6	0	15	247
7:45 AM	0	1	0	4	0	0	0	0	0	4	5	0	0	0	7	1	22	252
7:50 AM	0	0	0	2	0	0	0	0	0	4	4	0	0	0	7	0	17	259
7:55 AM	0	0	0	3	0	0	0	0	0	5	6	0	0	0	5	1	20	268
8:00 AM	0	0	0	3	0	0	0	0	0	11	8	0	0	0	5	0	27	268
8:05 AM	0	0	0	1	0	0	0	0	0	8	0	0	0	0	7	1	17	
8:10 AM	0	0	0	4	0	0	0	0	0	5	9	0	0	0	2	0	20	
8:15 AM	0	0	0	1	0	0	0	0	0	4	7	0	0	0	3	0	15	
8:20 AM	0	0	0	3	0	0	0	0	0	6	4	0	0	0	7	1	21	
8:25 AM	0	0	0	2	0	0	0	0	0	12	6	0	0	0	4	1	25	
8:30 AM	0	0	0	3	0	0	0	0	0	3	6	0	0	0	10	0	22	
8:35 AM	0	0	0	5	0	0	0	0	0	7	11	0	0	0	3	0	26	
8:40 AM	0	0	0	2	0	0	0	0	0	8	5	0	0	0	5	0	20	
8:45 AM	0	0	0	5	0	0	0	0	0	7	13	0	0	0	4	0	29	
8:50 AM	0	0	0	1	0	0	0	0	1	8	5	0	0	0	10	1	26	
8:55 AM	0	0	0	3	0	0	0	0	0	4	8	0	0	0	5	0	20	
Count Total	0	3	0	71	0	0	0	0	1	144	128	0	0	0	111	10	468	
Peak Hour	0	0	0	33	0	0	0	0	1	84	80	0	0	0	65	5	268	

Location: 4 Fred Meyer & Driveway AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

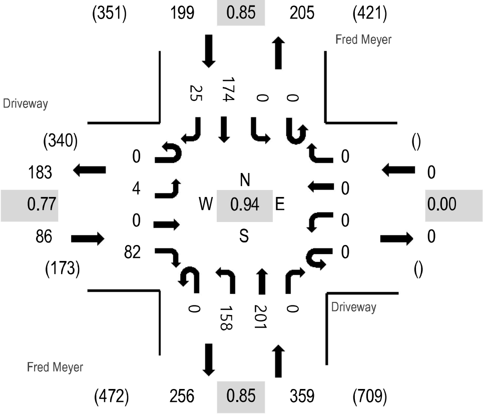
Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	1	0	0	1	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	0	1	0	0	1	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0	8:00 AM	1	1	0	0	2
8:05 AM	0	1	0	1	2	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	0	1	0	0	1	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	0	1	0	0	1	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	1	1	0	1	3	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	1	0	0	0	1	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	2	6	0	2	10	Count Total	0	0	0	0	0	Count Total	1	1	0	0	2
Peak Hour	1	4	0	2	7	Peak Hour	0	0	0	0	0	Peak Hour	1	1	0	0	2

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

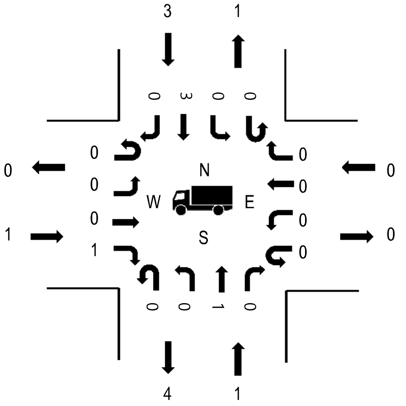
Location: 4 Fred Meyer & Driveway PM
Date: Thursday, September 9, 2021
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 04:50 PM - 05:05 PM

Peak Hour

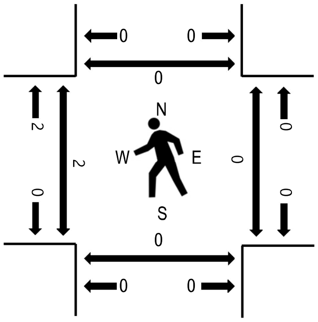
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	1.2%	0.77
WB	0.0%	0.00
NB	0.3%	0.85
SB	1.5%	0.85
All	0.8%	0.94

Traffic Counts - Motorized Vehicles

Interval Start Time	Driveway Eastbound				Driveway Westbound				Fred Meyer Northbound				Fred Meyer Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	1	0	9	0	0	0	0	0	13	23	0	0	0	9	1	56	624
4:05 PM	0	0	0	7	0	0	0	0	0	9	37	0	0	0	13	0	66	625
4:10 PM	0	1	0	5	0	0	0	0	0	9	16	0	0	0	16	0	47	612
4:15 PM	0	0	0	3	0	0	0	0	0	14	12	0	0	0	18	1	48	618
4:20 PM	0	2	0	7	0	0	0	0	0	13	16	0	0	0	15	2	55	634
4:25 PM	0	1	0	7	0	0	0	0	0	8	13	0	0	0	9	1	39	628
4:30 PM	0	2	0	13	0	0	0	0	0	10	18	0	0	0	16	2	61	640
4:35 PM	0	0	0	6	0	0	0	0	0	16	13	0	0	0	8	1	44	626
4:40 PM	0	0	0	8	0	0	0	0	0	7	22	0	0	0	9	2	48	643
4:45 PM	0	0	0	4	0	0	0	0	0	13	17	0	0	0	11	1	46	644
4:50 PM	0	0	0	8	0	0	0	0	0	14	18	0	0	0	17	3	60	636
4:55 PM	0	0	0	5	0	0	0	0	0	11	22	0	0	0	16	0	54	617
5:00 PM	0	1	0	7	0	0	0	0	0	13	13	0	0	0	20	3	57	609
5:05 PM	0	0	0	8	0	0	0	0	0	11	17	0	0	0	14	3	53	
5:10 PM	0	1	0	8	0	0	0	0	0	18	16	0	0	0	10	0	53	
5:15 PM	0	0	0	10	0	0	0	0	0	21	21	0	0	0	11	1	64	
5:20 PM	0	0	0	6	0	0	0	0	0	8	13	0	0	0	19	3	49	
5:25 PM	0	0	0	6	0	0	0	0	0	9	17	0	0	0	15	4	51	
5:30 PM	0	0	0	4	0	0	0	0	0	13	14	0	0	0	16	0	47	
5:35 PM	0	1	0	10	0	0	0	0	0	16	19	0	0	0	13	2	61	
5:40 PM	0	1	0	6	0	0	0	0	0	11	14	0	0	0	12	5	49	
5:45 PM	0	2	0	3	0	0	0	0	0	10	10	0	0	0	12	1	38	
5:50 PM	0	0	0	3	0	0	0	0	0	18	14	0	0	0	4	2	41	
5:55 PM	0	0	0	7	0	0	0	0	0	16	13	0	0	0	9	1	46	
Count Total	0	13	0	160	0	0	0	0	0	301	408	0	0	0	312	39	1,233	
Peak Hour	0	4	0	82	0	0	0	0	0	158	201	0	0	0	174	25	644	

Location: 4 Fred Meyer & Driveway PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
4:00 PM	0	1	0	0	1	4:00 PM	0	0	0	0	0	4:00 PM	2	2	0	0	4
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	1	0	0	0	1	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	1	0	0	1	4:30 PM	0	1	0	0	1	4:30 PM	0	0	0	0	0
4:35 PM	0	1	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	1	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	1	1	5:05 PM	0	0	0	0	0	5:05 PM	2	0	0	0	2
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	1	0	0	1	5:20 PM	0	2	0	0	2	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	1	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	1	0	0	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	4	4	5:55 PM	0	0	0	0	0
Count Total	2	4	0	3	9	Count Total	0	3	0	4	7	Count Total	4	2	0	0	6
Peak Hour	1	1	0	3	5	Peak Hour	0	2	0	0	2	Peak Hour	2	0	0	0	2

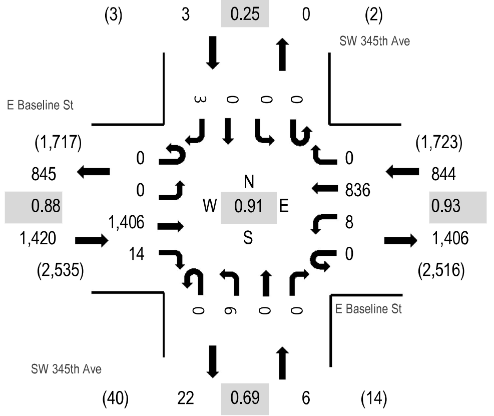
Location: 5 SW 345th Ave & E Baseline St AM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

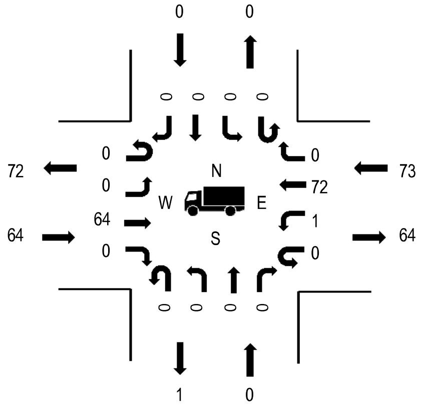
Location: 5 SW 345th Ave & E Baseline St AM
Date: Thursday, September 9, 2021
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:50 AM - 08:05 AM

Peak Hour

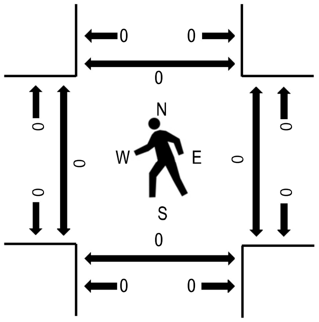
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.5%	0.88
WB	8.6%	0.93
NB	0.0%	0.69
SB	0.0%	0.25
All	6.0%	0.91

Traffic Counts - Motorized Vehicles

Interval	E Baseline St				E Baseline St				SW 345th Ave				SW 345th Ave					Rolling
	Eastbound				Westbound				Northbound				Southbound					
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	Hour
7:00 AM	0	0	89	0	0	1	58	0	0	0	0	1	0	0	0	0	149	2,151
7:05 AM	0	1	95	0	0	2	73	0	0	0	0	0	0	0	0	0	171	2,202
7:10 AM	0	1	87	2	0	2	47	0	0	0	0	0	0	0	0	0	139	2,212
7:15 AM	0	0	120	0	0	0	53	0	0	0	0	0	0	0	0	0	173	2,273
7:20 AM	0	0	102	0	0	0	67	0	0	0	0	0	0	0	0	0	169	2,246
7:25 AM	0	0	111	1	0	0	82	0	0	0	0	0	0	0	0	0	194	2,246
7:30 AM	0	0	107	0	0	0	51	0	0	0	0	0	0	0	0	0	158	2,248
7:35 AM	0	0	122	2	0	0	81	0	0	1	0	0	0	0	0	0	206	2,260
7:40 AM	0	0	108	0	0	1	66	0	0	1	0	0	0	0	0	1	177	2,228
7:45 AM	0	0	115	1	0	1	75	0	0	0	0	0	0	0	0	0	192	2,231
7:50 AM	0	0	129	1	0	2	66	0	0	1	0	0	0	0	0	2	201	2,211
7:55 AM	0	0	141	6	0	1	74	0	0	0	0	0	0	0	0	0	222	2,173
8:00 AM	0	0	123	2	0	0	74	0	0	1	0	0	0	0	0	0	200	2,124
8:05 AM	0	0	120	1	0	1	58	0	0	1	0	0	0	0	0	0	181	
8:10 AM	0	0	108	0	0	2	89	0	0	1	0	0	0	0	0	0	200	
8:15 AM	0	0	76	0	0	0	70	0	0	0	0	0	0	0	0	0	146	
8:20 AM	0	0	83	0	0	0	86	0	0	0	0	0	0	0	0	0	169	
8:25 AM	0	0	112	0	0	0	81	0	0	3	0	0	0	0	0	0	196	
8:30 AM	0	0	87	0	0	2	81	0	0	0	0	0	0	0	0	0	170	
8:35 AM	0	0	93	0	0	2	79	0	0	0	0	0	0	0	0	0	174	
8:40 AM	0	0	99	0	0	0	79	0	0	2	0	0	0	0	0	0	180	
8:45 AM	0	0	94	1	0	0	75	0	0	0	0	2	0	0	0	0	172	
8:50 AM	0	0	89	1	0	1	72	0	0	0	0	0	0	0	0	0	163	
8:55 AM	0	0	103	2	0	2	66	0	0	0	0	0	0	0	0	0	173	
Count Total	0	2	2,513	20	0	20	1,703	0	0	11	0	3	0	0	0	3	4,275	
Peak Hour	0	0	1,406	14	0	8	836	0	0	6	0	0	0	0	0	3	2,273	

Location: 5 SW 345th Ave & E Baseline St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
7:00 AM	2	0	3	0	5	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	2	0	7	0	9	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	3	0	5	0	8	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	4	0	6	0	10	7:15 AM	1	0	0	0	1	7:15 AM	0	0	0	0	0
7:20 AM	10	0	5	0	15	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	5	0	12	0	17	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	3	0	5	0	8	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	7	0	5	0	12	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	5	0	4	0	9	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	6	0	8	0	14	7:45 AM	0	0	1	0	1	7:45 AM	0	0	0	0	0
7:50 AM	5	0	5	0	10	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	7	0	3	0	10	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	3	0	3	0	6	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	5	0	5	0	10	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	4	0	12	0	16	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	1	0	1	0	2	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	5	0	6	0	11	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	10	0	2	0	12	8:25 AM	1	0	0	0	1	8:25 AM	0	0	0	0	0
8:30 AM	6	0	3	0	9	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	5	0	4	0	9	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	3	0	3	0	6	8:40 AM	0	0	0	0	0	8:40 AM	0	0	1	0	1
8:45 AM	5	0	4	0	9	8:45 AM	0	0	1	0	1	8:45 AM	0	0	0	1	1
8:50 AM	3	0	5	0	8	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	8	0	4	0	12	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	117	0	120	0	237	Count Total	2	0	2	0	4	Count Total	0	0	1	1	2
Peak Hour	64	0	73	0	137	Peak Hour	1	0	1	0	2	Peak Hour	0	0	0	0	0

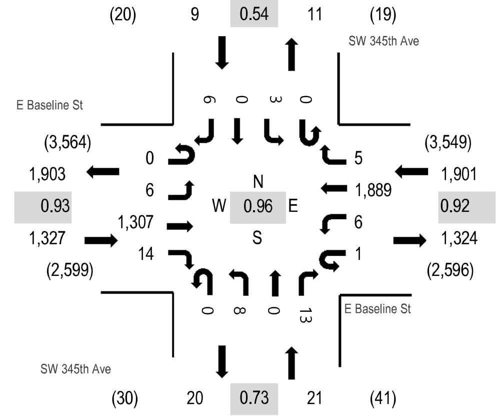
Location: 5 SW 345th Ave & E Baseline St PM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 5 SW 345th Ave & E Baseline St PM
Date: Thursday, September 9, 2021
Peak Hour: 04:20 PM - 05:20 PM
Peak 15-Minutes: 05:05 PM - 05:20 PM

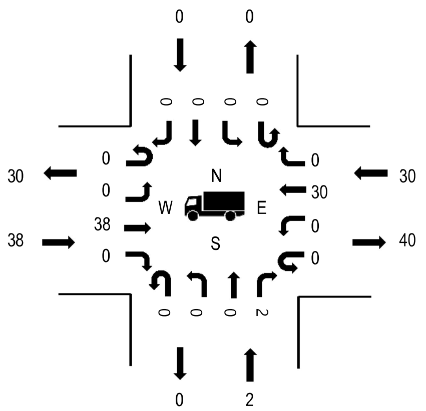
Peak Hour

Motorized Vehicles

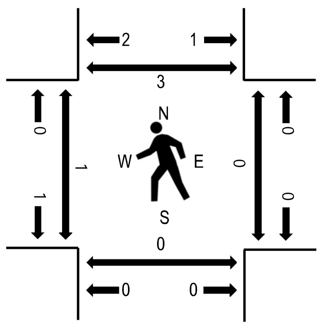


Note: Total study counts contained in parentheses.

Heavy Vehicles



Pedestrians



	HV%	PHF
EB	2.9%	0.93
WB	1.6%	0.92
NB	9.5%	0.73
SB	0.0%	0.54
All	2.1%	0.96

Traffic Counts - Motorized Vehicles

Interval	E Baseline St				E Baseline St				SW 345th Ave				SW 345th Ave					Rolling
	Eastbound				Westbound				Northbound				Southbound					
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	Hour
4:00 PM	0	0	95	0	0	0	131	0	0	1	0	0	0	1	0	0	228	3,149
4:05 PM	0	0	113	3	0	0	148	0	0	3	0	0	0	0	0	1	268	3,184
4:10 PM	0	0	126	0	0	0	123	0	0	0	0	0	0	0	0	1	250	3,190
4:15 PM	0	0	107	1	0	0	148	0	0	0	0	1	0	0	0	0	257	3,241
4:20 PM	0	0	125	3	0	0	159	0	0	0	0	0	0	0	0	0	287	3,258
4:25 PM	0	0	94	0	0	0	161	0	0	0	0	0	0	0	0	0	255	3,233
4:30 PM	0	0	119	3	0	0	154	0	0	0	0	0	0	0	0	0	276	3,244
4:35 PM	0	0	110	1	0	0	138	0	0	0	0	0	0	0	0	0	249	3,231
4:40 PM	0	0	113	0	0	2	150	0	0	0	0	1	0	0	0	0	266	3,221
4:45 PM	0	1	102	0	1	2	153	1	0	1	0	2	0	0	0	1	264	3,169
4:50 PM	0	3	122	4	0	0	149	0	0	1	0	0	0	0	0	1	280	3,168
4:55 PM	0	0	102	1	0	0	160	2	0	0	0	2	0	1	0	1	269	3,107
5:00 PM	0	1	92	1	0	0	160	1	0	3	0	3	0	1	0	1	263	3,060
5:05 PM	0	1	95	0	0	1	171	0	0	2	0	2	0	1	0	1	274	
5:10 PM	0	0	114	0	0	0	185	0	0	1	0	1	0	0	0	0	301	
5:15 PM	0	0	119	1	0	1	149	1	0	0	0	2	0	0	0	1	274	
5:20 PM	0	0	110	0	0	0	149	0	0	1	0	2	0	0	0	0	262	
5:25 PM	0	0	101	1	0	1	156	0	0	1	0	5	0	0	0	1	266	
5:30 PM	0	0	97	1	0	1	162	0	0	0	0	2	0	0	0	0	263	
5:35 PM	0	1	102	0	0	0	133	0	0	3	0	0	0	0	0	0	239	
5:40 PM	0	2	82	0	0	0	128	1	0	0	0	0	0	0	0	1	214	
5:45 PM	0	1	136	0	0	0	124	0	0	0	0	0	0	1	0	1	263	
5:50 PM	0	2	105	0	0	2	109	0	0	0	0	1	0	0	0	0	219	
5:55 PM	0	1	85	0	0	0	132	0	0	0	0	0	0	0	0	4	222	
Count Total	0	13	2,566	20	1	10	3,532	6	0	17	0	24	0	5	0	15	6,209	
Peak Hour	0	6	1,307	14	1	6	1,889	5	0	8	0	13	0	3	0	6	3,258	

Location: 5 SW 345th Ave & E Baseline St PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
4:00 PM	6	0	4	0	10	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	4	0	4	4:05 PM	1	0	0	0	1	4:05 PM	0	0	0	0	0
4:10 PM	3	0	3	0	6	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	4	0	4	0	8	4:15 PM	1	0	0	0	1	4:15 PM	0	0	0	0	0
4:20 PM	7	0	5	0	12	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	4	0	5	4:25 PM	0	0	1	0	1	4:25 PM	0	0	0	1	1
4:30 PM	1	0	2	0	3	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	4	0	5	4:35 PM	0	0	0	0	0	4:35 PM	1	0	0	0	1
4:40 PM	0	0	4	0	4	4:40 PM	1	0	0	0	1	4:40 PM	0	0	0	0	0
4:45 PM	2	0	1	0	3	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	7	0	1	0	8	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	2	2
4:55 PM	10	0	1	0	11	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	1	1	6	0	8	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	2	0	0	0	2	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	3	0	0	0	3	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	3	1	2	0	6	5:15 PM	1	0	1	0	2	5:15 PM	0	0	0	0	0
5:20 PM	2	1	1	0	4	5:20 PM	0	0	1	0	1	5:20 PM	0	0	0	0	0
5:25 PM	1	3	6	0	10	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	3	1	3	0	7	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	3	0	2	0	5	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	2	0	1	0	3	5:40 PM	0	0	1	0	1	5:40 PM	0	0	0	2	2
5:45 PM	0	0	1	0	1	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	2	0	1	0	3	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	1	1
5:55 PM	4	0	2	0	6	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	68	7	62	0	137	Count Total	4	0	4	0	8	Count Total	1	0	0	6	7
Peak Hour	38	2	30	0	70	Peak Hour	2	0	2	0	4	Peak Hour	1	0	0	3	4

ALL TRAFFIC DATA SERVICES
(303) 216-2439
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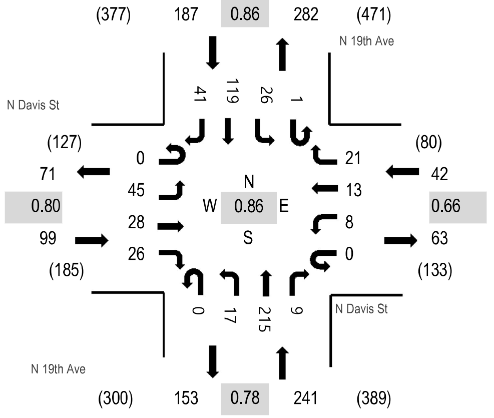
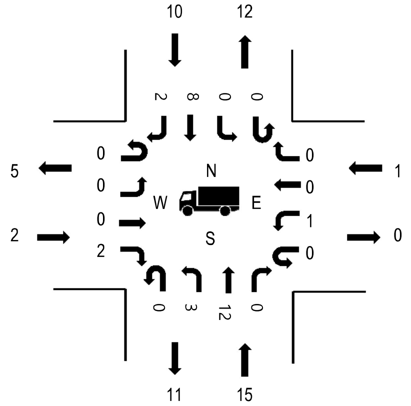
Location: 6 N 19th Ave & N Davis St AM
Date: Thursday, September 9, 2021
Peak Hour: 07:05 AM - 08:05 AM
Peak 15-Minutes: 07:35 AM - 07:50 AM

Peak Hour

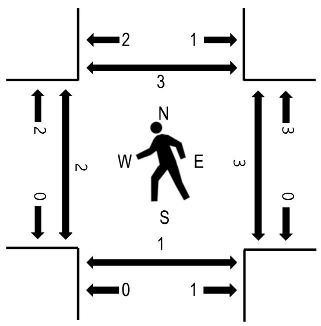
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	2.0%	0.80
WB	2.4%	0.66
NB	6.2%	0.78
SB	5.3%	0.86
All	4.9%	0.86

Traffic Counts - Motorized Vehicles

Interval	N Davis St				N Davis St				N 19th Ave				N 19th Ave					Rolling
	Eastbound				Westbound				Northbound				Southbound					
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	Hour
7:00 AM	0	6	4	0	0	0	1	2	0	0	9	1	0	3	11	0	37	550
7:05 AM	0	4	1	2	0	2	1	0	0	2	25	2	0	0	8	2	49	569
7:10 AM	0	5	4	1	0	1	2	2	0	1	21	1	0	2	5	2	47	564
7:15 AM	0	3	2	1	0	0	1	1	0	0	13	1	1	2	6	3	34	551
7:20 AM	0	2	0	1	0	2	0	3	0	0	12	0	0	2	10	5	37	558
7:25 AM	0	2	2	1	0	1	2	0	0	1	19	0	0	3	9	6	46	569
7:30 AM	0	6	3	3	0	0	0	0	0	0	9	1	0	2	14	4	42	558
7:35 AM	0	6	3	1	0	1	1	4	0	1	20	0	0	2	9	5	53	553
7:40 AM	0	4	1	6	0	1	3	3	0	2	14	0	0	4	15	4	57	545
7:45 AM	0	4	4	2	0	0	1	2	0	2	20	1	0	3	14	2	55	533
7:50 AM	0	2	4	5	0	0	1	2	0	1	15	0	0	2	12	2	46	507
7:55 AM	0	3	2	2	0	0	0	2	0	2	24	1	0	3	7	1	47	504
8:00 AM	0	4	2	1	0	0	1	2	0	5	23	2	0	1	10	5	56	481
8:05 AM	0	5	3	1	0	0	0	0	0	1	16	3	0	2	13	0	44	
8:10 AM	0	4	0	1	0	1	1	3	0	1	10	0	0	1	10	2	34	
8:15 AM	0	6	2	1	0	1	0	2	0	2	12	0	0	4	9	2	41	
8:20 AM	0	2	4	0	0	0	0	4	0	1	15	0	0	4	14	4	48	
8:25 AM	0	5	2	1	0	0	1	1	0	3	8	0	0	2	10	2	35	
8:30 AM	0	2	4	1	0	1	0	2	0	1	11	0	0	2	11	2	37	
8:35 AM	0	2	1	1	0	1	3	2	0	1	12	1	0	1	14	6	45	
8:40 AM	0	5	2	2	0	0	0	0	0	1	12	1	0	5	12	5	45	
8:45 AM	0	3	0	2	0	1	1	5	0	0	4	0	0	0	9	4	29	
8:50 AM	0	2	8	2	0	0	1	1	0	3	10	2	0	4	8	2	43	
8:55 AM	0	1	1	0	0	1	1	1	0	2	4	1	0	2	8	2	24	
Count Total	0	88	59	38	0	14	22	44	0	33	338	18	1	56	248	72	1,031	
Peak Hour	0	45	28	26	0	8	13	21	0	17	215	9	1	26	119	41	569	

Location: 6 N 19th Ave & N Davis St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

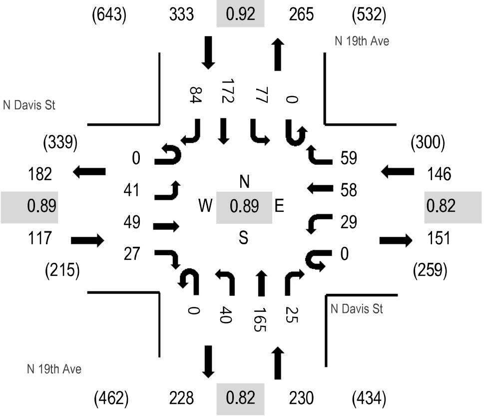
Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
7:00 AM	0	0	0	1	1	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	0	3	0	0	3	7:05 AM	0	0	0	0	0	7:05 AM	2	0	0	0	2
7:10 AM	0	0	0	2	2	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	1	0	0	1	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	0	0	0	2	2	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	0	3	1	1	5	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	0	1	0	3	4	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	1	1
7:35 AM	0	2	0	0	2	7:35 AM	0	0	0	0	0	7:35 AM	0	1	0	1	2
7:40 AM	1	1	0	0	2	7:40 AM	0	0	0	0	0	7:40 AM	0	0	1	0	1
7:45 AM	0	2	0	1	3	7:45 AM	0	0	0	0	0	7:45 AM	0	0	2	1	3
7:50 AM	1	0	0	0	1	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	1	0	1	2	7:55 AM	0	0	0	1	1	7:55 AM	0	0	0	0	0
8:00 AM	0	1	0	0	1	8:00 AM	0	1	1	0	2	8:00 AM	0	0	0	0	0
8:05 AM	0	1	0	0	1	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	2	2
8:10 AM	0	1	0	2	3	8:10 AM	0	0	0	0	0	8:10 AM	0	0	1	0	1
8:15 AM	2	0	0	0	2	8:15 AM	0	0	0	0	0	8:15 AM	0	0	1	0	1
8:20 AM	0	1	0	0	1	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	1	1
8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	0	0	0	2	2	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	2	0	2	4	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	0	0	1	1	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	0	1	1	2	8:45 AM	0	0	0	0	0	8:45 AM	0	0	1	1	2
8:50 AM	0	2	0	0	2	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
8:55 AM	0	0	0	1	1	8:55 AM	0	0	0	0	0	8:55 AM	0	0	0	0	0
Count Total	4	22	2	20	48	Count Total	0	1	1	1	3	Count Total	2	1	6	7	16
Peak Hour	2	15	1	10	28	Peak Hour	0	1	1	1	3	Peak Hour	2	1	3	3	9

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 6 N 19th Ave & N Davis St PM
Date: Thursday, September 9, 2021
Peak Hour: 04:35 PM - 05:35 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour

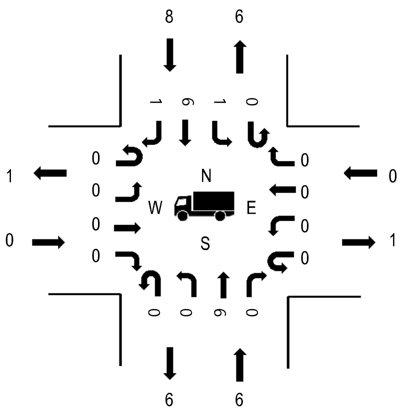
Motorized Vehicles



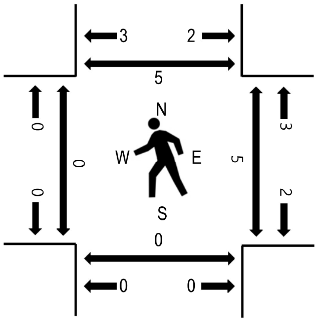
Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.89
WB	0.0%	0.82
NB	2.6%	0.82
SB	2.4%	0.92
All	1.7%	0.89

Heavy Vehicles



Pedestrians



Traffic Counts - Motorized Vehicles

Interval Start Time	N Davis St Eastbound U-Turn	Left	Thru	Right	N Davis St Westbound U-Turn	Left	Thru	Right	N 19th Ave Northbound U-Turn	Left	Thru	Right	N 19th Ave Southbound U-Turn	Left	Thru	Right	Total	Rolling Hour
4:00 PM	0	4	5	1	0	4	4	5	0	0	12	6	0	4	23	7	75	789
4:05 PM	0	6	4	4	0	2	7	8	0	3	11	1	0	1	13	3	63	786
4:10 PM	0	4	0	1	0	1	6	4	0	0	10	3	0	4	14	5	52	801
4:15 PM	0	4	6	4	0	2	6	8	0	2	20	1	0	9	21	3	86	807
4:20 PM	0	3	3	1	0	3	7	11	0	3	11	1	0	9	13	8	73	800
4:25 PM	0	5	2	0	0	2	3	5	0	4	13	2	0	4	16	5	61	802
4:30 PM	0	4	2	3	0	1	4	5	0	1	14	3	0	4	18	4	63	820
4:35 PM	0	4	8	2	0	1	2	8	0	1	14	2	0	7	16	9	74	826
4:40 PM	0	2	3	3	0	2	11	3	0	2	7	3	0	4	13	4	57	802
4:45 PM	0	3	5	3	0	2	2	2	0	2	11	3	0	10	9	10	62	811
4:50 PM	0	5	5	3	0	3	2	5	0	0	16	2	0	7	16	7	71	826
4:55 PM	0	0	3	2	0	2	4	4	0	0	12	2	0	5	12	6	52	814
5:00 PM	0	2	3	3	0	1	11	8	0	6	8	1	0	9	13	7	72	803
5:05 PM	0	4	3	3	0	0	3	3	0	3	25	3	0	7	16	8	78	
5:10 PM	0	5	1	0	0	1	5	1	0	6	14	1	0	4	13	7	58	
5:15 PM	0	6	3	4	0	5	4	5	0	4	15	1	0	6	16	10	79	
5:20 PM	0	0	3	1	0	4	4	4	0	8	14	4	0	10	18	5	75	
5:25 PM	0	6	8	1	0	5	4	9	0	3	14	2	0	5	18	4	79	
5:30 PM	0	4	4	2	0	3	6	7	0	5	15	1	0	3	12	7	69	
5:35 PM	0	1	1	0	0	2	5	1	0	5	15	0	0	4	11	5	50	
5:40 PM	0	3	5	2	0	4	3	7	0	5	5	1	0	6	15	10	66	
5:45 PM	0	3	4	2	0	0	6	8	0	4	17	0	0	5	21	7	77	
5:50 PM	0	1	2	1	0	2	5	6	0	3	15	0	0	2	17	5	59	
5:55 PM	0	3	4	0	0	0	3	4	0	2	11	0	0	0	10	4	41	
Count Total	0	82	87	46	0	52	117	131	0	72	319	43	0	129	364	150	1,592	
Peak Hour	0	41	49	27	0	29	58	59	0	40	165	25	0	77	172	84	826	

Location: 6 N 19th Ave & N Davis St PM

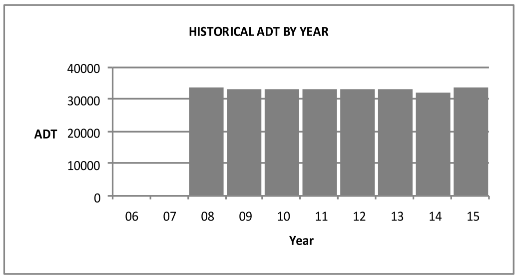
Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval	Heavy Vehicles					Interval	Bicycles on Roadway					Interval	Pedestrians/Bicycles on Crosswalk				
Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total	Start Time	EB	NB	WB	SB	Total
4:00 PM	0	0	0	1	1	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	1	1	2	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	1	1
4:10 PM	1	2	1	1	5	4:10 PM	0	0	0	0	0	4:10 PM	0	1	0	0	1
4:15 PM	1	1	0	0	2	4:15 PM	0	0	0	0	0	4:15 PM	0	0	1	1	2
4:20 PM	0	0	0	1	1	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	0	1	1	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	1	0	0	1	4:30 PM	0	0	1	0	1	4:30 PM	0	0	2	3	5
4:35 PM	0	0	0	1	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	1	2	3
4:40 PM	0	2	0	1	3	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	1	0	0	1	4:45 PM	0	0	0	0	0	4:45 PM	0	0	1	1	2
4:50 PM	0	0	0	1	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	1	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	1	0	1
5:05 PM	0	2	0	1	3	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	2	2	4
5:15 PM	0	1	0	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	1	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	1	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	1	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	1	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	4	4	8
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	1	0	0	0	1	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	2	10	2	14	28	Count Total	1	0	1	0	2	Count Total	0	1	12	14	27
Peak Hour	0	6	0	8	14	Peak Hour	0	0	0	0	0	Peak Hour	0	0	5	5	10

Location:	OR8; MP 14.84; TUALATIN VALLEY HIGHWAY NO. 29; 0.28 mile west of N.W. 334th Avenue	**Site Name:**	Cornelius (34-009)
		Installed:	September, 2007

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	**ADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2006	***	***	***	***	***	***
2007	***	***	***	***	***	***
2008	33838	120	10.2	9.7	9.6	9.5
2009	33043	120	14.0	9.6	9.4	9.3
2010	33237	124	10.2	9.7	9.5	9.4
2011	33248	118	9.9	9.7	9.5	9.4
2012	33333	117	9.8	9.5	9.4	9.4
2013	33000	120	9.9	9.5	9.4	9.2
2014	32198	120	10.0	9.6	9.5	9.4
2015	33905	127	10.2	9.6	9.4	9.3



2015 TRAFFIC DATA

	Average Weekday Traffic	**Percent of ADT**	**Average Daily Traffic**	**Percent of ADT**
January	32443	96	31323	92
February	34522	102	33594	99
March	34753	103	33690	99
April	35181	104	34438	102
May	35006	103	34660	102
June	35430	104	34500	102
July	35432	105	33940	100
August	35240	104	34140	101
September	35196	104	34187	101
October	35221	104	34180	101
November	34334	101	33159	98
December	37136	110	35048	103

For Vehicle Classification data near this ATR, please go to the following web page: https://gis.odot.state.or.us/TransGIS/

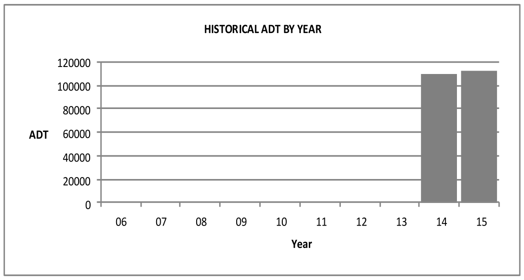
🟨 - Peak Month (December)

🟩 - Count Month (September)

Location:	US26; MP 65.02; SUNSET HIGHWAY NO. 47; 0.73 mile east of 185th Avenue overcrossing	**Site Name:**	Beaverton-Bethany (34-010)
		Installed:	February, 2013

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	**ADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2006	***	***	***	***	***	***
2007	***	***	***	***	***	***
2008	***	***	***	***	***	***
2009	***	***	***	***	***	***
2010	***	***	***	***	***	***
2011	***	***	***	***	***	***
2012	***	***	***	***	***	***
2013	***	***	***	***	***	***
2014	109193	120	8.6	8.5	8.5	8.4
2015	112772	117	8.4	8.3	8.3	8.2



2015 TRAFFIC DATA

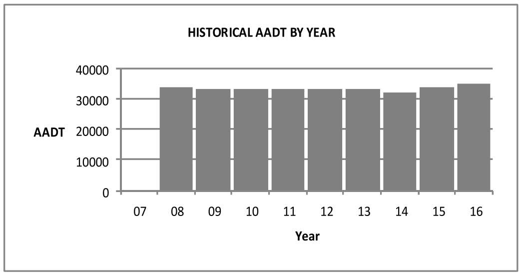
	Average Weekday Traffic	**Percent of ADT**	**Average Daily Traffic**	**Percent of ADT**
January	112212	100	103917	92
February	116492	103	109708	97
March	119301	106	111740	99
April	121800	108	114601	102
May	120607	107	114717	102
June	125110	111	119197	106
July	127552	113	118924	105
August	126785	112	119896	106
September	121420	108	115686	103
October	122064	108	114871	102
November	114487	102	107160	95
December	111533	99	102851	91

For Vehicle Classification data near this ATR, please go to the following web page: https://gis.odot.state.or.us/TransGIS/

Location:	OR8; MP 14.84; TUALATIN VALLEY HIGHWAY NO. 29; 0.28 mile west of N.W. 334th Avenue	**Site Name:**	Cornelius (34-009)
		Installed:	September, 2007

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	**AADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2007	***	***	***	***	***	***
2008	33838	120	10.2	9.7	9.6	9.5
2009	33043	120	14.0	9.6	9.4	9.3
2010	33237	124	10.2	9.7	9.5	9.4
2011	33248	118	9.9	9.7	9.5	9.4
2012	33333	117	9.8	9.5	9.4	9.4
2013	33000	120	9.9	9.5	9.4	9.2
2014	32198	120	10.0	9.6	9.5	9.4
2015	33905	127	10.2	9.6	9.4	9.3
2016	34836	119	9.5	9.3	9.2	9.1



2016 TRAFFIC DATA

	Average Weekday Traffic	**Percent of AADT**	**Average Daily Traffic**	**Percent of AADT**
January	34425	99	32417	93
February	35602	102	34525	99
March	36257	104	34874	100
April	37194	107	36267	104
May	37042	106	36265	104
June	37066	106	36145	104
July	36114	104	35350	101
August	36701	105	35497	102
September	36125	104	35096	101
October	35949	103	34598	99
November	35451	102	34085	98
December	33912	97	32907	94

For Vehicle Classification data near your project, please go to the following web page:
https://gis.odot.state.or.us/TransGIS/

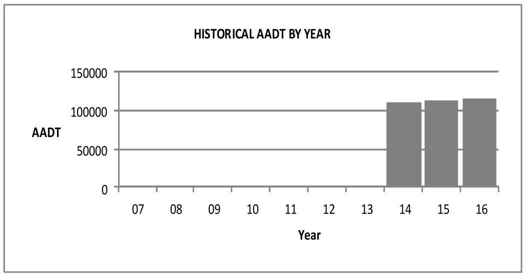
🟨 - Peak Month (April)

🟩 - Count Month (September)

Location:	US26; MP 65.02; SUNSET HIGHWAY NO. 47; 0.73 mile east of 185th Avenue overcrossing	**Site Name:**	Beaverton-Bethany (34-010)
		Installed:	February, 2013

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	**AADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2007	***	***	***	***	***	***
2008	***	***	***	***	***	***
2009	***	***	***	***	***	***
2010	***	***	***	***	***	***
2011	***	***	***	***	***	***
2012	***	***	***	***	***	***
2013	***	***	***	***	***	***
2014	109193	120	8.6	8.5	8.5	8.4
2015	112772	117	8.4	8.3	8.3	8.2
2016	114746	119	8.3	8.2	8.2	8.2



2016 TRAFFIC DATA

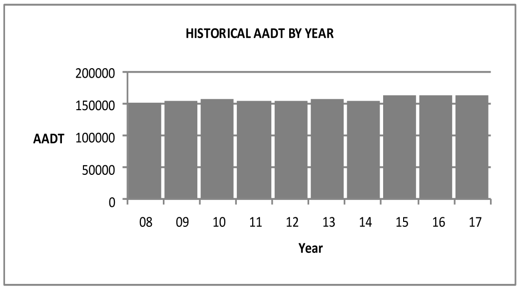
	Average Weekday Traffic	**Percent of AADT**	**Average Daily Traffic**	**Percent of AADT**
January	112343	98	102939	90
February	119751	104	112280	98
March	121293	106	113237	99
April	126371	110	120223	105
May	126041	110	118948	104
June	130048	113	123356	108
July	127050	111	120923	105
August	130224	113	123997	108
September	124504	109	118443	103
October	121466	106	114387	100
November	117599	102	110082	96
December	104814	91	98140	86

For Vehicle Classification data near your project, please go to the following web page:
https://gis.odot.state.or.us/TransGIS/

Location:	I-5; MP 290.14; PACIFIC HIGHWAY NO. 1; 0.34 mile south of Boones Ferry Road Interchange	**Site Name:**	Tigard (34-008)
		Installed:	September, 2007

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	**AADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2008	151707	120	8.6	8.5	8.5	8.4
2009	153545	118	8.6	8.5	8.4	8.3
2010	155956	117	8.6	8.4	8.3	8.3
2011	154847	117	8.6	8.4	8.4	8.4
2012	153197	117	8.5	8.3	8.3	8.2
2013	157538	117	8.4	8.2	8.2	8.1
2014	154594	119	9.6	8.1	8.0	8.0
2015	164156	114	8.0	7.8	7.7	7.7
2016	164465	114	7.8	7.7	7.6	7.6
2017	164338	114	7.9	7.7	7.6	7.6



2017 TRAFFIC DATA

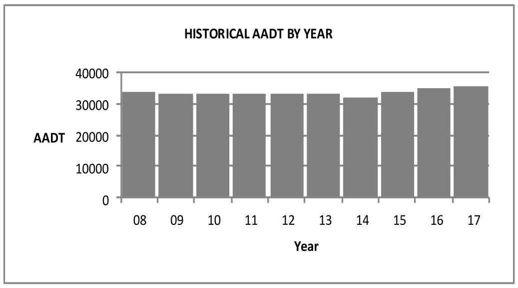
	Average Weekday Traffic	**Percent of AADT**	**Average Daily Traffic**	**Percent of AADT**
January	145287	88	136629	83
February	169310	103	159842	97
March	171599	104	163785	100
April	178351	109	170457	104
May	176763	108	169059	103
June	181971	111	174091	106
July	176466	107	170442	104
August	178294	108	171288	104
September	172248	105	167129	102
October	173827	106	168228	102
November	169223	103	161762	98
December	166325	101	159347	97

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR8; MP 14.84; TUALATIN VALLEY HIGHWAY NO. 29; 0.28 mile west of N.W. 334th Avenue	**Site Name:**	Cornelius (34-009)
		Installed:	September, 2007

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	**AADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2008	33838	120	10.2	9.7	9.6	9.5
2009	33043	120	14.0	9.6	9.4	9.3
2010	33237	124	10.2	9.7	9.5	9.4
2011	33248	118	9.9	9.7	9.5	9.4
2012	33333	117	9.8	9.5	9.4	9.4
2013	33000	120	9.9	9.5	9.4	9.2
2014	32198	120	10.0	9.6	9.5	9.4
2015	33905	127	10.2	9.6	9.4	9.3
2016	34836	119	9.5	9.3	9.2	9.1
2017	35234	119	9.7	9.3	9.1	9.1



2017 TRAFFIC DATA

	Average Weekday Traffic	**Percent of AADT**	**Average Daily Traffic**	**Percent of AADT**
January	32382	92	31043	88
February	37311	106	35882	102
March	36642	104	35548	101
April	37406	106	36380	103
May	37392	106	36672	104
June	37651	107	36619	104
July	36564	104	35754	101
August	36754	104	35721	101
September	36432	103	35431	101
October	36448	103	35349	100
November	35932	102	34447	98
December	34676	98	33960	96

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

🟨 - Peak Month (June)
🟩 - Count Month (September)

Location:	OR8; MP 14.84; TUALATIN VALLEY HIGHWAY NO. 29; 0.28 mile west of N.W. 334th Avenue	**Site Name:**	Cornelius (34-009)
		Installed:	September, 2007

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	**AADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2009	33043	120	14.0	9.6	9.4	9.3
2010	33237	124	10.2	9.7	9.5	9.4
2011	33248	118	9.9	9.7	9.5	9.4
2012	33333	117	9.8	9.5	9.4	9.4
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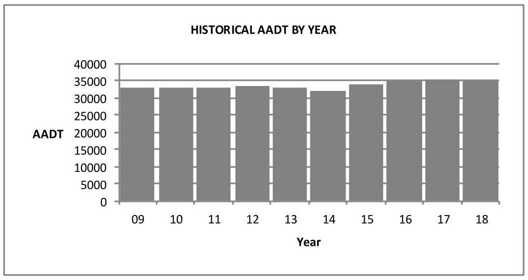
2015	33905	127	10.2	9.6	9.4	9.3
2016	34836	119	9.5	9.3	9.2	9.1
2017	35234	119	9.7	9.3	9.1	9.1
2018	35151	116	9.3	9.1	9.0	9.0



2018 TRAFFIC DATA

	Average Weekday Traffic	**Percent of AADT**	**Average Daily Traffic**	**Percent of AADT**
January	34292	98	33189	94
February	35397	101	34349	98
March	36552	104	35413	101
April	37159	106	35895	102
May	37111	106	36372	103
June	37289	106	36214	103
July	36516	104	35460	101
August	37064	105	35934	102
September	36225	103	35172	100
October	36510	104	35314	100
November	35748	102	34434	98
December	34801	99	34067	97

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2018.xlsx

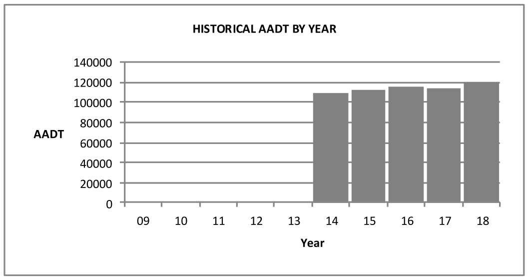
🟨 - Peak Month (June)

🟩 - Count Month (September)

Location:	US26; MP 65.02; SUNSET HIGHWAY NO. 47; 0.73 mile east of 185th Avenue overcrossing	**Site Name:**	Beaverton-Bethany (34-010)
		Installed:	February, 2013

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	**AADT**	**Max Day**	**Max Hour**	**10TH Hour**	**20TH Hour**	**30TH Hour**
2009	***	***	***	***	***	***
2010	***	***	***	***	***	***
2011	***	***	***	***	***	***
2012	***	***	***	***	***	***
2013	***	***	***	***	***	***
2014	109193	120	8.6	8.5	8.5	8.4
2015	112772	117	8.4	8.3	8.3	8.2
2016	114746	119	8.3	8.2	8.2	8.2
2017	114408	117	8.2	8.0	8.0	8.0
2018	119946	117	8.2	8.1	8.0	8.0



2018 TRAFFIC DATA

	Average Weekday Traffic	**Percent of AADT**	**Average Daily Traffic**	**Percent of AADT**
January	115892	97	110068	92
February	115773	97	110737	92
March	125827	105	118828	99
April	128500	107	120907	101
May	126538	105	122263	102
June	134167	112	126918	106
July	131620	110	126612	106
August	135108	113	128445	107
September	129188	108	123330	103
October	129463	108	122995	103
November	123983	103	116436	97
December	117819	98	111814	93

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2018.xlsx

Summary of Trends
at
Automatic Traffic Recorder Stations
2019

Location	OR8; MP 14.84; TUALATIN VALLEY HIGHWAY NO. 29; 0.28 mile west of NW 334th Ave	**Site Name**	Cornelius (34-009)
		Installed	September, 2007

HISTORICAL ANNUAL TRAFFIC DATA

Year	**Annual Average Daily Traffic (AADT)**	**Critical Values as percent of Annual Average Daily Traffic (AADT)**				
		Max Day	**Max Hour**	**10th Hour**	**20th Hour**	**30th Hour**
2010	33237	124	10.2	9.7	9.5	9.4
2011	33248	118	9.9	9.7	9.5	9.4
2012	33333	117	9.8	9.5	9.4	9.4
2013	33000	120	9.9	9.5	9.4	9.2
2014	32198	120	10.0	9.6	9.5	9.4
2015	33905	127	10.2	9.6	9.4	9.3
2016	34836	119	9.5	9.3	9.2	9.1
2017	35234	119	9.7	9.3	9.1	9.1
2018	35151	116	9.3	9.1	9.0	9.0
2019	35335	116	9.6	9.1	9.1	9.0

Average growth from listed year up to 2019:	
1%	2010-2019

2019 SEASONAL TRAFFIC DATA

Month	**Weekday**		**Daily**	
	Average	**% AADT**	**Average**	**% AADT**
January	34262	97	33143	94
February	35593	101	34113	97
March	36389	103	35332	100
April	37561	106	36474	103
May	36970	105	36292	103
June	37408	106	36377	103
July	36648	104	35444	100
August	37592	106	36118	102
September	37134	105	35946	102
October	36877	104	35737	101
November	35387	100	34515	98
December	35525	101	34534	98

	2019	2018	2017	2016	2015		Avg Rank
Peak Month >	8	6	6	4	12	4	2.6
2nd Peak >	4	4	4	6	7	6	2.0
3rd Peak >	6	5	5	5	6		
					8		
					10		
					4		

	2019	2018	2017	2016	2015	Average (Excluding Highest & Lowest)
Peak Month (June)	106%	106%	107%	106%	104%	106%
Count Month (September)	105%	103%	103%	104%	104%	104%
						1.02 Seasonal Adjustment

Traffic Volumes at Fred Meyer Driveway from Drone Footage

PM		Fred Meyer TMC (Turning Movements only) From drone camera angle, viewing driveways from north to south	Fred Meyer TMC (corrected orientation)	Fred Meyer (raw data)	Fred Meyer (adjusted)
					19%
THROUGH		34	48		
		48	34		
Driveway A (northernmost EB-only driveway)			0	0 51	0 63
			0	0	0
				98	121
			0	0	0
	A		A 0	A 0 47	A 0 58
Driveway B (northernmost WB-only driveway)		7	0	0 51	0 63
			0	0	0
				105	130
			0	0	0
	B		B 7	B 7 47	B 9 58
Driveway C (EB only)			0	0 51	0 63
		10	2	2	2
				115	141
		2	10	10	12
	C		C 0	C 0 52	C 0 64
Driveway D (EB & WB)		44	0	0 61	0 75
		14	0	0	0
				171	210
			14	14	17
	D		D 44	D 44 52	D 54 64
Driveway E (WB only)		9	0	0 75	0 93
			0	0	0
				180	222
			0	0	0
	E		E 9	E 9 96	E 11 118
Driveway F (EB only)			0	0 75	0 93
		14	5	5	6
				194	239
		5	14	14	17
	F		F 0	F 0 100	F 0 123
Driveway G (WB only)		18	2	2 87	2 107
			0	0	0
				207	254
			0	0	0
	G	2	G 18	G 18 100	G 22 123
Driveway H (EB only)			0	0 87	0 107
		19	4	4	5
				224	276
		4	19	19	23
	H		H 0	H 0 114	H 0 141
Driveway I (southernmost WB-only driveway)		49	1	1 105	1 130
		1	0	0	0
				270	333
			1	1	1
	I	1	I 49	I 49 114	I 60 141
Driveway J (southernmost EB-only driveway)		1	0	0 106	0 131
		18	2	2	2
				288	355
		2	18	18	22
	J		J 1	J 1 161	J 1 199

	Historical Volumes	Recent Volumes	Numerical Change (gross)	Pct. Change by Movement	Pct. Change by Approach
N 23rd Avenue / Burger King Driveway	25 174 Sep-21	19 118 Oct-21	-6 -56	-24% -32%	-31%
	4	3	-1	-25%	
	644	522	-122	-19%	-35% -19%
	82	53	-29	-35%	
	4 158 201	4 141 188	4 -17 -13	4 -11% -6%	4 -8%

Drone Data over 60 mins

-19%	Change by total entering volumes << USE THIS BECAUSE IT'S HIGHER, THEREFORE MORE CONSERVATIVE.
-18%	Change using only north-south through volumes

Fred Meyer Driveway Labels

06/10/2021 16:00:58

BLRB architects

TACOMA
1250 Pacific Ave
Suite 700
WA 98402
253.627.5599

I SPOKANE
505 W Riverside
Suite 500
WA 98201
509.252.5080

I PORTLAND
621 SW Morrison St.
Suite 950
OR 97205
503.595.0270

I BEND
721 SW Industrial
Suite 130
OR 97702
541.330.6506

Stamp

DRAWING REVISIONS

#	Date	Description

CORNELIUS MULTIFAMILY

CALIDA RESIDENTIAL, LLC

CONCEPT DESIGN

Drawing Title:
CONCEPT SITE PLAN

Date : 10/05/2021
Drawn By : Author
Project No. 021112
Revised :

Sheet No.
PR1.0E

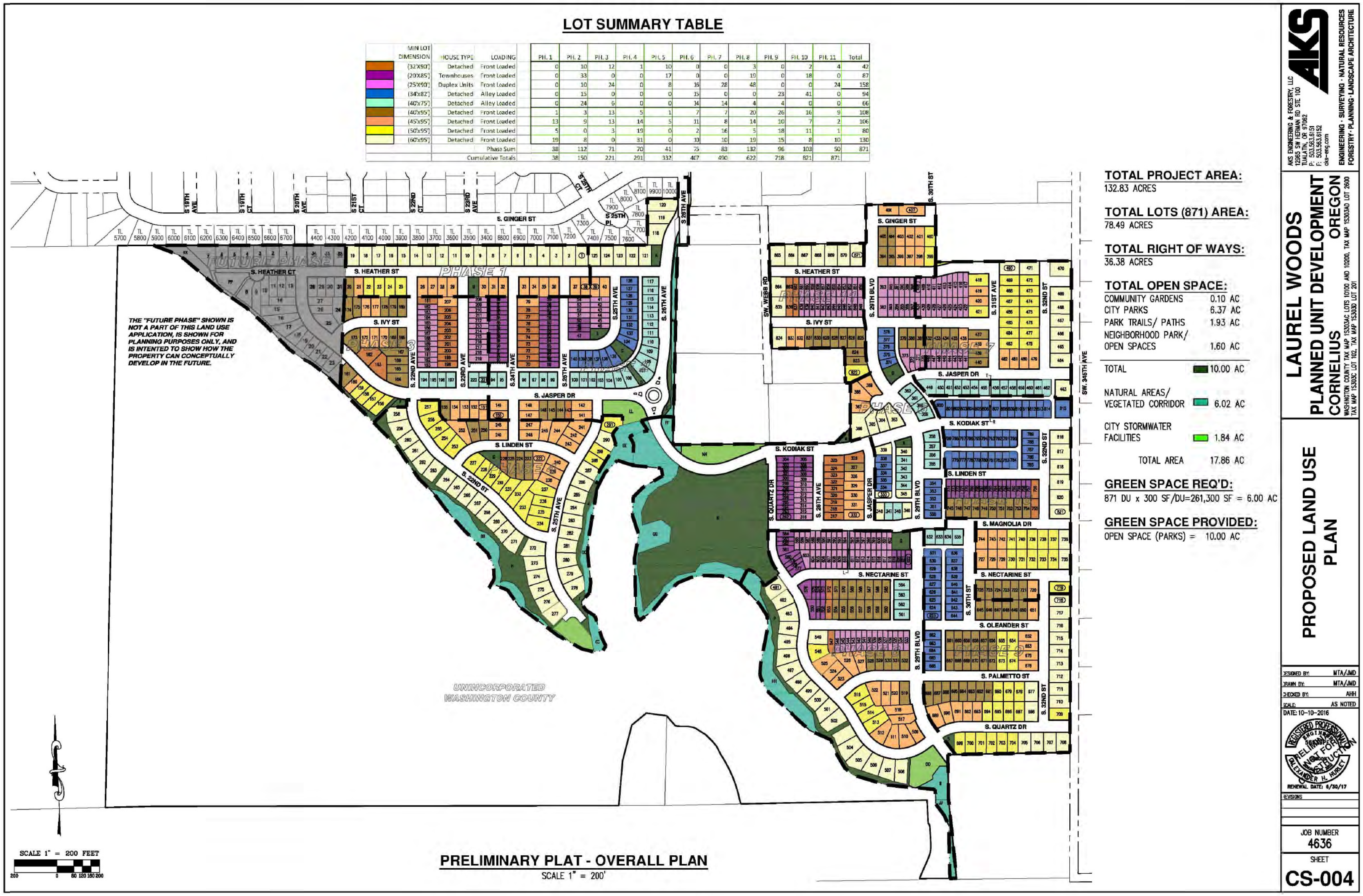
BLRB ARCHITECTS, P.S.

Background Growth Calculations

Site id	HWY	MP	DIR	HS	Description	2017	2018	2019	2039	RSQ	
1977	029	15.70	1		0.02 mile east of W 26th Avenue		30500		37800	MODEL	1.0%
1978	029	16.11	1		0.02 mile east of 19th Avenue		15500		19300	MODEL	1.0%
1984	029	16.05	2		0.02 mile east of 20th Avenue		14700		18300	MODEL	1.0%

Appendix B

In-Process Projects



LOT SUMMARY TABLE

	MIN LOT DIMENSION	HOUSE TYPE	LOADING	PH. 1	PH. 2	PH. 3	PH. 4	PH. 5	PH. 6	PH. 7	PH. 8	PH. 9	PH. 10	PH. 11	Total
🟧	(32'X90')	Detached	Front Loaded	0	10	12	1	10	0	0	3	0	2	4	42
🟪	(20'X85')	Townhouses	Front Loaded	0	33	0	0	17	0	0	19	0	18	0	87
🟪	(25'X90')	Duplex Units	Front Loaded	0	10	24	0	8	16	28	48	0	0	24	158
🟦	(34'x82')	Detached	Alley Loaded	0	15	0	0	0	15	0	0	23	41	0	94
🟩	(40'x75')	Detached	Alley Loaded	0	24	6	0	0	14	14	4	4	0	0	66
🟫	(40'x95')	Detached	Front Loaded	1	3	13	5	1	7	7	20	26	16	9	108
🟧	(45'x95')	Detached	Front Loaded	13	9	13	14	5	11	8	14	10	7	2	106
🟨	(50'x95')	Detached	Front Loaded	5	0	3	19	0	2	16	5	18	11	1	80
🟨	(60'x95')	Detached	Front Loaded	19	8	0	31	0	10	10	19	15	8	10	130
			Phase Sum	38	112	71	70	41	75	83	132	96	103	50	871
			Cumulative Totals	38	150	221	291	332	407	490	622	718	821	871	

TOTAL PROJECT AREA:
132.83 ACRES

TOTAL LOTS (871) AREA:
78.49 ACRES

TOTAL RIGHT OF WAYS:
36.38 ACRES

TOTAL OPEN SPACE:

COMMUNITY GARDENS		0.10 AC
CITY PARKS		6.37 AC
PARK TRAILS/ PATHS		1.93 AC
NEIGHBORHOOD PARK/ OPEN SPACES		1.60 AC
TOTAL	■	10.00 AC
NATURAL AREAS/ VEGETATED CORRIDOR	■	6.02 AC
CITY STORMWATER FACILITIES	■	1.84 AC
TOTAL AREA		17.86 AC

GREEN SPACE REQ'D:
871 DU x 300 SF/DU=261,300 SF = 6.00 AC

GREEN SPACE PROVIDED:
OPEN SPACE (PARKS) = 10.00 AC

THE "FUTURE PHASE" SHOWN IS NOT A PART OF THIS LAND USE APPLICATION, IS SHOWN FOR PLANNING PURPOSES ONLY, AND IS INTENTED TO SHOW HOW THE PROPERTY CAN CONCEPTUALLY DEVELOP IN THE FUTURE.

PRELIMINARY PLAT - OVERALL PLAN
SCALE 1" = 200'

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

ENGINEERING · SURVEYING · NATURAL RESOURCES
FORESTRY · PLANNING · LANDSCAPE ARCHITECTURE

LAUREL WOODS
PLANNED UNIT DEVELOPMENT
CORNELIUS OREGON
WASHINGTON COUNTY TAX MAP 1S303AC LOTS 10100 AND 10200, TAX MAP 1S303AD LOT 2600
TAX MAP 1S303C LOT 102, TAX MAP 1S303D LOT 201

PROPOSED LAND USE PLAN

DESIGNED BY: MTA/JMD
DRAWN BY: MTA/JMD
CHECKED BY: AHH
SCALE: AS NOTED
DATE: 10-10-2016

REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION
ALEXANDER H. HURLEY
RENEWAL DATE: 6/30/17

REVISIONS

JOB NUMBER
4636
SHEET
CS-004

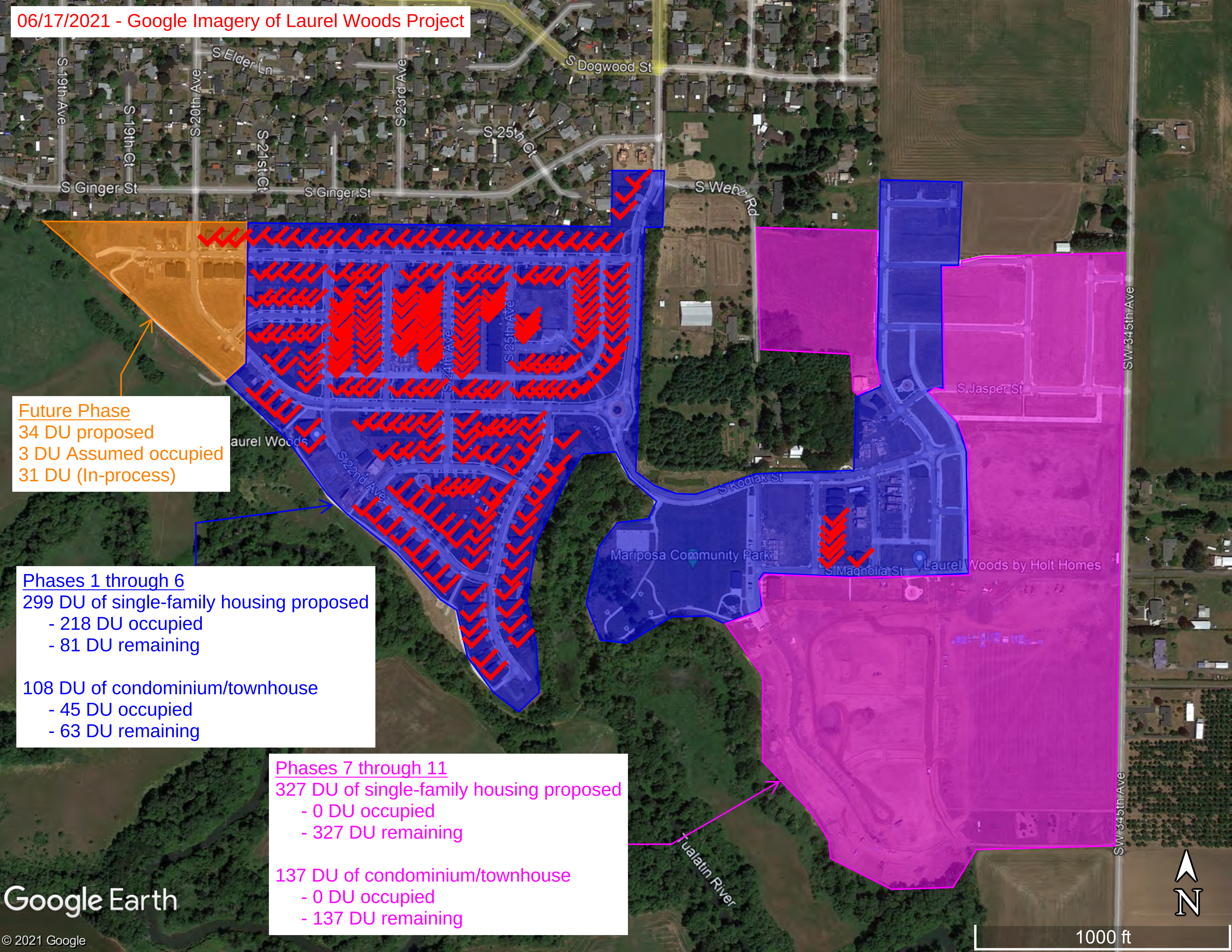
Provided by AKS Engineering on 2016-10-06

Conceptual Site Plan
Cornelious, OR

Figure
2

H:\projfile\19474 - Holt Homes Cornelius\dwgs\figs\19474_Fig1.dwg Oct 14, 2016 - 9:18am - mbell Layout Tab: Fig02

06/17/2021 - Google Imagery of Laurel Woods Project



Future Phase
34 DU proposed
3 DU Assumed occupied
31 DU (In-process)

Phases 1 through 6
299 DU of single-family housing proposed
- 218 DU occupied
- 81 DU remaining

108 DU of condominium/townhouse
- 45 DU occupied
- 63 DU remaining

Phases 7 through 11
327 DU of single-family housing proposed
- 0 DU occupied
- 327 DU remaining

137 DU of condominium/townhouse
- 0 DU occupied
- 137 DU remaining

Traffic Operations

The weekday a.m. and p.m. peak-hour turning-movement volumes shown in Figure 6 were used to conduct an operational analysis at the study intersections to determine the year 2019 background traffic conditions. As show, all of the study intersections are forecast to operate acceptably during the weekday a.m. and p.m. peak hours. *Appendix "E" contains the worksheets used to evaluate year 2019 background traffic conditions at the study intersections.*

YEAR 2019 PROPOSED DEVELOPMENT PLAN

The year 2019 proposed development plan includes Phases 1-6 of the proposed Laurel Woods development. Phases 1-6 will include 407 of the 871 residential units, including 299 single-family residential homes, 50 townhomes, and 58 duplexes. Construction of Phases 1-6 is expected to begin in 2017 with full build-out and occupancy in 2019. Access to Phases 1-6 is planned to be provided via extensions of 20th Avenue and 26th Avenue.

Trip Generation

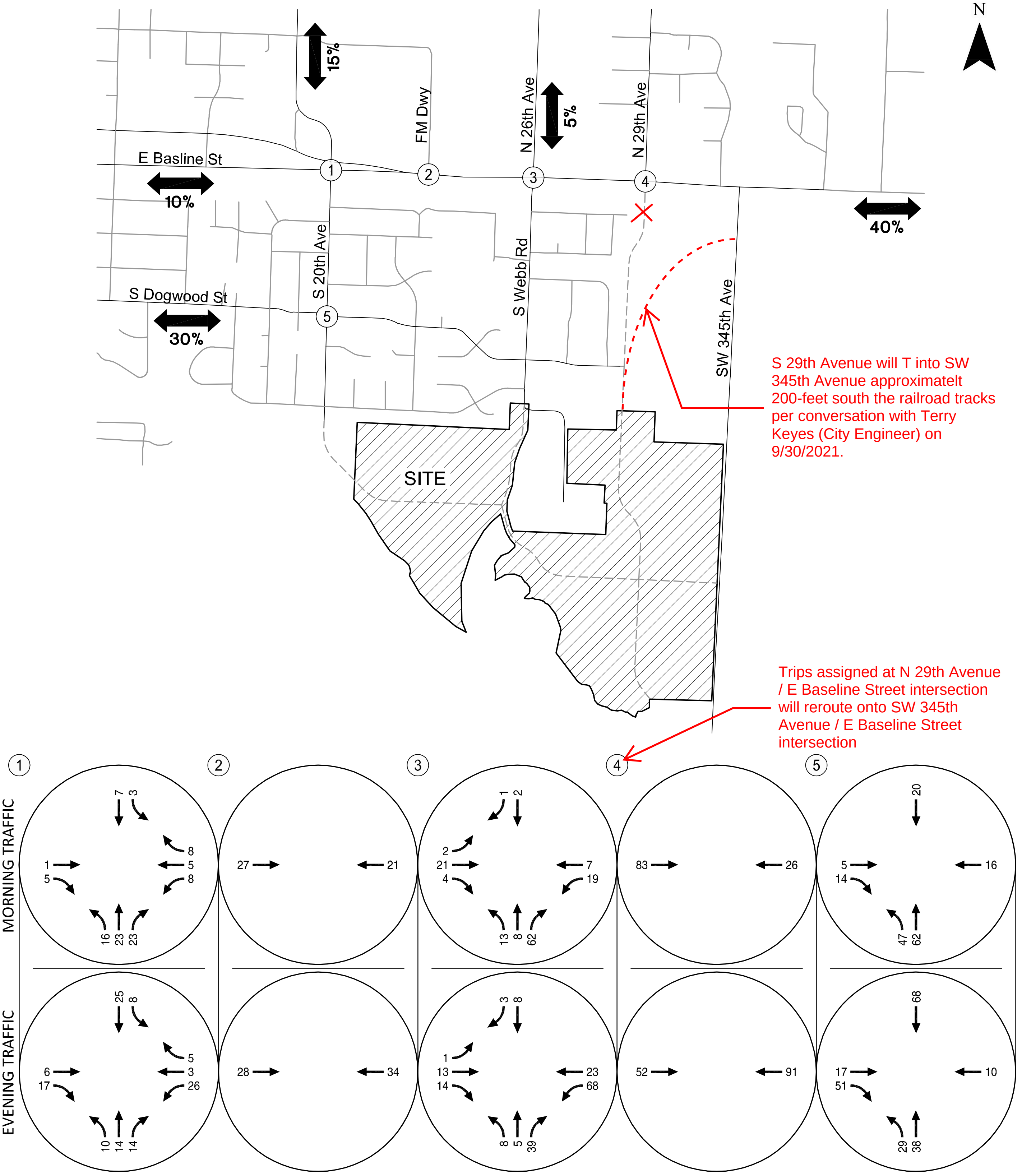
A trip generation estimate was prepared for Phases 1-6 of the proposed development based on information provided in the standard reference manual, *Trip Generation, 9th Edition,* published by the Institute of Transportation Engineers (ITE – Reference 7). ITE Land Use Codes 210 (Single-Family Detached Housing) and 230 (Residential Condominium/Townhouse) were used to represent the proposed development. Table 3 summarizes the anticipated number of trips that will be generated by Phases 1-6 of the proposed development on a typical mid-week day and during the weekday morning and evening peak time periods.

Table 3: Estimated Laurel Woods Development Trip Generation (Phases 1-6)

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	299 units	2,846	224	56	168	299	188	111
Residential Condominium/Townhouse	230	108 units	628	48	8	40	56	38	18
		Total Trips	**3,474**	**272**	**64**	**208**	**355**	**226**	**129**

Site Trip Distribution/Trip Assignment

The site-generated trips were distributed onto the study area roadway system based on a travel demand model select zone analysis prepared by Washington County as well as a review of existing traffic patterns and the location of major trip origins and destinations in the Cornelius and Washington County area. Figure 7 illustrates the estimated trip distribution pattern for the proposed development. Figure 7 also illustrates the site-generated trips that are expected to use the study intersections during the weekday a.m. and p.m. peak hours. *The select zone analysis prepare by Washington Count is provided in Appendix "F".*



S 29th Avenue will T into SW 345th Avenue approximatelt 200-feet south the railroad tracks per conversation with Terry Keyes (City Engineer) on 9/30/2021.

Trips assigned at N 29th Avenue / E Baseline Street intersection will reroute onto SW 345th Avenue / E Baseline Street intersection

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Year 2019 Estimated Trip Distribution Pattern & Site-generated Trips
Weekday AM and PM Peak Hours
Cornelius, OR

Figure
7

YEAR 2022 PROPOSED DEVELOPMENT PLAN

The year 2022 proposed development plan includes Phases 7-11 of the proposed Laurel Woods development. Phases 7-11 will include construction of 464 of the 871 residential units, including 327 single-family residential homes, 37 townhomes, and 100 duplexes. Construction of Phase 7-11 is expected to begin in 2019 with full build-out and occupancy in 2022. Access to Phases 7-11 is planned to be provided via 20th Avenue, 26th Avenue, and 29th Avenue.

Trip Generation

A trip generation estimate was prepared for Phases 7-11 of the proposed development based on information provided in ITE. ITE Land Use Codes 210 (Single-Family Detached Housing) and 230 (Residential Condominium/Townhouse) were used to represent the proposed development. Table 5 summarizes the anticipated number of trips that will be generated by Phases 7-11 of the proposed development on a typical mid-week day and during the weekday morning and evening peak time periods.

Table 5: Estimated Laurel Woods Development Trip Generation (Phases 7-11)

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	327 units	3,114	246	62	184	328	207	121
Residential Condominium/Townhouse	230	137 units	796	60	10	50	71	47	24
		Total Trips	**3,910**	**306**	**72**	**234**	**399**	**254**	**145**

Site Trip Distribution/Trip Assignment

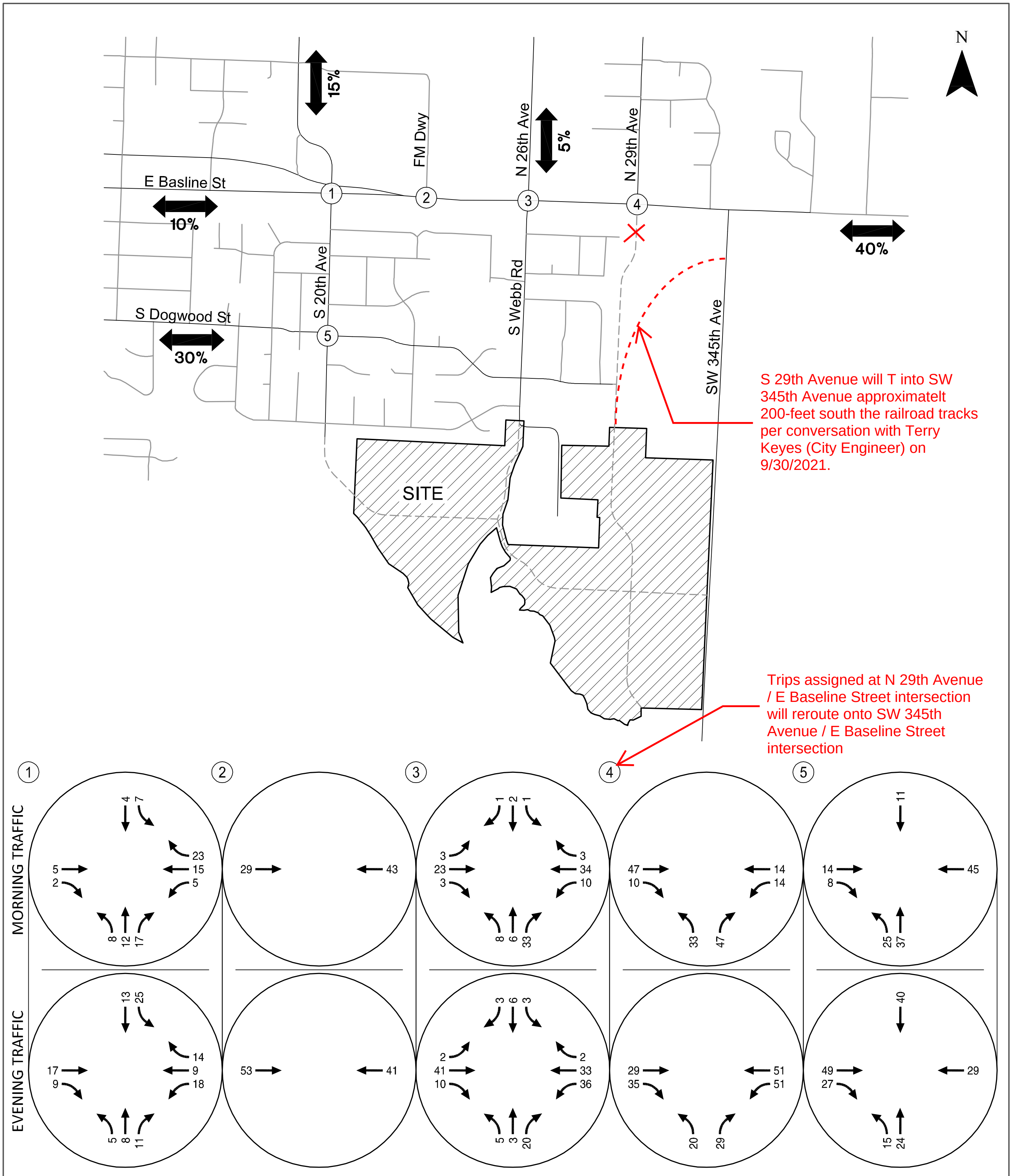
Figure 13 illustrates the estimated trip distribution pattern and the site-generated trips that are expected to use the study intersections during the weekday a.m. and p.m. peak hours.

YEAR 2022 TOTAL TRAFFIC CONDITIONS

The year 2022 total traffic conditions analysis forecasts how the study area's transportation system will operate with traffic generated by full build-out and occupancy of the proposed Laurel Woods development. The year 2022 background traffic volumes shown in Figure 12 were added to the site-generated traffic shown in Figure 13 to arrive at the total traffic volumes that are shown in Figure 14.

Traffic Operations

The weekday a.m. and p.m. peak hour turning-movement volumes shown in Figure 14 were used to conduct an operational analysis at the study intersections to determine year 2022 total traffic conditions. The results of the analysis indicate that all of the study intersections are forecast to operate acceptably during the weekday a.m. and p.m. peak hours with the exception of the 29th Avenue/Baseline Street extension. *Appendix "I" contains the worksheets used to evaluate year 2022 total traffic conditions at the study intersections*.



S 29th Avenue will T into SW 345th Avenue approximatelt 200-feet south the railroad tracks per conversation with Terry Keyes (City Engineer) on 9/30/2021.

Trips assigned at N 29th Avenue / E Baseline Street intersection will reroute onto SW 345th Avenue / E Baseline Street intersection

Year 2022 Estimated Trip Distribution Pattern & Site-generated Trips
Weekday AM and PM Peak Hours
Cornelius, OR

Figure
13

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Trip Generation Summary

Alternative: Phase 1 to 6

Phase:

Project: Laurel Woods Remaining Dwelling Units

Open Date: 10/5/2021

Analysis Date: 10/5/2021

		Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic			
ITE	Land Use	*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
210	SFHOUSE 1 81 Dwelling Units		386	385	771		15	46	61		51	30	81
230	CONDO 1 63 Dwelling Units		183	183	366		5	23	28		22	11	33
	Unadjusted Volume		569	568	1137		20	69	89		73	41	114
	Internal Capture Trips		0	0	0		0	0	0		0	0	0
	Pass-By Trips		0	0	0		0	0	0		0	0	0
	Volume Added to Adjacent Streets		569	568	1137		20	69	89		73	41	114

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary

Alternative: Alternative 1
Phase:
Project: Laurel Woods Future Phase

Open Date: 10/5/2021
Analysis Date: 10/5/2021

		Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic			
ITE	Land Use	*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
210	SFHOUSE 1		177	177	354		7	20	27		21	12	33
	31 Dwelling Units												

Unadjusted Volume	177	177	354	7	20	27	21	12	33
Internal Capture Trips	0	0	0	0	0	0	0	0	0
Pass-By Trips	0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets	177	177	354	7	20	27	21	12	33

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

Site Trips

Trip Generation

The proposed development will construct a 56-lot subdivision within the subject site. To estimate the trip generation of the proposed subdivision, trip rates from the *Trip Generation Manual*, Tenth Edition, published by the Institute of Transportation Engineers (ITE), were used. Trip rates for land-use code 210, *Single-Family Detached Housing*, were referenced in projecting the trip generation based on the number of dwelling units.

Upon completion and occupancy of the proposed development, the property is projected to generate 41 trips during the morning peak hour, with 10 trips entering the site and 31 trips exiting. During the evening peak hour, 55 trips are projected with 35 entering and 20 exiting the site. A total 528 total daily trips are projected during a typical weekday. Table 1 summarizes the trip generation for the proposed development. Detailed trip generation calculations are included in the technical appendix.

Table 1: Trip Generation Summary

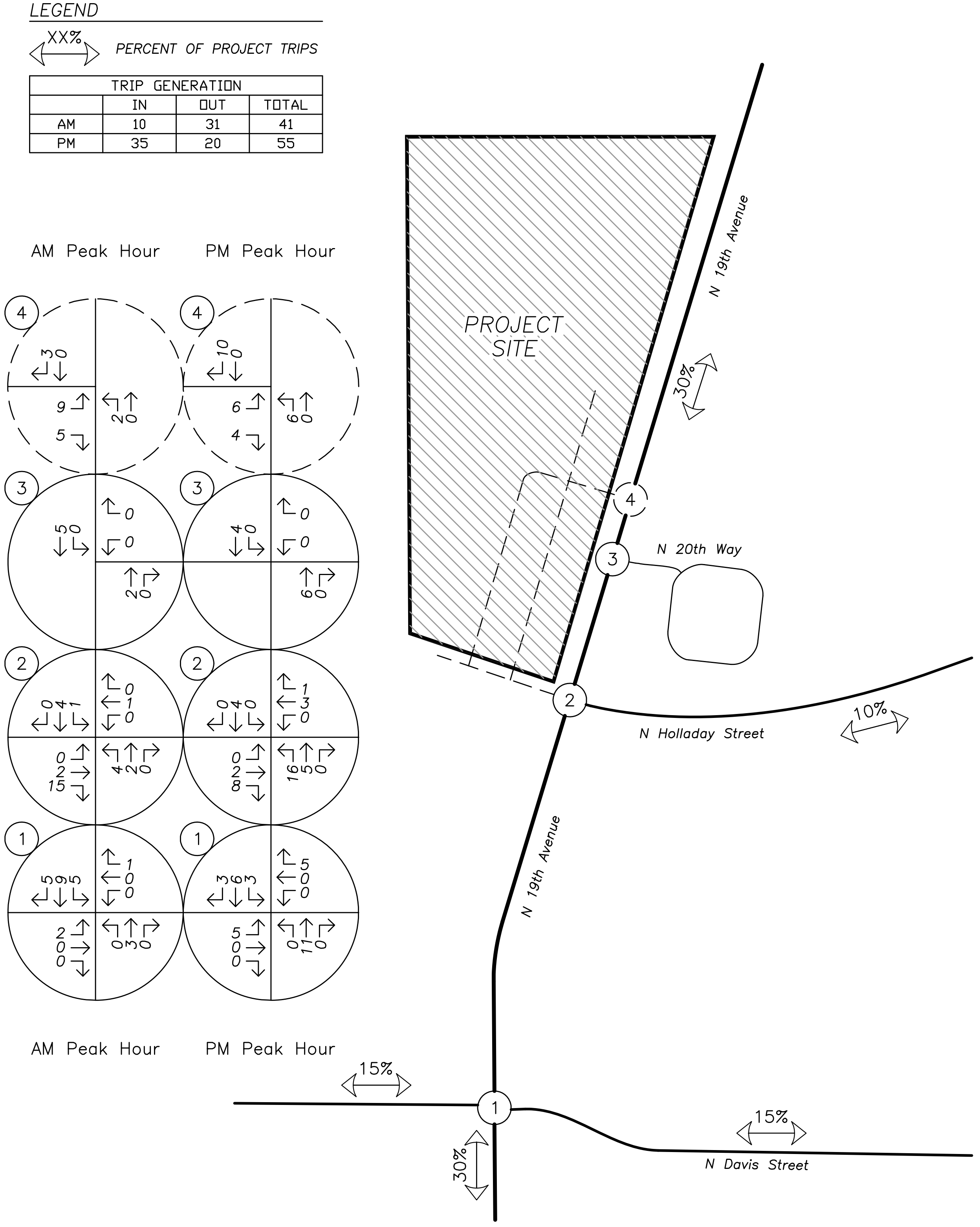
		AM Peak Hour			PM Peak Hour			Weekday
	Size	In	Out	Total	In	Out	Total	Total
Proposed Development								
Single-Family Dwellings	56 units	10	31	41	35	20	55	528

Trip Distribution

The directional distribution of site trips to/from the proposed development was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections. The following trip distribution was estimated and used for analysis:

- 30 percent of trips to and from the north along N 19th Avenue;
- 30 percent of trips to and from the south along N 19th Avenue;
- 15 percent of trips to and from the west along N Davis Street;
- 15 percent of trips to and from the east along N Davis Street; and
- 10 percent of trips to and from the east along N Holladay Street.

The distribution and assignment for trips generated by the proposed development during the morning and evening peak hours is shown in Figure 3 on page 7.



TRIP GENERATION			
	IN	OUT	TOTAL
AM	10	31	41
PM	35	20	55

SITE TRIP DISTRIBUTION
Trip Generation and Distribution
AM & PM Peak Hours

no scale

FIGURE
3

Trip Generation Summary

Using the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th Edition, for Apartments, vehicular trip generation is initially estimated as shown in **Table 1**.

Table 1: Vehicle Trip Generation Using ITE Manual

ITE Code/ Land Use	Size	AM Peak			PM Peak			Total Daily
		In	Out	Total	In	Out	Total	
221/Apartments (multi-family mid-rise)	113 units	11	30	41	30	20	50	615

According to ITE, "Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and ten levels (floors)." With 3-4 levels, Plaza Los Amigos falls into the mid-rise apartment land use category.

The case studies for the ITE trip rates are typically suburban locations along arterials which have some transit service, typically approximately 30 minutes each direction. The income levels of residents vary based on typical mid-rise apartments.

There are a variety of differences which affect vehicular trip generation for Plaza Los Amigos:

1) Units are targeted for residents at the Very-Low and Low Income ranges (30%-60% Area Median Income or AMI)
2) The complex is well situated near a frequent TriMet bus route with frequent service, as well as being located within walk/bike distance of Fred Meyer and other retail, services, and restaurants
3) Research into similar affordable housing developments indicates vehicle ownership rates are very low; in turn vehicular trip generation rates will be low as well since the preferred transportation modes are walking, bicycling, and transit.

Reviewing a proposal called "Attention Homes Apartments: Permanent Supportive Housing for Homeless Young Adults" submitted in 2016 to the City of Boulder, Colorado (document available upon request), the applicant stated, "We anticipate that 5% or less (2 or fewer) of the households living in the proposed new structure will own a car."

Share Vancouver, a non-profit organization which supports affordable housing and exiting homelessness programs, currently has 19 participants in their scattered-site permanent supportive housing program, which includes housing in complexes similar to Plaza Los Amigos. Share indicates that five of these people own cars, which is approximately 26%.

Lincoln Place Apartments in west Vancouver opened in 2016 and are housing tenants with a similar socioeconomic status as those anticipated for Plaza Los Amigos. A discussion with Amy Reynolds of Share, one of the partners operating and housing tenants in Lincoln Place, confirms that only one of the tenants owns and parks a vehicle at Lincoln Place out of 30 apartment units, a rate of approximately 3%.

A comprehensive set of California studies[1] [2] [3]indicate that average daily vehicle trip generation for low- and very-low income, multifamily, urban neighborhood households is measurably lower than the ITE Manual's calculated trip rates. A graph from the Transportation Impacts of Affordable Housing report comparing ITE rates with affordable housing rates from the comprehensive land use studies is shown below:

Figure 3— Adjustments to ITE Apartment Trip Generation Rates from California Studies

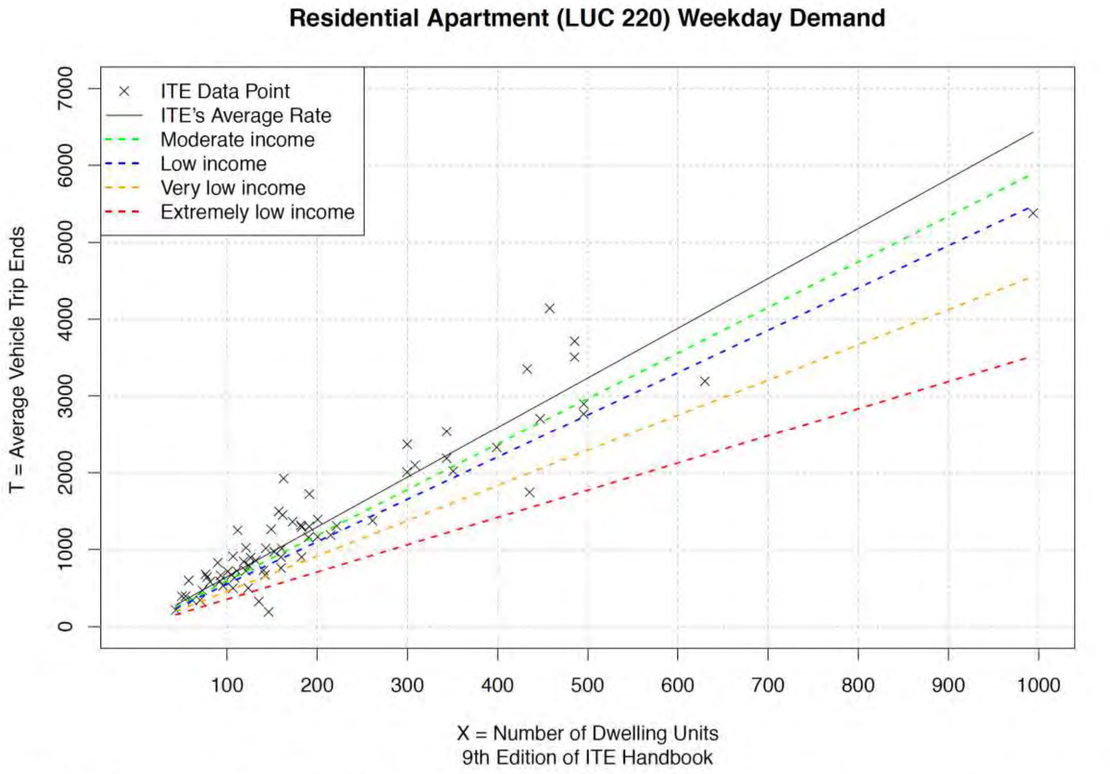


Figure 2: ITE residential apartment (LUC 220) weekday vehicle trips compared to home-based vehicle trip estimates from Model 1

Trip rate reductions based on affordable housing studies referenced in the Vancouver, Boulder, and California reports are recommended as follows:

---

[1] Trip Generation Data and Methods for Affordable Housing Developments, Clifton, et. al. Caltrans Planning Horizons Webinar, September 13, 2018. http://www.dot.ca.gov/hq/tpp/offices/owd/Caltrans%20Affordable%20Housing%20Trip%20Generation%20Webinar%2020180913.pdf.

[2] https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/final-reports/ca18-2465-finalreport-a11y.pdf

[3] Transportation impacts of affordable housing: Informing development review with travel behavior analysis, Howell, Currans, Gehrke, et. al., The Journal of Transport and Land Use, Vol. 11, No. 1, [2018] pp. 103–118.

Table 2: Plaza Los Amigos Proposed Vehicle Trip Generation Rates

Category	AM Peak Rate (Vehicle Trips/Unit)	PM Peak Rate (Vehicle Trips/Unit)	Weekday Rate (Vehicle Trips/Unit)
ITE Rate (Apartment Land Use Code 221)	0.36	0.44	5.44
Low Income	0.31	0.38	4.66
Very-Low Income	0.23	0.28	3.50
Average Low/Very-Low Income, Proposed Trip Rates	*0.27*	*0.33*	*4.08*

Based on the above analysis, adjusted Trip Generation estimates for Plaza Los Amigos are shown in **Table 3**.

Table 3: Proposed Adjusted Vehicle Trip Generation Estimates

ITE Code/Land Use	Size	AM Peak			PM Peak			Total Daily
		In	Out	Total	In	Out	Total	
Apartments, Low/ Very Low Income	113 units	8	23	31	26	18	44	461
Reduction from Table 1 (ITE Rates)		(3)	(7)	(10)	(4)	(2)	(6)	(154)

Trip Distribution

The City's Transportation System Plan (2018) traffic counts and zoning information were used to estimate trip distribution for site trips. It should be noted that this assumes the existing street circulation in the area, including Davis Street and a connection through the Fred Meyer retail center to Baseline Road.

The TSP shows an extension of Davis Street to 26th Avenue in the future. The completion of this link is anticipated to change trip distribution in the area; many of the existing trips and future trips, as well as this site's trips, are anticipated use the new Davis Street link to circulate. This in turn will relieve the N 19th Avenue/Davis Street intersection. That future connection is not currently funded nor programmed for short-term implementation, therefore this TIA assumes that all site trips upon buildout (Year 2025 scenario) will either use Davis Street to N 19th Avenue, or Davis Street to the north-south route on the east side of the Fred Meyer complex to Baseline.

For the mini-roundabout analysis (see next section), Year 2040 trip distribution assumes the TSP's extension of Davis Street to N 26th Avenue.

Trip distribution percentages are shown in **Figures 4 and 5** below.

Figure 4 — Plaza Los Amigos Site Trip Distribution (Current Street System)

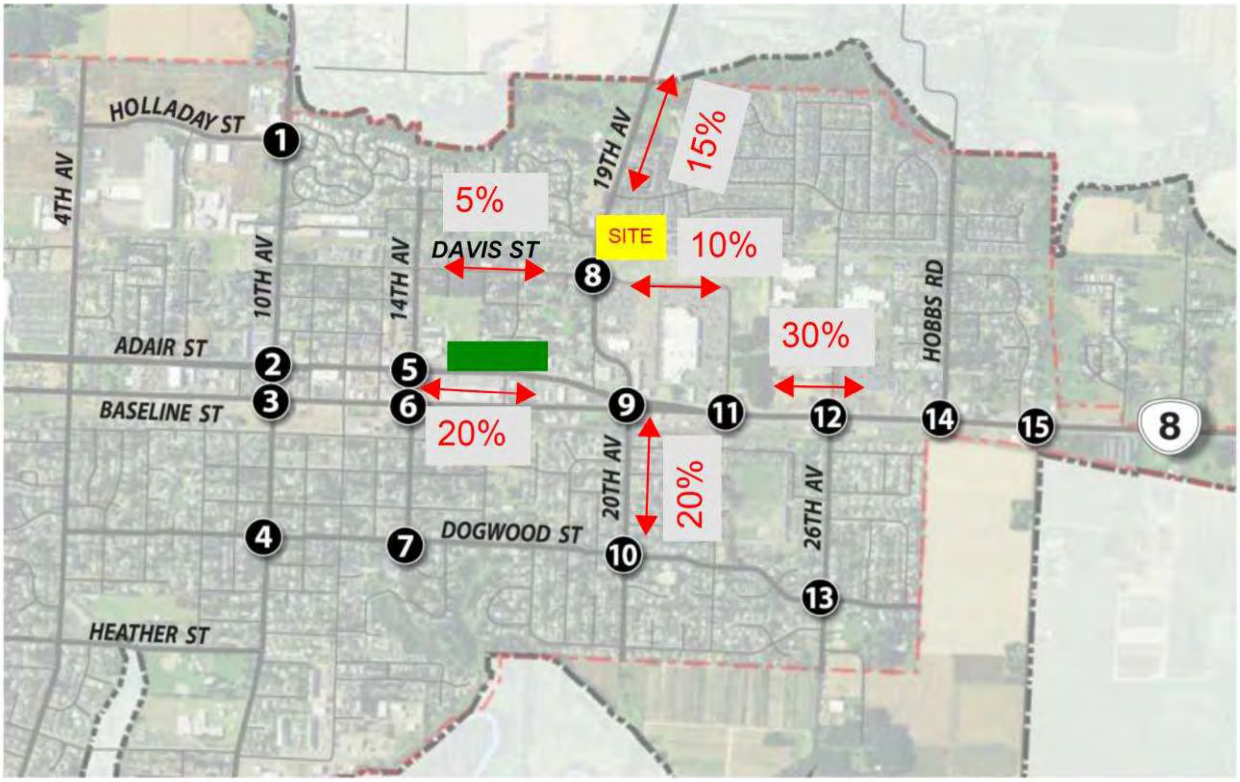
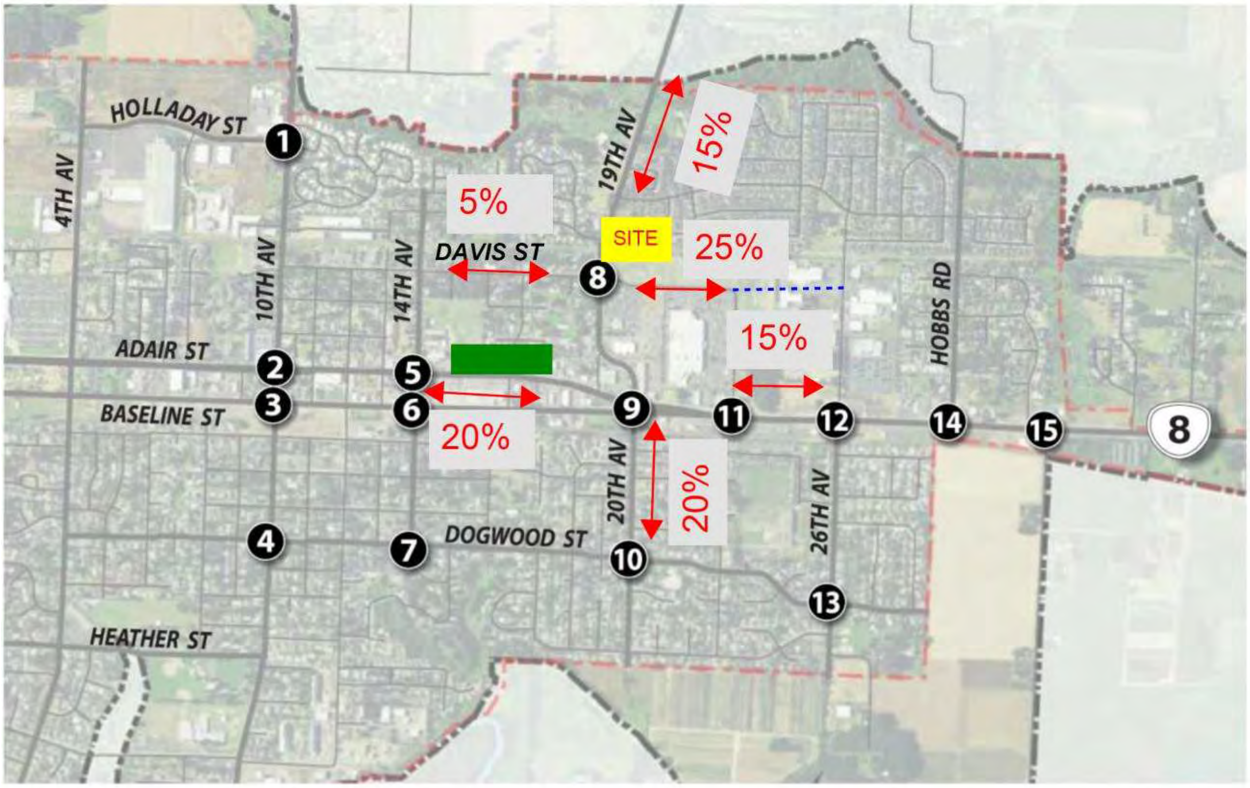
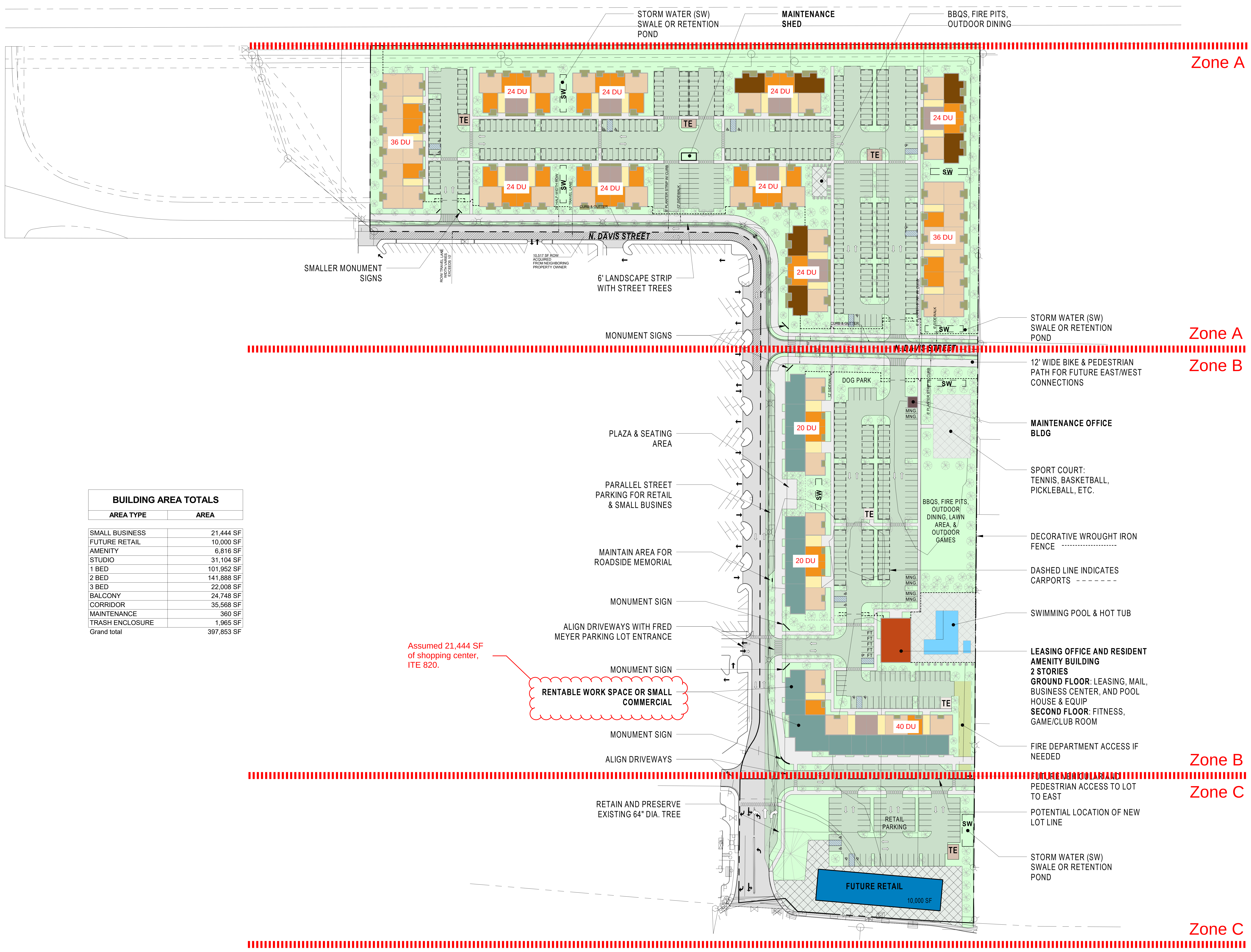


Figure 5 — Year 2040 Plaza Los Amigos Site Trip Distribution (With Davis Extension)



Appendix C

Trip Generation Calculations and Trip Distribution



BUILDING AREA TOTALS

AREA TYPE	AREA
SMALL BUSINESS	21,444 SF
FUTURE RETAIL	10,000 SF
AMENITY	6,816 SF
STUDIO	31,104 SF
1 BED	101,952 SF
2 BED	141,888 SF
3 BED	22,008 SF
BALCONY	24,748 SF
CORRIDOR	35,568 SF
MAINTENANCE	360 SF
TRASH ENCLOSURE	1,965 SF
Grand total	397,853 SF

06/10/2021 16:00:58

BLRB architects
TACOMA
1250 Pacific Ave
Suite 700
WA 98402
253.627.5599
I SPOKANE
505 W Riverside
Suite 500
WA 98201
509.252.5080
I PORTLAND
621 SW Morrison St.
Suite 950
OR 97205
503.595.0270
I BEND
721 SW Industrial
Suite 130
OR 97702
541.330.6506

Stamp

DRAWING REVISIONS

#	Date	Description

CORNELIUS MULTIFAMILY

CALIDA RESIDENTIAL, LLC

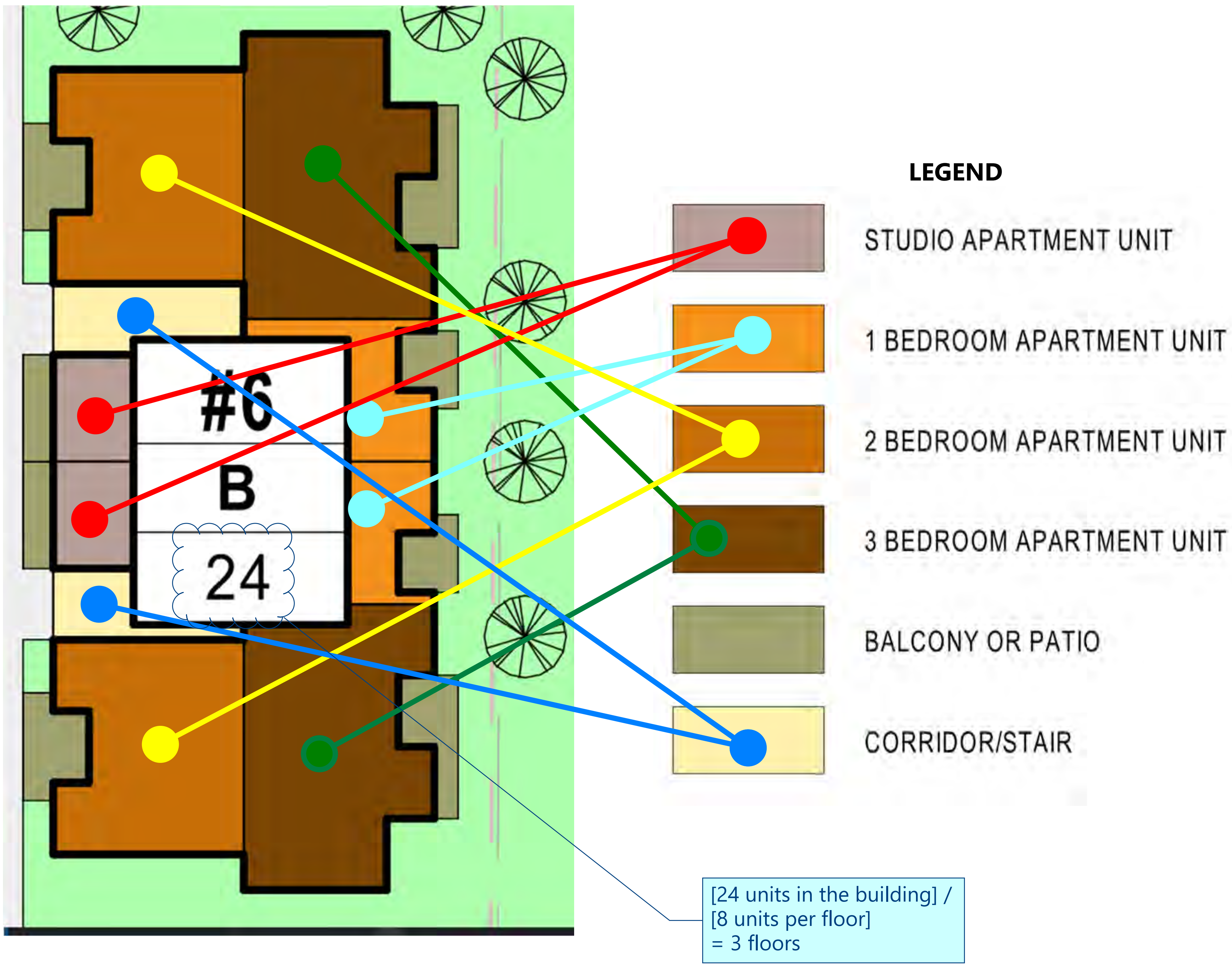
CONCEPT DESIGN

Drawing Title:
CONCEPT SITE PLAN

Drawn By : Author
Project No. 021112
Date : 10/05/2021
Revised :

Sheet No.
PR1.0E

BLRB ARCHITECTS, P.S.



[24 units in the building] /
[8 units per floor]
= 3 floors

Detailed Land Use Data

For 344 Dwelling Units of MID-RISE 1

(221) Multifamily Housing (Mid-Rise)

Open Date: 10/25/2021

Project: Cornelius Multifamily 74217.000

Analysis Date: 10/25/2021

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq.	Equation	R2
Weekday Average Daily Trips	1873	0	5.44	1.27	12.5	2.03	205	50	50	True	T = 5.45(X) - 1.75	0.77
Source : Trip Generation Manual 10th Edition												
Weekday AM Peak Hour of Adjacent Street Traffic	115	0	0.36	0.06	1.61	0.19	207	26	74	True	Ln(T) = 0.98 Ln(X) - 0.98	0.67
Source : Trip Generation Manual 10th Edition												
Weekday PM Peak Hour of Adjacent Street Traffic	145	0	0.44	0.15	1.11	0.19	208	61	39	True	Ln(T) = 0.96 Ln(X) - 0.63	0.72
Source : Trip Generation Manual 10th Edition												

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

Detailed Land Use Data

For 31.45 1000 Sq. Ft. GLA of CENTERSHOPPING 1

(820) Shopping Center

Open Date: 10/25/2021

Project: Cornelius Multifamily 74217.000

Analysis Date: 10/25/2021

Day / Period	Total Trips	Pass-By Trips	Avg Rate	Min Rate	Max Rate	Std Dev	Avg Size	% Enter	% Exit	Use Eq.	Equation	R2
Weekday Average Daily Trips	2738	821	37.75	7.42	207.98	16.41	453	50	50	True	Ln(T) = 0.68 Ln(X) + 5.57	0.76
Source : Trip Generation Manual 10th Edition												
Weekday AM Peak Hour of Adjacent Street Traffic	168	29	0.94	0.18	23.74	0.87	351	62	38	True	T = 0.5(X) + 151.78	0.5
Source : Trip Generation Manual 10th Edition												
Weekday PM Peak Hour of Adjacent Street Traffic	231	79	3.81	0.74	18.69	2.04	327	48	52	True	Ln(T) = 0.74 Ln(X) + 2.89	0.82
Source : Trip Generation Manual 10th Edition												

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Trip Generation Summary

Alternative: Alternative 1

Phase:

Project: Cornelius Multifamily 74217.000

Open Date: 10/12/2021

Analysis Date: 10/12/2021

			Weekday Average Daily Trips				Weekday AM Peak Hour of Adjacent Street Traffic				Weekday PM Peak Hour of Adjacent Street Traffic		
ITE	Land Use	*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
221	MID-RISE 1 344 Dwelling Units		937	936	1873		30	85	115		88	57	145
820	CENTERSHOPPING 1 31.45 1000 Sq. Ft. GLA		1369	1369	2738		104	64	168		111	120	231
Unadjusted Volume			2306	2305	4611		134	149	283		199	177	376
Internal Capture Trips			0	0	0		2	2	4		42	42	84
Pass-By Trips			411	411	822		14	14	28		32	32	64
Volume Added to Adjacent Streets			1895	1894	3789		118	133	251		125	103	228

Total Weekday Average Daily Trips Internal Capture = 0 Percent

Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 1 Percent

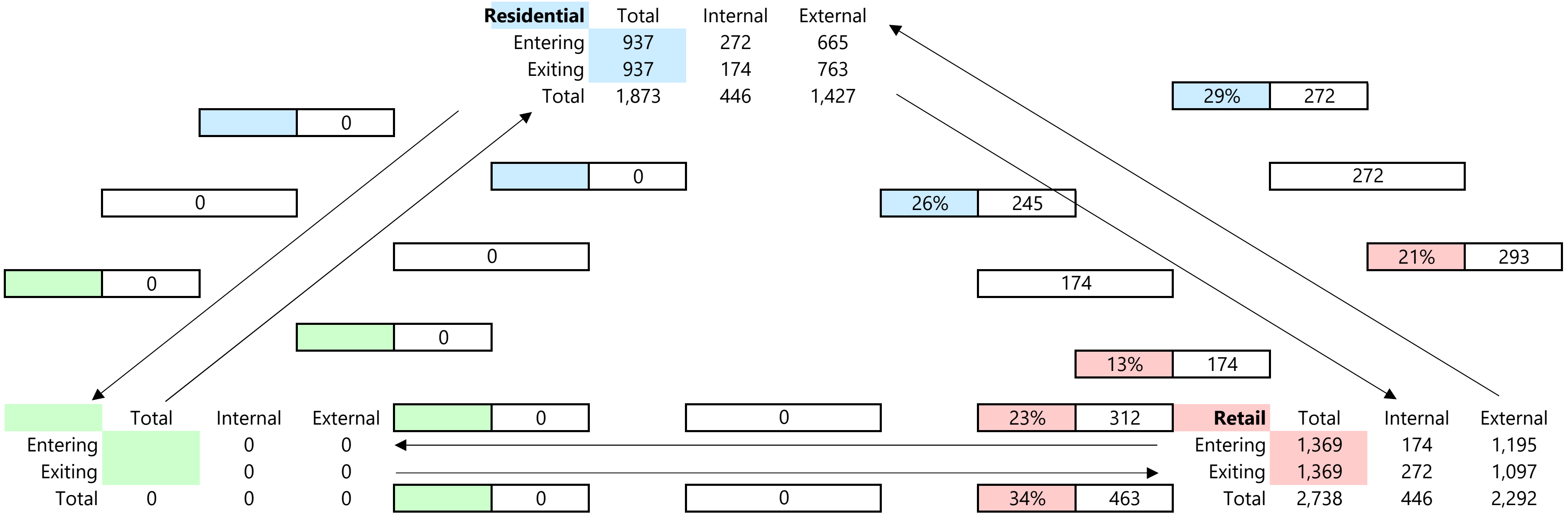
Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 22 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Internal Capture - Weekday
Site Development By 2023



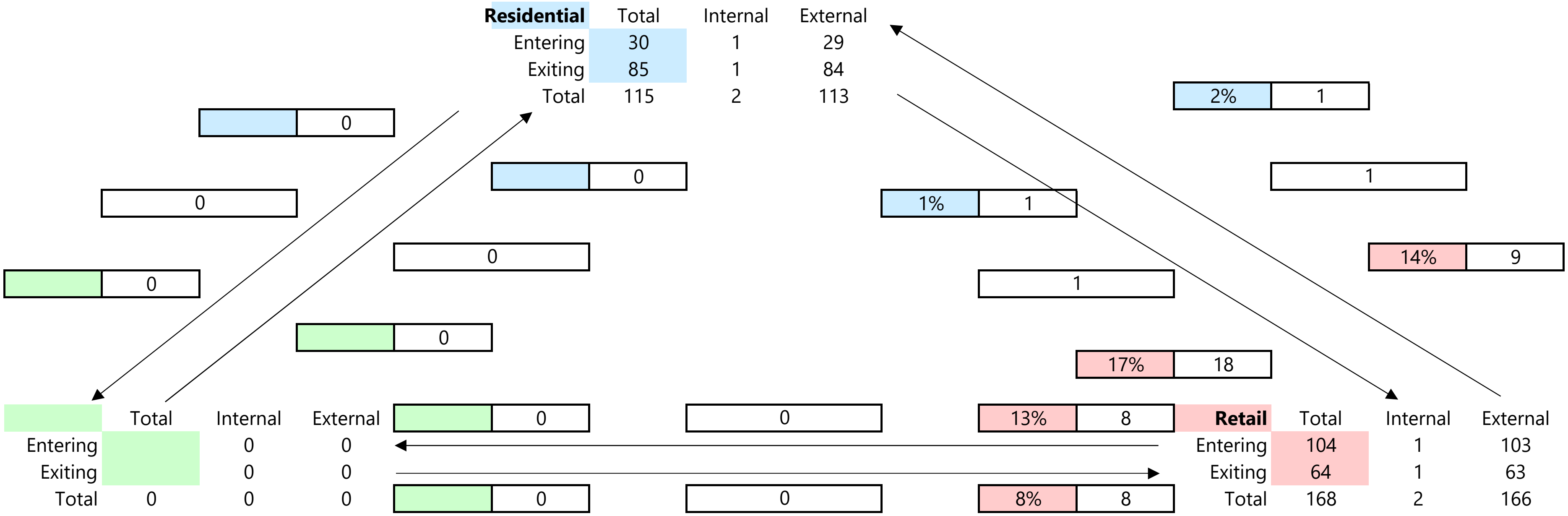
Residential	Total	Internal	External
Entering	937	272	665
Exiting	937	174	763
Total	1,873	446	1,427

	Total	Internal	External
Entering		0	0
Exiting		0	0
Total	0	0	0

Retail	Total	Internal	External
Entering	1,369	174	1,195
Exiting	1,369	272	1,097
Total	2,738	446	2,292

Trip Generation Breakdown

Internal Capture - Weekday AM Peak Hour
Site Development By 2023

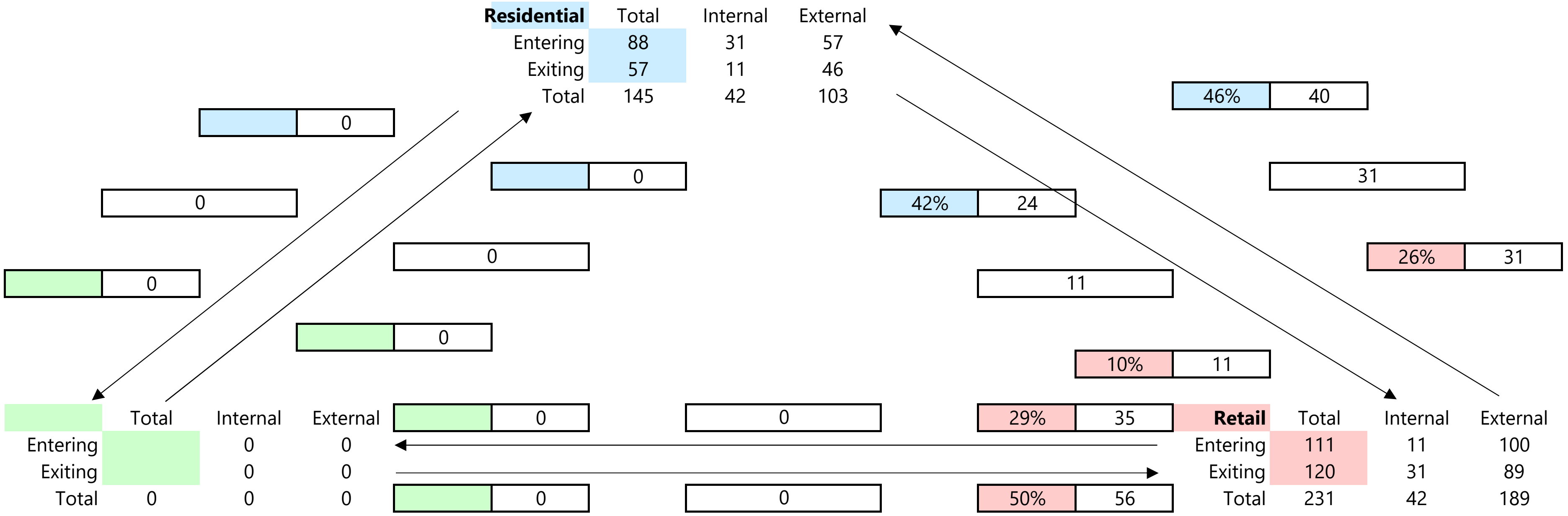


Residential	Total	Internal	External
Entering	30	1	29
Exiting	85	1	84
Total	115	2	113

	Total	Internal	External
Entering		0	0
Exiting		0	0
Total	0	0	0

Retail	Total	Internal	External
Entering	104	1	103
Exiting	64	1	63
Total	168	2	166

Internal Capture - Weekday PM Peak Hour
Site Development By 2023



Residential	Total	Internal	External
Entering	88	31	57
Exiting	57	11	46
Total	145	42	103

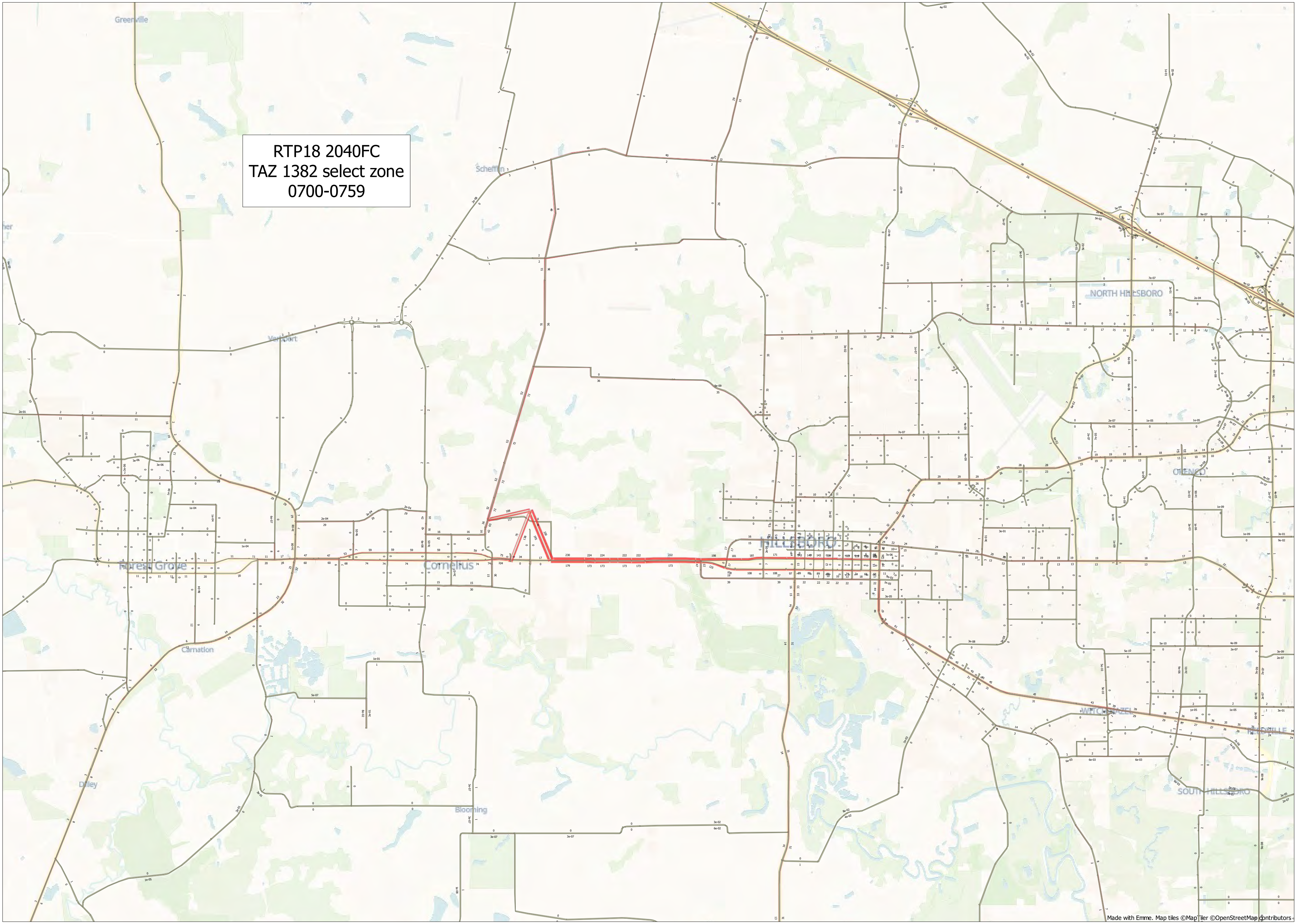
	Total	Internal	External
Entering		0	0
Exiting		0	0
Total	0	0	0

Retail	Total	Internal	External
Entering	111	11	100
Exiting	120	31	89
Total	231	42	189

TRIP GENERATION BREAKDOWN

	Cornelius Multifamily Housing - Total Trips			***ADT***		***AM***			***PM***	
ITE Code	**Land Use**	**Total**	**Unit**		**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
221	Multi-Family Residential	344	dwelling units	1,873	30	85	115	88	57	145
820	General Commercial	31.45	1,000 sf	2,738	104	64	168	111	120	231
			Total Trips	4,611	134	149	283	199	177	376
			Internal Trips	*-892*	*-2*	*-2*	*-4*	*-42*	*-42*	*-84*
			External Trips	3,719	132	147	279	157	135	292
			Pass-By Trips	*-822*	*-14*	*-14*	*-28*	*-32*	*-32*	*-64*
			Primary (Net New) Trips	2,897	118	133	251	125	103	228

	Cornelius Multifamily Housing - by 2025			***ADT***		***AM***			***PM***	
	Land Use	**Total**	**Unit**		**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
2023	Multi-Family Residential	344	dwelling units	1,873	30	85	115	88	57	145
	Internal Trips			*-446*	*-1*	*-1*	*-2*	*-31*	*-11*	*-42*
	External Trips/Primary Trips			1,427	29	84	113	57	46	103
	General Commercial	31.45	1,000 sf	2,738	104	64	168	111	120	231
	Internal Trips			*-446*	*-1*	*-1*	*-2*	*-11*	*-31*	*-42*
	External Trips			2,292	103	63	166	100	89	189
	Pass-By Trips			*-688*	*-14*	*-14*	*-28*	*-32*	*-32*	*-64*
	Primary Trips			1,604	89	49	138	68	57	125
			Total Trips Generated	4,611	134	149	283	199	177	376
			Internal Trips	*-892*	*-2*	*-2*	*-4*	*-42*	*-42*	*-84*
			External Trips	3,719	132	147	279	157	135	292
			Pass-By Trips	*-688*	*-14*	*-14*	*-28*	*-32*	*-32*	*-64*
			Primary Trips	3,031	118	133	251	125	103	228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TAZ 1382 select zone
0700-0759

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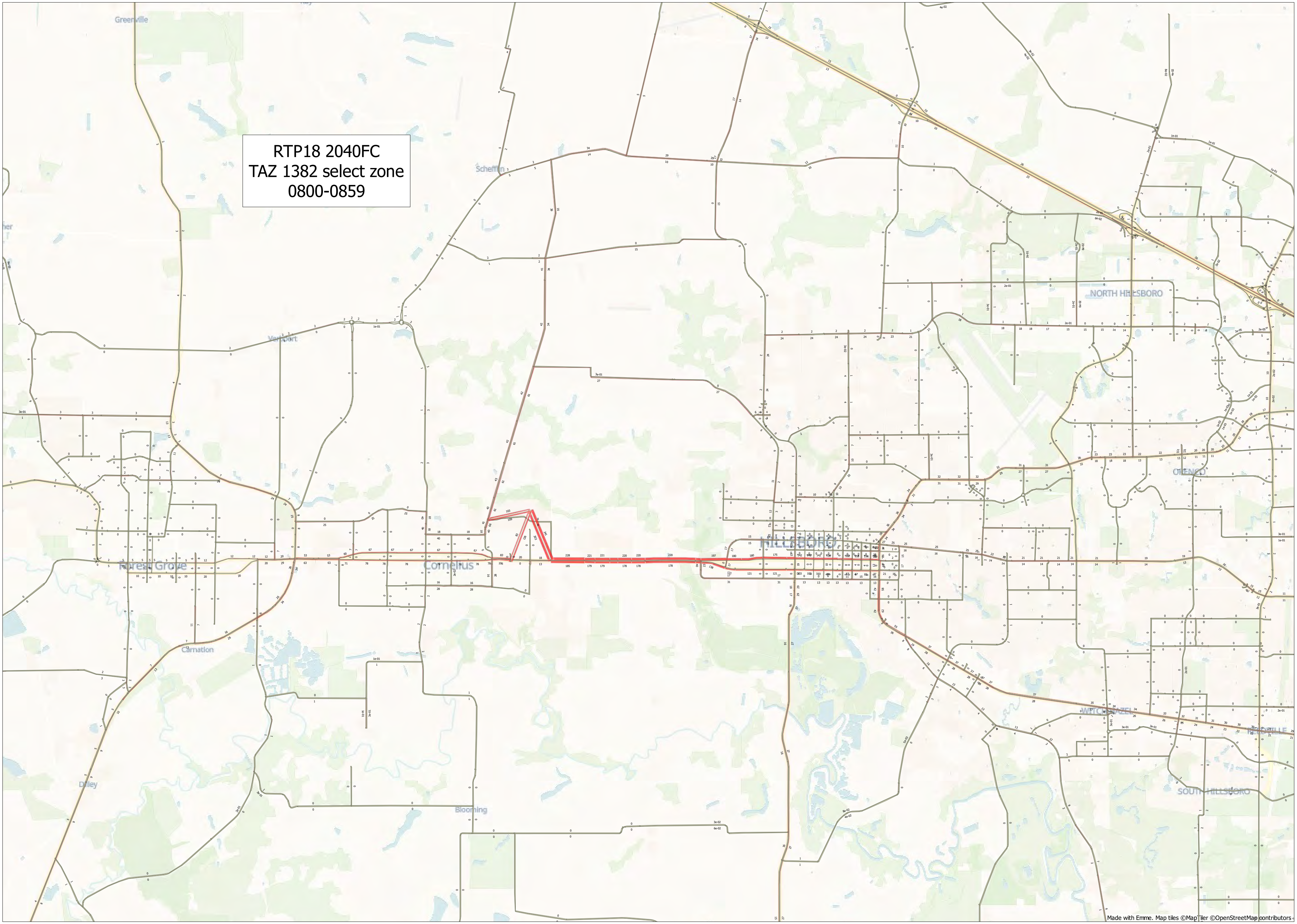

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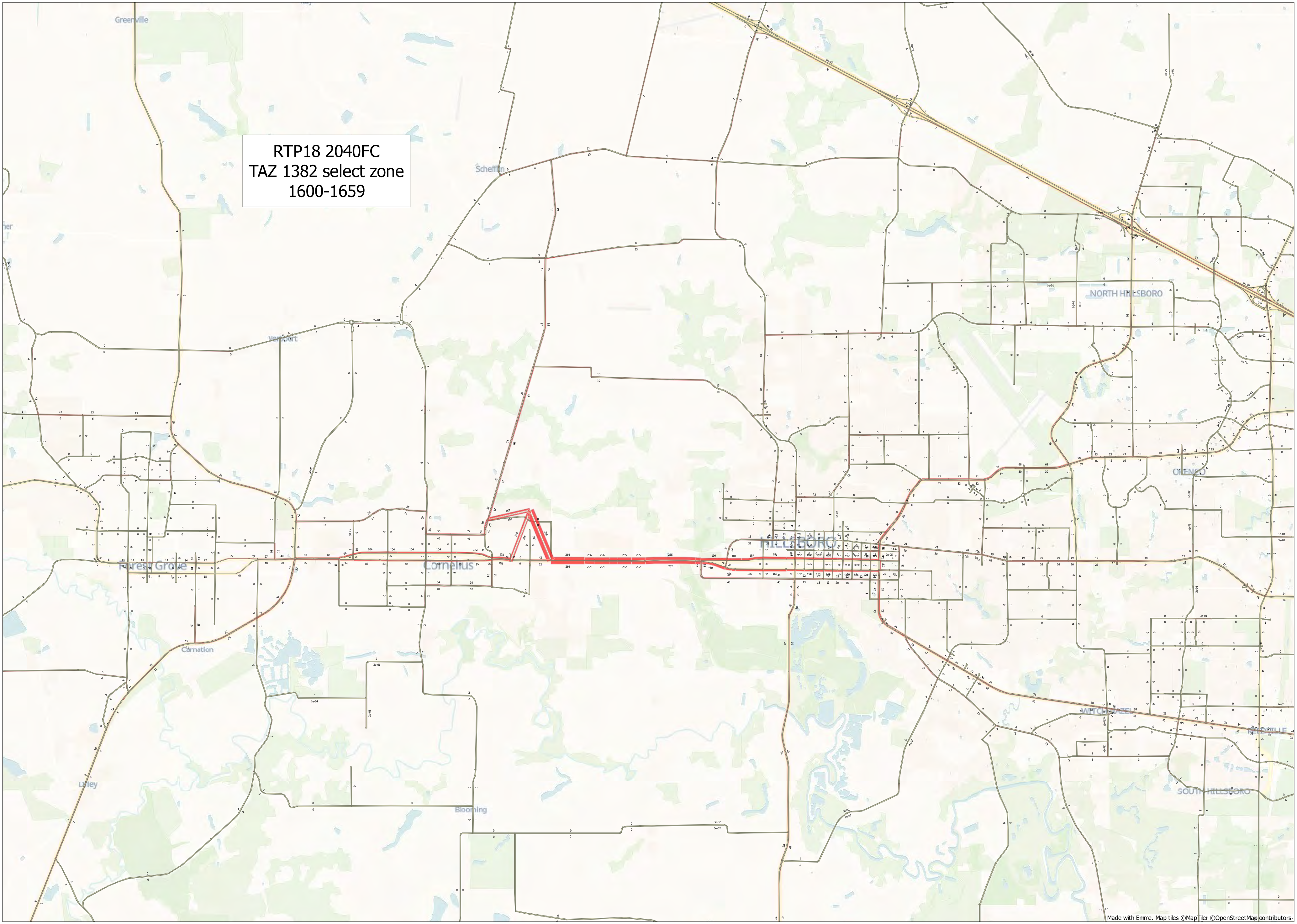

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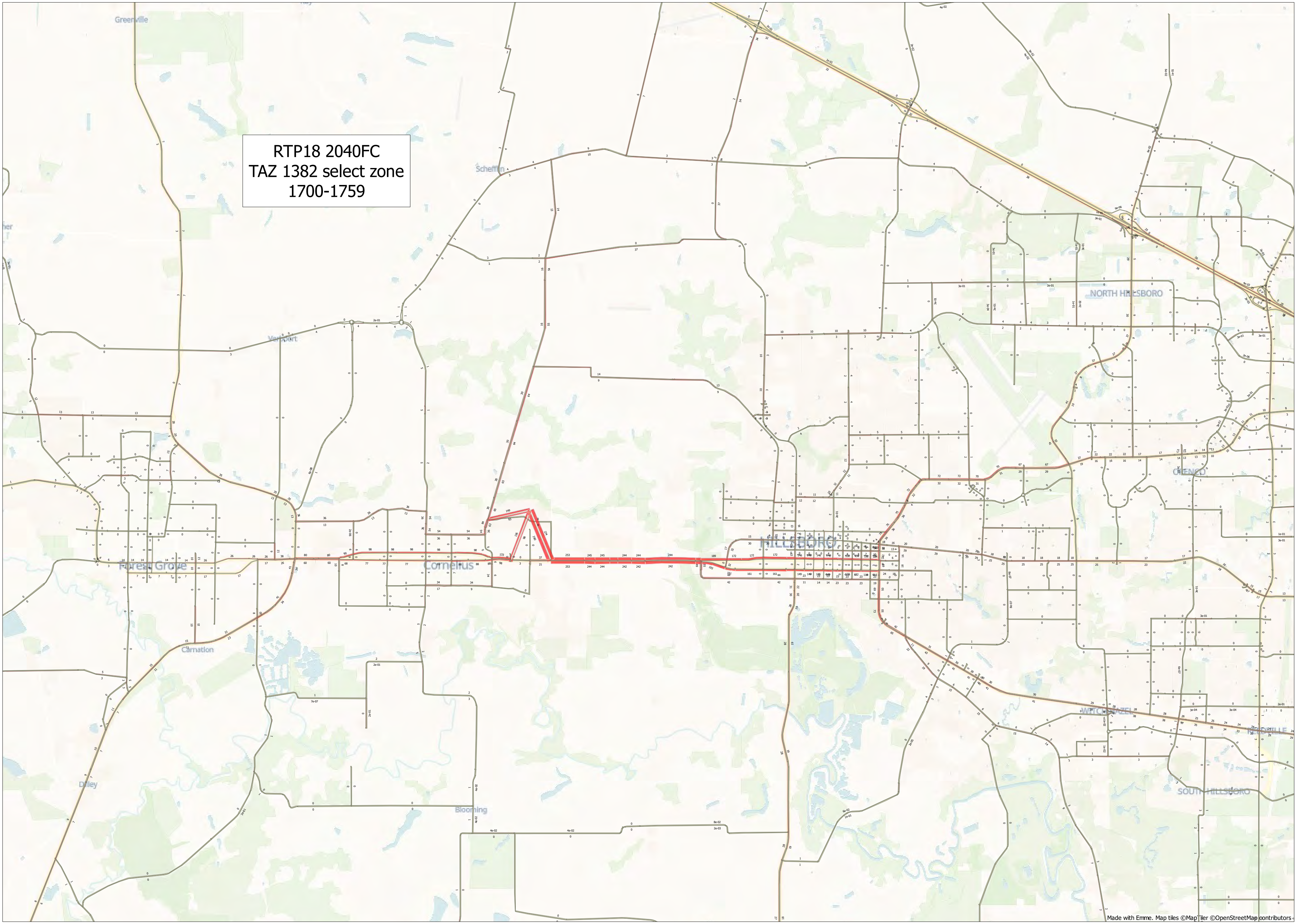

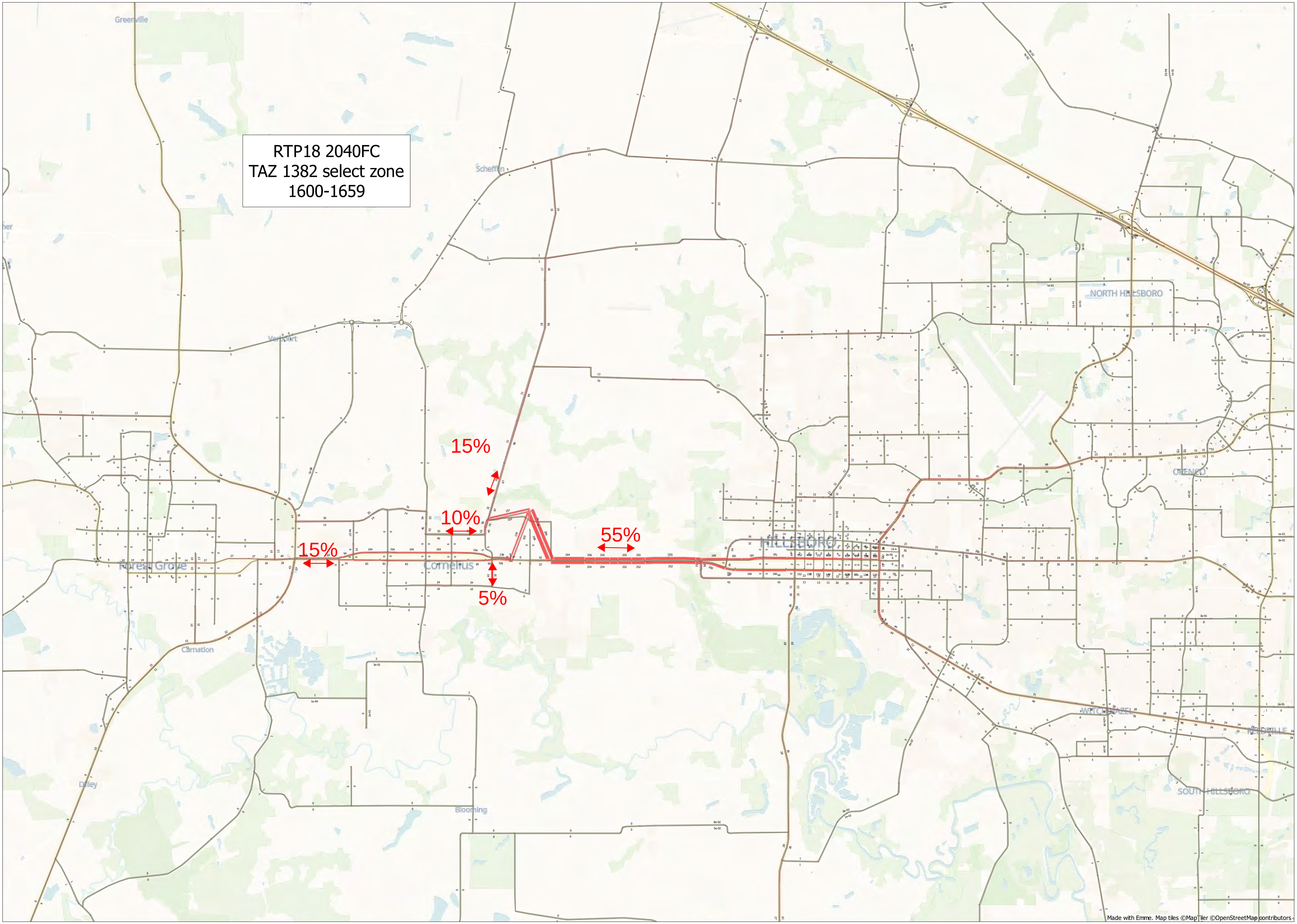
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1600-1659
15%
10%
15%
55%
5%
Greenville
Scheffllin
Verboort
Forest Grove
Cornelius
Carnation
Dilley
Blooming
HILLSBORO
NORTH HILLSBORO
ORENCO
WITCH HAZEL
SOUTH HILLSBORO
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Appendix D

Level of Service Calculations

HCM Signalized Intersection Capacity Analysis
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (vph)	24	1149	27	84	795	33	49	31	173	5	45	34
Future Volume (vph)	24	1149	27	84	795	33	49	31	173	5	45	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		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		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1630	3185		1539	3167	1202		1615	1410		1496	1444
Flt Permitted	0.26	1.00		0.15	1.00	1.00		0.78	1.00		0.97	1.00
Satd. Flow (perm)	442	3185		248	3167	1202		1299	1410		1461	1444
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	28	1321	31	97	914	38	56	36	199	6	52	39
RTOR Reduction (vph)	0	1	0	0	0	16	0	0	174	0	0	34
Lane Group Flow (vph)	28	1351	0	97	914	22	0	92	25	0	58	5
Confl. Peds. (#/hr)									3	3		
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	2%	4%	4%	8%	5%	21%	2%	10%	4%	80%	9%	3%
Turn Type	D.P+P	NA		D.P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2		6	8		8	4		4
Actuated Green, G (s)	74.7	67.8		74.7	58.8	58.8		12.5	12.5		12.5	12.5
Effective Green, g (s)	74.7	67.8		74.7	58.8	58.8		12.5	12.5		12.5	12.5
Actuated g/C Ratio	0.75	0.68		0.75	0.59	0.59		0.12	0.12		0.12	0.12
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	519	2159		274	1862	706		162	176		182	180
v/s Ratio Prot	0.01	c0.42		0.02	c0.29							
v/s Ratio Perm	0.03			0.24		0.02		c0.07	0.02		0.04	0.00
v/c Ratio	0.05	0.63		0.35	0.49	0.03		0.57	0.14		0.32	0.03
Uniform Delay, d1	6.7	9.0		5.3	11.9	8.6		41.2	39.0		39.9	38.4
Progression Factor	1.14	1.22		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	1.2		0.5	0.9	0.1		3.7	0.3		0.7	0.0
Delay (s)	7.6	12.2		5.8	12.9	8.7		44.9	39.2		40.6	38.5
Level of Service	A	B		A	B	A		D	D		D	D
Approach Delay (s)		12.1			12.1			41.0			39.7	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	24	1149	27	84	795	33	49	31	173	5	45	34
Future Volume (veh/h)	24	1149	27	84	795	33	49	31	173	5	45	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	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	1723	1695	1695	1641	1682	1463	1723	1614	1695	658	1627	1709
Adj Flow Rate, veh/h	28	1321	31	97	914	38	56	36	199	6	52	39
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	4	4	8	5	21	2	10	4	80	9	3
Cap, veh/h	660	2153	50	301	1273	483	167	91	234	50	252	236
Arrive On Green	0.30	0.67	0.67	0.04	0.40	0.40	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1641	3215	75	1563	3195	1212	665	554	1429	60	1537	1440
Grp Volume(v), veh/h	28	661	691	97	914	38	92	0	199	58	0	39
Grp Sat Flow(s),veh/h/ln	1641	1611	1680	1563	1598	1212	1219	0	1429	1597	0	1440
Q Serve(g_s), s	0.0	23.0	23.1	1.9	24.1	1.9	4.7	0.0	13.5	0.0	0.0	2.3
Cycle Q Clear(g_c), s	0.0	23.0	23.1	1.9	24.1	1.9	7.8	0.0	13.5	3.1	0.0	2.3
Prop In Lane	1.00		0.04	1.00		1.00	0.61		1.00	0.10		1.00
Lane Grp Cap(c), veh/h	660	1079	1125	301	1273	483	258	0	234	301	0	236
V/C Ratio(X)	0.04	0.61	0.61	0.32	0.72	0.08	0.36	0.00	0.85	0.19	0.00	0.17
Avail Cap(c_a), veh/h	660	1079	1125	506	1476	560	306	0	286	357	0	288
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)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	9.3	9.3	8.1	25.3	18.7	38.5	0.0	40.6	36.3	0.0	35.9
Incr Delay (d2), s/veh	0.0	2.2	2.2	0.4	3.5	0.3	0.6	0.0	17.1	0.2	0.0	0.2
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	0.3	7.2	7.5	0.5	9.2	0.6	2.1	0.0	5.9	1.3	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	11.5	11.4	8.5	28.9	19.0	39.2	0.0	57.7	36.5	0.0	36.2
LnGrp LOS	B	B	B	A	C	B	D	A	E	D	A	D
Approach Vol, veh/h		1380			1049			291			97	
Approach Delay, s/veh		11.5			26.6			51.8			36.4	
Approach LOS		B			C			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	71.8		20.4	35.0	44.6		20.4				
Change Period (Y+Rc), s	4.0	4.8		4.0	4.8	* 4.8		4.0				
Max Green Setting (Gmax), s	17.0	50.2		20.0	21.0	* 46		20.0				
Max Q Clear Time (g_c+I1), s	3.9	25.1		5.1	2.0	26.1		15.5				
Green Ext Time (p_c), s	0.2	21.1		0.3	0.0	13.7		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
2: Fred Meyer Driveway & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	75	1093	13	9	812	80	16	4	5	69	4	21
Future Volume (vph)	75	1093	13	9	812	80	16	4	5	69	4	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99		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		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1599	3191		1630	3167	1411		1651	1438		1636	1417
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.77	1.00		0.72	1.00
Satd. Flow (perm)	1599	3191		1630	3167	1411		1322	1438		1237	1417
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	86	1256	15	10	933	92	18	5	6	79	5	24
RTOR Reduction (vph)	0	0	0	0	0	30	0	0	5	0	0	22
Lane Group Flow (vph)	86	1271	0	10	933	62	0	23	1	0	84	2
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	4%	4%	2%	2%	5%	4%	2%	2%	2%	2%	2%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	8.9	75.4		1.4	67.9	67.9		10.4	10.4		10.4	10.4
Effective Green, g (s)	8.9	75.4		1.4	67.9	67.9		10.4	10.4		10.4	10.4
Actuated g/C Ratio	0.09	0.75		0.01	0.68	0.68		0.10	0.10		0.10	0.10
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.3		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	142	2406		22	2150	958		137	149		128	147
v/s Ratio Prot	0.05	c0.40		0.01	c0.29							
v/s Ratio Perm						0.04		0.02	0.00		c0.07	0.00
v/c Ratio	0.61	0.53		0.45	0.43	0.07		0.17	0.00		0.66	0.02
Uniform Delay, d1	43.9	5.0		48.9	7.3	5.4		40.9	40.2		43.1	40.2
Progression Factor	1.09	0.65		0.73	0.72	0.97		1.00	1.00		1.00	1.00
Incremental Delay, d2	4.8	0.7		7.7	0.6	0.1		0.4	0.0		10.3	0.0
Delay (s)	52.7	4.0		43.3	5.8	5.3		41.3	40.2		53.4	40.2
Level of Service	D	A		D	A	A		D	D		D	D
Approach Delay (s)		7.0			6.1			41.0			50.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
2: Fred Meyer Driveway & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	75	1093	13	9	812	80	16	4	5	69	4	21
Future Volume (veh/h)	75	1093	13	9	812	80	16	4	5	69	4	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	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	1695	1695	1723	1723	1682	1695	1723	1723	1723	1723	1723	1682
Adj Flow Rate, veh/h	86	1256	15	10	933	92	18	5	6	79	5	24
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	4	2	2	5	4	2	2	2	2	2	5
Cap, veh/h	106	1490	18	388	2032	902	64	10	247	70	2	241
Arrive On Green	0.13	0.91	0.91	0.47	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1615	3259	39	1641	3195	1418	0	56	1455	0	13	1420
Grp Volume(v), veh/h	86	621	650	10	933	92	23	0	6	84	0	24
Grp Sat Flow(s),veh/h/ln	1615	1611	1687	1641	1598	1418	56	0	1455	13	0	1420
Q Serve(g_s), s	5.2	14.4	14.4	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	1.4
Cycle Q Clear(g_c), s	5.2	14.4	14.4	0.3	0.0	0.0	17.0	0.0	0.3	17.0	0.0	1.4
Prop In Lane	1.00		0.02	1.00		1.00	0.78		1.00	0.94		1.00
Lane Grp Cap(c), veh/h	106	736	771	388	2032	902	74	0	247	72	0	241
V/C Ratio(X)	0.81	0.84	0.84	0.03	0.46	0.10	0.31	0.00	0.02	1.17	0.00	0.10
Avail Cap(c_a), veh/h	210	953	999	388	2032	902	74	0	247	72	0	241
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.88	0.88	0.88	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.8	2.9	2.9	20.2	0.0	0.0	43.0	0.0	34.6	49.5	0.0	35.0
Incr Delay (d2), s/veh	6.9	9.3	8.9	0.0	0.7	0.2	1.8	0.0	0.0	157.8	0.0	0.1
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	2.1	3.1	3.2	0.1	0.2	0.0	0.6	0.0	0.1	5.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.7	12.2	11.8	20.2	0.7	0.2	44.8	0.0	34.6	207.3	0.0	35.2
LnGrp LOS	D	B	B	C	A	A	D	A	C	F	A	D
Approach Vol, veh/h		1357			1035			29			108	
Approach Delay, s/veh		14.4			0.8			42.7			169.0	
Approach LOS		B			A			D			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	28.5	50.5		21.0	10.6	68.4		21.0				
Change Period (Y+Rc), s	4.8	* 4.8		4.0	4.0	4.8		4.0				
Max Green Setting (Gmax), s	11.0	* 59		17.0	13.0	57.2		17.0				
Max Q Clear Time (g_c+I1), s	2.3	16.4		19.0	7.2	2.0		19.0				
Green Ext Time (p_c), s	0.0	29.3		0.0	0.1	28.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (vph)	84	1051	65	33	798	60	65	83	66	49	42	77
Future Volume (vph)	84	1051	65	33	798	60	65	83	66	49	42	77
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.3		4.5	5.3	4.0	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	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	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1599	3130		1614	3167	1390	1581	1567		1567	1636	1398
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.73	1.00		0.41	1.00	1.00
Satd. Flow (perm)	1599	3130		1614	3167	1390	1209	1567		684	1636	1398
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	93	1168	72	37	887	67	72	92	73	54	47	86
RTOR Reduction (vph)	0	3	0	0	0	0	0	30	0	0	0	76
Lane Group Flow (vph)	93	1237	0	37	887	67	72	135	0	54	47	10
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	5%	8%	3%	5%	7%	5%	5%	2%	6%	7%	5%
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						Free	8			4		4
Actuated Green, G (s)	9.3	68.3		5.0	64.0	100.0	12.4	12.4		11.9	11.9	11.9
Effective Green, g (s)	9.3	68.3		5.0	64.0	100.0	12.4	12.4		11.9	11.9	11.9
Actuated g/C Ratio	0.09	0.68		0.05	0.64	1.00	0.12	0.12		0.12	0.12	0.12
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	4.5		5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	148	2137		80	2026	1390	149	194		81	194	166
v/s Ratio Prot	c0.06	c0.40		0.02	0.28			c0.09			0.03	
v/s Ratio Perm						0.05	0.06			0.08		0.01
v/c Ratio	0.63	0.58		0.46	0.44	0.05	0.48	0.70		0.67	0.24	0.06
Uniform Delay, d1	43.7	8.3		46.2	9.0	0.0	40.8	42.0		42.2	40.0	39.1
Progression Factor	1.00	1.00		0.89	1.01	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.6	1.2		2.3	0.6	0.1	1.8	9.6		17.1	0.5	0.1
Delay (s)	50.3	9.5		43.2	9.8	0.1	42.6	51.6		59.2	40.4	39.2
Level of Service	D	A		D	A	A	D	D		E	D	D
Approach Delay (s)		12.3			10.4			48.9			45.3	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
3: 20th Avenue & Baseline Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	84	1051	65	33	798	60	65	83	66	49	42	77
Future Volume (veh/h)	84	1051	65	33	798	60	65	83	66	49	42	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1695	1682	1641	1709	1682	1654	1682	1682	1723	1668	1654	1682
Adj Flow Rate, veh/h	93	1168	72	37	887	0	72	92	73	54	47	86
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	5	8	3	5	7	5	5	2	6	7	5
Cap, veh/h	118	2059	127	45	2010		225	130	103	130	248	213
Arrive On Green	0.07	0.67	0.67	0.06	1.00	0.00	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	1615	3053	188	1628	3195	1402	1223	867	688	1180	1654	1420
Grp Volume(v), veh/h	93	611	629	37	887	0	72	0	165	54	47	86
Grp Sat Flow(s),veh/h/ln	1615	1598	1643	1628	1598	1402	1223	0	1555	1180	1654	1420
Q Serve(g_s), s	5.7	20.2	20.2	2.2	0.0	0.0	5.5	0.0	10.1	4.6	2.5	5.5
Cycle Q Clear(g_c), s	5.7	20.2	20.2	2.2	0.0	0.0	8.0	0.0	10.1	14.7	2.5	5.5
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	118	1077	1108	45	2010		225	0	233	130	248	213
V/C Ratio(X)	0.79	0.57	0.57	0.82	0.44		0.32	0.00	0.71	0.42	0.19	0.40
Avail Cap(c_a), veh/h	412	1077	1108	415	2010		231	0	241	130	248	213
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.6	8.6	8.6	47.0	0.0	0.0	40.7	0.0	40.4	47.4	37.2	38.5
Incr Delay (d2), s/veh	7.1	2.2	2.1	18.1	0.6	0.0	0.6	0.0	8.3	1.6	0.3	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	2.4	6.3	6.5	1.1	0.2	0.0	1.7	0.0	4.4	1.4	1.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	10.7	10.7	65.1	0.6	0.0	41.3	0.0	48.7	49.0	37.5	39.4
LnGrp LOS	D	B	B	E	A		D	A	D	D	D	D
Approach Vol, veh/h		1333			924	A		237			187	
Approach Delay, s/veh		13.7			3.2			46.4			41.7	
Approach LOS		B			A			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.3	72.7		20.0	11.8	68.2		20.0
Change Period (Y+Rc), s	4.5	5.3		5.0	4.5	5.3		* 5
Max Green Setting (Gmax), s	25.5	44.7		15.0	25.5	44.7		* 16
Max Q Clear Time (g_c+I1), s	4.2	22.2		16.7	7.7	2.0		12.1
Green Ext Time (p_c), s	0.1	18.2		0.0	0.2	21.4		0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Vol, veh/h	0	33	85	80	65	5
Future Vol, veh/h	0	33	85	80	65	5
Conflicting Peds, #/hr	0	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	3	2	4	3	2
Mvmt Flow	0	37	96	90	73	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	359	78	80	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.42	6.23	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.327	2.218	-	-	-
Pot Cap-1 Maneuver	640	980	1518	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	598	978	1517	-	-	-
Mov Cap-2 Maneuver	598	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	765	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	8.8		3.9		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1517	-	978	-	-
HCM Lane V/C Ratio	0.063	-	0.038	-	-
HCM Control Delay (s)	7.5	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-

HCM Signalized Intersection Capacity Analysis
1: 26th Avenue & Baseline Street

10/21/2021

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (vph)	77	1173	56	139	1664	81	34	4	87	2	7	71
Future Volume (vph)	77	1173	56	139	1664	81	34	4	87	2	7	71
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		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	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)	1630	3234		1614	3260	1420		1560	1458		1555	1458
Flt Permitted	0.10	1.00		0.18	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	172	3234		314	3260	1420		1211	1458		1499	1458
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)	79	1209	58	143	1715	84	35	4	90	2	7	73
RTOR Reduction (vph)	0	2	0	0	0	15	0	0	82	0	0	67
Lane Group Flow (vph)	79	1265	0	143	1715	69	0	39	8	0	9	6
Confl. Peds. (#/hr)	2					2						
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	8%	2%	2%	2%	14%	2%
Turn Type	D.P+P	NA		D.P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2		6	8		8	4		4
Actuated Green, G (s)	96.7	88.1		96.7	90.1	90.1		10.5	10.5		10.5	10.5
Effective Green, g (s)	96.7	88.1		96.7	90.1	90.1		10.5	10.5		10.5	10.5
Actuated g/C Ratio	0.81	0.73		0.81	0.75	0.75		0.09	0.09		0.09	0.09
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	218	2374		346	2447	1066		105	127		131	127
v/s Ratio Prot	0.02	c0.39		0.03	c0.53							
v/s Ratio Perm	0.27			0.30		0.05		c0.03	0.01		0.01	0.00
v/c Ratio	0.36	0.53		0.41	0.70	0.07		0.37	0.06		0.07	0.05
Uniform Delay, d1	14.7	7.0		3.8	7.9	3.9		51.6	50.2		50.3	50.2
Progression Factor	1.06	0.47		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.7		0.5	1.7	0.1		1.6	0.1		0.2	0.1
Delay (s)	16.1	4.0		4.3	9.6	4.0		53.2	50.4		50.4	50.3
Level of Service	B	A		A	A	A		D	D		D	D
Approach Delay (s)		4.7			8.9			51.2			50.3	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	77	1173	56	139	1664	81	34	4	87	2	7	71
Future Volume (veh/h)	77	1173	56	139	1664	81	34	4	87	2	7	71
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1723	1723	1723	1709	1723	1723	1641	1723	1723	1723	1559	1723
Adj Flow Rate, veh/h	79	1209	58	143	1715	84	35	4	90	2	7	73
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	3	2	2	8	2	2	2	14	2
Cap, veh/h	464	2455	118	455	1878	818	151	14	122	50	112	122
Arrive On Green	0.46	1.00	1.00	0.04	0.57	0.57	0.08	0.08	0.08	0.08	0.08	0.08
Sat Flow, veh/h	1641	3176	152	1628	3273	1425	1135	169	1460	161	1345	1460
Grp Volume(v), veh/h	79	623	644	143	1715	84	39	0	90	9	0	73
Grp Sat Flow(s),veh/h/ln	1641	1637	1691	1628	1637	1425	1304	0	1460	1507	0	1460
Q Serve(g_s), s	0.0	0.0	0.0	2.2	56.3	3.2	3.0	0.0	7.2	0.0	0.0	5.8
Cycle Q Clear(g_c), s	0.0	0.0	0.0	2.2	56.3	3.2	3.6	0.0	7.2	0.6	0.0	5.8
Prop In Lane	1.00		0.09	1.00		1.00	0.90		1.00	0.22		1.00
Lane Grp Cap(c), veh/h	464	1265	1308	455	1878	818	166	0	122	162	0	122
V/C Ratio(X)	0.17	0.49	0.49	0.31	0.91	0.10	0.24	0.00	0.74	0.06	0.00	0.60
Avail Cap(c_a), veh/h	464	1265	1308	585	1888	822	289	0	255	296	0	255
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	0.0	2.4	22.9	11.6	52.2	0.0	53.7	50.7	0.0	53.1
Incr Delay (d2), s/veh	0.1	1.2	1.1	0.2	8.3	0.3	0.5	0.0	6.4	0.1	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.4	0.4	0.5	21.7	1.0	1.1	0.0	2.9	0.3	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	1.2	1.1	2.6	31.2	11.8	52.8	0.0	60.2	50.8	0.0	56.6
LnGrp LOS	C	A	A	A	C	B	D	A	E	D	A	E
Approach Vol, veh/h		1346			1942			129			82	
Approach Delay, s/veh		2.4			28.2			57.9			55.9	
Approach LOS		A			C			E			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	97.6		14.0	32.3	73.7		14.0
Change Period (Y+Rc), s	4.0	4.8		4.0	4.8	* 4.8		4.0
Max Green Setting (Gmax), s	14.0	72.2		21.0	17.0	* 69		21.0
Max Q Clear Time (g_c+I1), s	4.2	2.0		7.8	2.0	58.3		9.2
Green Ext Time (p_c), s	0.3	43.3		0.2	0.2	10.6		0.4

Intersection Summary	
HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
2: 23rd Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	137	1162	6	7	1544	220	11	3	3	149	3	93
Future Volume (vph)	137	1162	6	7	1544	220	11	3	3	149	3	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99		1.00	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	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.95	1.00
Satd. Flow (prot)	1630	3257		1630	3260	1440		1562	1458		1626	1434
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.81	1.00		0.72	1.00
Satd. Flow (perm)	1630	3257		1630	3260	1440		1310	1458		1229	1434
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)	141	1198	6	7	1592	227	11	3	3	154	3	96
RTOR Reduction (vph)	0	0	0	0	0	63	0	0	3	0	0	81
Lane Group Flow (vph)	141	1204	0	7	1592	164	0	14	0	0	157	15
Confl. Peds. (#/hr)			2	2			4					4
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	33%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	14.8	85.6		3.4	74.2	74.2		18.2	18.2		18.2	18.2
Effective Green, g (s)	14.8	85.6		3.4	74.2	74.2		18.2	18.2		18.2	18.2
Actuated g/C Ratio	0.12	0.71		0.03	0.62	0.62		0.15	0.15		0.15	0.15
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.3		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	201	2323		46	2015	890		198	221		186	217
v/s Ratio Prot	c0.09	0.37		0.00	c0.49							
v/s Ratio Perm						0.11		0.01	0.00		c0.13	0.01
v/c Ratio	0.70	0.52		0.15	0.79	0.18		0.07	0.00		0.84	0.07
Uniform Delay, d1	50.5	7.8		56.9	17.1	9.9		43.6	43.2		49.5	43.6
Progression Factor	1.18	0.36		0.80	0.75	0.57		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.0	0.7		0.7	2.4	0.3		0.1	0.0		27.5	0.1
Delay (s)	67.5	3.5		46.1	15.2	6.0		43.8	43.2		77.1	43.7
Level of Service	E	A		D	B	A		D	D		E	D
Approach Delay (s)		10.2			14.1			43.7			64.4	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	137	1162	6	7	1544	220	11	3	3	149	3	93
Future Volume (veh/h)	137	1162	6	7	1544	220	11	3	3	149	3	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1723	1723	1723	1723	1723	1723	1627	1723	1723	1723	1300	1723
Adj Flow Rate, veh/h	141	1198	6	7	1592	227	11	3	3	154	3	96
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	9	2	2	2	33	2
Cap, veh/h	165	1470	7	459	2049	902	54	8	242	59	0	242
Arrive On Green	0.20	0.88	0.88	0.56	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1641	3339	17	1641	3273	1440	0	47	1449	0	0	1449
Grp Volume(v), veh/h	141	587	617	7	1592	227	14	0	3	157	0	96
Grp Sat Flow(s),veh/h/ln	1641	1637	1719	1641	1637	1440	47	0	1449	0	0	1449
Q Serve(g_s), s	9.9	18.2	18.2	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	7.1
Cycle Q Clear(g_c), s	9.9	18.2	18.2	0.2	0.0	0.0	20.0	0.0	0.2	20.0	0.0	7.1
Prop In Lane	1.00		0.01	1.00		1.00	0.79		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	165	720	757	459	2049	902	61	0	242	59	0	242
V/C Ratio(X)	0.85	0.81	0.82	0.02	0.78	0.25	0.23	0.00	0.01	2.64	0.00	0.40
Avail Cap(c_a), veh/h	273	1039	1092	459	2049	902	61	0	242	59	0	242
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	0.80	0.68	0.68	0.68	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.1	5.1	5.1	19.1	0.0	0.0	49.0	0.0	41.8	60.0	0.0	44.6
Incr Delay (d2), s/veh	7.3	8.0	7.7	0.0	2.0	0.5	1.4	0.0	0.0	784.7	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	3.7	3.8	0.1	0.6	0.1	0.5	0.0	0.1	14.8	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.4	13.1	12.8	19.1	2.0	0.5	50.3	0.0	41.8	844.7	0.0	45.4
LnGrp LOS	D	B	B	B	A	A	D	A	D	F	A	D
Approach Vol, veh/h		1345			1826			17			253	
Approach Delay, s/veh		17.3			1.9			48.8			541.4	
Approach LOS		B			A			D			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	38.4	57.6		24.0	16.1	79.9		24.0
Change Period (Y+Rc), s	4.8	* 4.8		4.0	4.0	4.8		4.0
Max Green Setting (Gmax), s	11.0	* 76		20.0	20.0	67.2		20.0
Max Q Clear Time (g_c+I1), s	2.2	20.2		22.0	11.9	2.0		22.0
Green Ext Time (p_c), s	0.0	32.6		0.0	0.2	56.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	47.8
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
3: 20th Avenue & Baseline Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (vph)	159	1165	66	89	1591	76	68	55	64	43	91	137
Future Volume (vph)	159	1165	66	89	1591	76	68	55	64	43	91	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.3		4.5	5.3	4.0	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	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	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1630	3230		1630	3260	1412	1609	1542		1622	1683	1436
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.63	1.00		0.46	1.00	1.00
Satd. Flow (perm)	1630	3230		1630	3260	1412	1073	1542		786	1683	1436
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)	164	1201	68	92	1640	78	70	57	66	44	94	141
RTOR Reduction (vph)	0	2	0	0	0	0	0	35	0	0	0	128
Lane Group Flow (vph)	164	1267	0	92	1640	78	70	88	0	44	94	13
Confl. Peds. (#/hr)	4		1	1		4	4		6	6		4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	5%	2%	2%	4%	2%
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						Free	8			4		4
Actuated Green, G (s)	16.7	83.0		11.4	77.7	120.0	11.3	11.3		10.8	10.8	10.8
Effective Green, g (s)	16.7	83.0		11.4	77.7	120.0	11.3	11.3		10.8	10.8	10.8
Actuated g/C Ratio	0.14	0.69		0.10	0.65	1.00	0.09	0.09		0.09	0.09	0.09
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	4.5		5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	226	2234		154	2110	1412	101	145		70	151	129
v/s Ratio Prot	c0.10	0.39		0.06	c0.50			0.06			0.06	
v/s Ratio Perm						0.06	c0.07			0.06		0.01
v/c Ratio	0.73	0.57		0.60	0.78	0.06	0.69	0.60		0.63	0.62	0.10
Uniform Delay, d1	49.5	9.4		52.1	15.0	0.0	52.7	52.2		52.7	52.6	50.1
Progression Factor	1.00	1.00		0.65	1.06	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.0	1.0		3.3	2.0	0.1	17.2	5.9		14.3	6.7	0.2
Delay (s)	59.4	10.4		37.2	17.9	0.1	69.9	58.1		66.9	59.4	50.4
Level of Service	E	B		D	B	A	E	E		E	E	D
Approach Delay (s)		16.0			18.1			62.4			56.0	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
3: 20th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	159	1165	66	89	1591	76	68	55	64	43	91	137
Future Volume (veh/h)	159	1165	66	89	1591	76	68	55	64	43	91	137
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.99		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	1723	1723	1723	1723	1723	1709	1709	1682	1723	1723	1695	1723
Adj Flow Rate, veh/h	164	1201	68	92	1640	0	70	57	66	44	94	141
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	3	3	5	2	2	4	2
Cap, veh/h	192	2185	124	114	2118		128	79	92	103	191	162
Arrive On Green	0.12	0.69	0.69	0.14	1.00	0.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1641	3144	178	1641	3273	1448	1127	704	815	1257	1695	1437
Grp Volume(v), veh/h	164	624	645	92	1640	0	70	0	123	44	94	141
Grp Sat Flow(s),veh/h/ln	1641	1637	1686	1641	1637	1448	1127	0	1519	1257	1695	1437
Q Serve(g_s), s	11.8	22.6	22.7	6.5	0.0	0.0	7.2	0.0	9.4	4.1	6.3	11.6
Cycle Q Clear(g_c), s	11.8	22.6	22.7	6.5	0.0	0.0	13.5	0.0	9.4	13.5	6.3	11.6
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	192	1137	1171	114	2118		128	0	171	103	191	162
V/C Ratio(X)	0.85	0.55	0.55	0.81	0.77		0.55	0.00	0.72	0.43	0.49	0.87
Avail Cap(c_a), veh/h	349	1137	1171	349	2118		128	0	171	103	191	162
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.56	0.56	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	9.0	9.0	50.9	0.0	0.0	56.5	0.0	51.4	58.0	50.0	52.4
Incr Delay (d2), s/veh	6.5	1.9	1.9	4.7	1.6	0.0	4.0	0.0	13.0	2.1	1.5	36.6
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	5.1	7.5	7.7	2.6	0.5	0.0	2.3	0.0	4.2	1.4	2.7	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	10.9	10.9	55.6	1.6	0.0	60.4	0.0	64.4	60.0	51.5	89.0
LnGrp LOS	E	B	B	E	A		E	A	E	E	D	F
Approach Vol, veh/h		1433			1732	A		193			279	
Approach Delay, s/veh		16.4			4.5			63.0			71.8	
Approach LOS		B			A			E			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.8	88.7		18.5	18.6	82.9		18.5				
Change Period (Y+Rc), s	4.5	5.3		5.0	4.5	5.3		* 5				
Max Green Setting (Gmax), s	25.5	66.7		13.0	25.5	66.7		* 14				
Max Q Clear Time (g_c+I1), s	8.5	24.7		15.5	13.8	2.0		15.5				
Green Ext Time (p_c), s	0.2	30.6		0.0	0.4	54.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

4: 23rd Avenue & Burger King Driveway

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Vol, veh/h	4	82	158	201	174	25
Future Vol, veh/h	4	82	158	201	174	25
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	87	168	214	185	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	751	201	214	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	378	840	1356	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	330	838	1353	-	-	-
Mov Cap-2 Maneuver	330	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1353	-	782	-	-
HCM Lane V/C Ratio	0.124	-	0.117	-	-
HCM Control Delay (s)	8	-	10.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.4	-	-

HCM Signalized Intersection Capacity Analysis
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (vph)	27	1226	32	101	854	37	62	42	227	6	49	36
Future Volume (vph)	27	1226	32	101	854	37	62	42	227	6	49	36
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		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		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1630	3183		1539	3167	1203		1615	1410		1489	1444
Flt Permitted	0.24	1.00		0.12	1.00	1.00		0.78	1.00		0.97	1.00
Satd. Flow (perm)	420	3183		197	3167	1203		1298	1410		1449	1444
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	31	1409	37	116	982	43	71	48	261	7	56	41
RTOR Reduction (vph)	0	1	0	0	0	16	0	0	224	0	0	35
Lane Group Flow (vph)	31	1445	0	116	982	27	0	119	37	0	63	6
Confl. Peds. (#/hr)									3	3		
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	2%	4%	4%	8%	5%	21%	2%	10%	4%	80%	9%	3%
Turn Type	D.P+P	NA		D.P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2		6	8		8	4		4
Actuated Green, G (s)	72.9	64.0		72.9	63.0	63.0		14.3	14.3		14.3	14.3
Effective Green, g (s)	72.9	64.0		72.9	63.0	63.0		14.3	14.3		14.3	14.3
Actuated g/C Ratio	0.73	0.64		0.73	0.63	0.63		0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	425	2037		263	1995	757		185	201		207	206
v/s Ratio Prot	0.01	c0.45		0.04	c0.31							
v/s Ratio Perm	0.05			0.28		0.02		c0.09	0.03		0.04	0.00
v/c Ratio	0.07	0.71		0.44	0.49	0.04		0.64	0.19		0.30	0.03
Uniform Delay, d1	7.4	11.9		7.8	9.9	7.0		40.4	37.7		38.4	36.9
Progression Factor	0.93	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	1.9		0.7	0.9	0.1		6.6	0.3		0.6	0.0
Delay (s)	6.9	13.7		8.5	10.8	7.1		47.0	38.1		39.0	36.9
Level of Service	A	B		A	B	A		D	D		D	D
Approach Delay (s)		13.5			10.4			40.9			38.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	27	1226	32	101	854	37	62	42	227	6	49	36
Future Volume (veh/h)	27	1226	32	101	854	37	62	42	227	6	49	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1723	1695	1695	1641	1682	1463	1723	1614	1695	658	1627	1709
Adj Flow Rate, veh/h	31	1409	37	116	982	43	71	48	261	7	56	41
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	4	4	8	5	21	2	10	4	80	9	3
Cap, veh/h	568	2007	53	262	1323	502	192	112	285	55	300	287
Arrive On Green	0.25	0.63	0.63	0.05	0.41	0.41	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1641	3205	84	1563	3195	1212	673	565	1430	75	1506	1442
Grp Volume(v), veh/h	31	707	739	116	982	43	119	0	261	63	0	41
Grp Sat Flow(s),veh/h/ln	1641	1611	1678	1563	1598	1212	1238	0	1430	1581	0	1442
Q Serve(g_s), s	0.0	29.3	29.4	2.6	26.0	2.2	6.3	0.0	17.9	0.0	0.0	2.3
Cycle Q Clear(g_c), s	0.0	29.3	29.4	2.6	26.0	2.2	9.5	0.0	17.9	3.2	0.0	2.3
Prop In Lane	1.00		0.05	1.00		1.00	0.60		1.00	0.11		1.00
Lane Grp Cap(c), veh/h	568	1009	1051	262	1323	502	304	0	285	355	0	287
V/C Ratio(X)	0.05	0.70	0.70	0.44	0.74	0.09	0.39	0.00	0.92	0.18	0.00	0.14
Avail Cap(c_a), veh/h	568	1009	1051	454	1476	560	305	0	286	356	0	288
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)	0.83	0.83	0.83	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	12.5	12.5	12.2	24.8	17.8	36.3	0.0	39.2	33.4	0.0	33.0
Incr Delay (d2), s/veh	0.0	3.4	3.3	0.7	3.8	0.3	0.6	0.0	32.0	0.2	0.0	0.2
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	0.4	9.8	10.2	0.9	9.8	0.6	2.7	0.0	8.8	1.3	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.8	15.8	15.8	13.0	28.6	18.1	36.9	0.0	71.2	33.5	0.0	33.2
LnGrp LOS	B	B	B	B	C	B	D	A	E	C	A	C
Approach Vol, veh/h		1477			1141			380			104	
Approach Delay, s/veh		15.9			26.6			60.5			33.4	
Approach LOS		B			C			E			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	67.4		23.9	29.9	46.2		23.9				
Change Period (Y+Rc), s	4.0	4.8		4.0	4.8	* 4.8		4.0				
Max Green Setting (Gmax), s	17.0	50.2		20.0	21.0	* 46		20.0				
Max Q Clear Time (g_c+I1), s	4.6	31.4		5.2	2.0	28.0		19.9				
Green Ext Time (p_c), s	0.2	16.9		0.3	0.0	13.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			25.9									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	75	1176	13	9	884	80	16	4	5	69	4	21
Future Volume (vph)	75	1176	13	9	884	80	16	4	5	69	4	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99		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		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1599	3192		1630	3167	1411		1651	1438		1636	1417
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.77	1.00		0.72	1.00
Satd. Flow (perm)	1599	3192		1630	3167	1411		1322	1438		1237	1417
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	86	1352	15	10	1016	92	18	5	6	79	5	24
RTOR Reduction (vph)	0	0	0	0	0	30	0	0	5	0	0	22
Lane Group Flow (vph)	86	1367	0	10	1016	62	0	23	1	0	84	2
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	4%	4%	2%	2%	5%	4%	2%	2%	2%	2%	2%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	8.9	75.4		1.4	67.9	67.9		10.4	10.4		10.4	10.4
Effective Green, g (s)	8.9	75.4		1.4	67.9	67.9		10.4	10.4		10.4	10.4
Actuated g/C Ratio	0.09	0.75		0.01	0.68	0.68		0.10	0.10		0.10	0.10
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.3		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	142	2406		22	2150	958		137	149		128	147
v/s Ratio Prot	0.05	c0.43		0.01	c0.32							
v/s Ratio Perm						0.04		0.02	0.00		c0.07	0.00
v/c Ratio	0.61	0.57		0.45	0.47	0.07		0.17	0.00		0.66	0.02
Uniform Delay, d1	43.9	5.3		48.9	7.6	5.4		40.9	40.2		43.1	40.2
Progression Factor	1.03	0.59		0.89	0.97	1.64		1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	0.7		7.7	0.7	0.1		0.4	0.0		10.3	0.0
Delay (s)	49.3	3.8		51.4	8.1	9.0		41.3	40.2		53.4	40.2
Level of Service	D	A		D	A	A		D	D		D	D
Approach Delay (s)		6.5			8.5			41.0			50.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
2: Fred Meyer Driveway & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	75	1176	13	9	884	80	16	4	5	69	4	21
Future Volume (veh/h)	75	1176	13	9	884	80	16	4	5	69	4	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.99	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	1695	1695	1723	1723	1682	1695	1723	1723	1723	1723	1723	1682
Adj Flow Rate, veh/h	86	1352	15	10	1016	92	18	5	6	79	5	24
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	4	2	2	5	4	2	2	2	2	2	5
Cap, veh/h	106	1544	17	362	2032	902	64	10	247	70	2	241
Arrive On Green	0.13	0.95	0.95	0.44	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1615	3262	36	1641	3195	1418	0	56	1455	0	13	1420
Grp Volume(v), veh/h	86	667	700	10	1016	92	23	0	6	84	0	24
Grp Sat Flow(s),veh/h/ln	1615	1611	1688	1641	1598	1418	56	0	1455	13	0	1420
Q Serve(g_s), s	5.2	12.9	12.9	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	1.4
Cycle Q Clear(g_c), s	5.2	12.9	12.9	0.3	0.0	0.0	17.0	0.0	0.3	17.0	0.0	1.4
Prop In Lane	1.00		0.02	1.00		1.00	0.78		1.00	0.94		1.00
Lane Grp Cap(c), veh/h	106	762	799	362	2032	902	74	0	247	72	0	241
V/C Ratio(X)	0.81	0.88	0.88	0.03	0.50	0.10	0.31	0.00	0.02	1.17	0.00	0.10
Avail Cap(c_a), veh/h	210	953	999	362	2032	902	74	0	247	72	0	241
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.63	0.89	0.89	0.89	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.8	1.7	1.7	21.9	0.0	0.0	43.0	0.0	34.6	49.5	0.0	35.0
Incr Delay (d2), s/veh	5.5	9.0	8.7	0.0	0.8	0.2	1.8	0.0	0.0	157.8	0.0	0.1
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	2.1	2.7	2.8	0.1	0.2	0.1	0.6	0.0	0.1	5.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	10.7	10.4	21.9	0.8	0.2	44.8	0.0	34.6	207.3	0.0	35.2
LnGrp LOS	D	B	B	C	A	A	D	A	C	F	A	D
Approach Vol, veh/h		1453			1118			29			108	
Approach Delay, s/veh		12.8			0.9			42.7			169.0	
Approach LOS		B			A			D			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	26.9	52.1		21.0	10.6	68.4		21.0
Change Period (Y+Rc), s	4.8	* 4.8		4.0	4.0	4.8		4.0
Max Green Setting (Gmax), s	11.0	* 59		17.0	13.0	57.2		17.0
Max Q Clear Time (g_c+I1), s	2.3	14.9		19.0	7.2	2.0		19.0
Green Ext Time (p_c), s	0.0	32.4		0.0	0.1	31.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (vph)	89	1078	70	44	831	90	81	110	102	71	56	86
Future Volume (vph)	89	1078	70	44	831	90	81	110	102	71	56	86
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.3		4.5	5.3	4.0	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	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	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1599	3128		1614	3167	1390	1581	1558		1568	1636	1398
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.72	1.00		0.43	1.00	1.00
Satd. Flow (perm)	1599	3128		1614	3167	1390	1193	1558		715	1636	1398
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	99	1198	78	49	923	100	90	122	113	79	62	96
RTOR Reduction (vph)	0	4	0	0	0	0	0	30	0	0	0	73
Lane Group Flow (vph)	99	1272	0	49	923	100	90	205	0	79	62	23
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	5%	8%	3%	5%	7%	5%	5%	2%	6%	7%	5%
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						Free	8			4		4
Actuated Green, G (s)	9.7	54.7		6.9	51.9	100.0	24.1	24.1		23.6	23.6	23.6
Effective Green, g (s)	9.7	54.7		6.9	51.9	100.0	24.1	24.1		23.6	23.6	23.6
Actuated g/C Ratio	0.10	0.55		0.07	0.52	1.00	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	4.5		5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	155	1711		111	1643	1390	287	375		168	386	329
v/s Ratio Prot	c0.06	c0.41		0.03	0.29			c0.13			0.04	
v/s Ratio Perm						0.07	0.08			0.11		0.02
v/c Ratio	0.64	0.74		0.44	0.56	0.07	0.31	0.55		0.47	0.16	0.07
Uniform Delay, d1	43.5	17.3		44.7	16.3	0.0	31.2	33.2		32.8	30.3	29.7
Progression Factor	1.00	1.00		1.05	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.9	3.0		1.5	1.3	0.1	0.5	1.3		1.5	0.1	0.1
Delay (s)	50.4	20.3		48.4	16.7	0.1	31.6	34.5		34.3	30.5	29.7
Level of Service	D	C		D	B	A	C	C		C	C	C
Approach Delay (s)		22.4			16.6			33.7			31.5	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
3: 20th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	89	1078	70	44	831	90	81	110	102	71	56	86
Future Volume (veh/h)	89	1078	70	44	831	90	81	110	102	71	56	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1695	1682	1641	1709	1682	1654	1682	1682	1723	1668	1654	1682
Adj Flow Rate, veh/h	99	1198	78	49	923	0	90	122	113	79	62	96
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	5	8	3	5	7	5	5	2	6	7	5
Cap, veh/h	125	2005	130	61	1980		218	124	115	76	256	220
Arrive On Green	0.08	0.66	0.66	0.08	1.00	0.00	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1615	3041	198	1628	3195	1402	1196	802	743	1107	1654	1420
Grp Volume(v), veh/h	99	629	647	49	923	0	90	0	235	79	62	96
Grp Sat Flow(s),veh/h/ln	1615	1598	1641	1628	1598	1402	1196	0	1545	1107	1654	1420
Q Serve(g_s), s	6.0	22.1	22.2	3.0	0.0	0.0	7.1	0.0	15.2	0.3	3.3	6.1
Cycle Q Clear(g_c), s	6.0	22.1	22.2	3.0	0.0	0.0	10.4	0.0	15.2	15.5	3.3	6.1
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.48	1.00		1.00
Lane Grp Cap(c), veh/h	125	1053	1082	61	1980		218	0	239	76	256	220
V/C Ratio(X)	0.79	0.60	0.60	0.80	0.47		0.41	0.00	0.98	1.04	0.24	0.44
Avail Cap(c_a), veh/h	412	1053	1082	415	1980		218	0	239	76	256	220
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.90	0.90	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	9.6	9.6	45.9	0.0	0.0	41.7	0.0	42.1	50.0	37.1	38.3
Incr Delay (d2), s/veh	6.8	2.5	2.4	12.3	0.7	0.0	0.9	0.0	52.7	115.8	0.4	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	2.6	7.1	7.3	1.3	0.2	0.0	2.1	0.0	9.2	4.3	1.3	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.2	12.1	12.0	58.2	0.7	0.0	42.6	0.0	94.8	165.7	37.4	39.3
LnGrp LOS	D	B	B	E	A		D	A	F	F	D	D
Approach Vol, veh/h		1375			972	A		325			237	
Approach Delay, s/veh		14.9			3.6			80.4			81.0	
Approach LOS		B			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	71.2		20.5	12.2	67.3		20.5
Change Period (Y+Rc), s	4.5	5.3		5.0	4.5	5.3		* 5
Max Green Setting (Gmax), s	25.5	44.7		15.0	25.5	44.7		* 16
Max Q Clear Time (g_c+I1), s	5.0	24.2		17.5	8.0	2.0		17.2
Green Ext Time (p_c), s	0.1	17.1		0.0	0.2	22.4		0.0

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑	↱	
Traffic Vol, veh/h	0	33	85	80	65	5
Future Vol, veh/h	0	33	85	80	65	5
Conflicting Peds, #/hr	0	1	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	3	2	4	3	2
Mvmt Flow	0	37	96	90	73	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	359	78	80	0	-	0
Stage 1	77	-	-	-	-	-
Stage 2	282	-	-	-	-	-
Critical Hdwy	6.42	6.23	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.327	2.218	-	-	-
Pot Cap-1 Maneuver	640	980	1518	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	598	978	1517	-	-	-
Mov Cap-2 Maneuver	598	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	765	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	3.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1517	-	978	-	-
HCM Lane V/C Ratio	0.063	-	0.038	-	-
HCM Control Delay (s)	7.5	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (vph)	81	1257	71	197	1764	85	42	10	119	5	18	75
Future Volume (vph)	81	1257	71	197	1764	85	42	10	119	5	18	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		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	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)	1630	3230		1614	3260	1420		1574	1458		1553	1458
Flt Permitted	0.08	1.00		0.15	1.00	1.00		0.75	1.00		0.95	1.00
Satd. Flow (perm)	143	3230		255	3260	1420		1228	1458		1488	1458
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)	84	1296	73	203	1819	88	43	10	123	5	19	77
RTOR Reduction (vph)	0	2	0	0	0	15	0	0	112	0	0	70
Lane Group Flow (vph)	84	1367	0	203	1819	73	0	53	11	0	24	7
Confl. Peds. (#/hr)	2					2						
Confl. Bikes (#/hr)			2			3						
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	8%	2%	2%	2%	14%	2%
Turn Type	D.P+P	NA		D.P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2		6	8		8	4		4
Actuated Green, G (s)	96.0	82.8		96.0	89.5	89.5		11.2	11.2		11.2	11.2
Effective Green, g (s)	96.0	82.8		96.0	89.5	89.5		11.2	11.2		11.2	11.2
Actuated g/C Ratio	0.80	0.69		0.80	0.75	0.75		0.09	0.09		0.09	0.09
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	194	2228		353	2431	1059		114	136		138	136
v/s Ratio Prot	0.02	c0.42		0.06	c0.56							
v/s Ratio Perm	0.32			0.40		0.05		c0.04	0.01		0.02	0.00
v/c Ratio	0.43	0.61		0.58	0.75	0.07		0.46	0.08		0.17	0.05
Uniform Delay, d1	19.9	10.0		7.0	8.8	4.1		51.6	49.7		50.1	49.6
Progression Factor	0.74	0.48		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	1.1		1.7	2.2	0.1		2.2	0.2		0.4	0.1
Delay (s)	15.4	5.9		8.6	10.9	4.2		53.7	49.9		50.6	49.7
Level of Service	B	A		A	B	A		D	D		D	D
Approach Delay (s)		6.4			10.4			51.1			49.9	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: 26th Avenue & Baseline Street

10/21/2021

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	81	1257	71	197	1764	85	42	10	119	5	18	75
Future Volume (veh/h)	81	1257	71	197	1764	85	42	10	119	5	18	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1723	1723	1723	1709	1723	1723	1641	1723	1723	1723	1559	1723
Adj Flow Rate, veh/h	84	1296	73	203	1819	88	43	10	123	5	19	77
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	3	2	2	8	2	2	2	14	2
Cap, veh/h	411	2330	131	432	1886	821	153	30	150	53	138	150
Arrive On Green	0.41	1.00	1.00	0.05	0.58	0.58	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1641	3146	177	1628	3273	1425	955	287	1460	160	1340	1460
Grp Volume(v), veh/h	84	673	696	203	1819	88	53	0	123	24	0	77
Grp Sat Flow(s),veh/h/ln	1641	1637	1686	1628	1637	1425	1242	0	1460	1500	0	1460
Q Serve(g_s), s	0.0	0.0	0.0	3.6	63.6	3.3	3.8	0.0	9.9	0.0	0.0	6.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.6	63.6	3.3	5.5	0.0	9.9	1.7	0.0	6.0
Prop In Lane	1.00		0.10	1.00		1.00	0.81		1.00	0.21		1.00
Lane Grp Cap(c), veh/h	411	1212	1249	432	1886	821	182	0	150	191	0	150
V/C Ratio(X)	0.20	0.56	0.56	0.47	0.96	0.11	0.29	0.00	0.82	0.13	0.00	0.51
Avail Cap(c_a), veh/h	411	1212	1249	541	1888	822	280	0	255	295	0	255
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	0.83	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.5	0.0	0.0	3.0	24.2	11.5	51.1	0.0	52.7	49.0	0.0	51.0
Incr Delay (d2), s/veh	0.1	1.5	1.5	0.5	13.9	0.3	0.6	0.0	7.9	0.2	0.0	2.0
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	0.5	0.5	0.9	25.7	1.1	1.6	0.0	4.0	0.7	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.6	1.5	1.5	3.5	38.1	11.7	51.8	0.0	60.6	49.2	0.0	53.0
LnGrp LOS	C	A	A	A	D	B	D	A	E	D	A	D
Approach Vol, veh/h		1453			2110			176			101	
Approach Delay, s/veh		3.0			33.7			57.9			52.1	
Approach LOS		A			C			E			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	93.7		16.4	29.7	74.0		16.4				
Change Period (Y+Rc), s	4.0	4.8		4.0	4.8	* 4.8		4.0				
Max Green Setting (Gmax), s	14.0	72.2		21.0	17.0	* 69		21.0				
Max Q Clear Time (g_c+I1), s	5.6	2.0		8.0	2.0	65.6		11.9				
Green Ext Time (p_c), s	0.4	48.1		0.3	0.2	3.6		0.5				

Intersection Summary

HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
2: 23rd Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	137	1261	6	7	1652	220	11	3	3	149	3	93
Future Volume (vph)	137	1261	6	7	1652	220	11	3	3	149	3	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99		1.00	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	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.95	1.00
Satd. Flow (prot)	1630	3257		1630	3260	1440		1562	1458		1626	1434
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.81	1.00		0.72	1.00
Satd. Flow (perm)	1630	3257		1630	3260	1440		1309	1458		1229	1434
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)	141	1300	6	7	1703	227	11	3	3	154	3	96
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	3	0	0	82
Lane Group Flow (vph)	141	1306	0	7	1703	168	0	14	0	0	157	14
Confl. Peds. (#/hr)			2	2			4					4
Confl. Bikes (#/hr)			2			2						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	33%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	14.8	86.6		2.6	74.4	74.4		18.0	18.0		18.0	18.0
Effective Green, g (s)	14.8	86.6		2.6	74.4	74.4		18.0	18.0		18.0	18.0
Actuated g/C Ratio	0.12	0.72		0.02	0.62	0.62		0.15	0.15		0.15	0.15
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.3		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	201	2350		35	2021	892		196	218		184	215
v/s Ratio Prot	c0.09	0.40		0.00	c0.52							
v/s Ratio Perm						0.12		0.01	0.00		c0.13	0.01
v/c Ratio	0.70	0.56		0.20	0.84	0.19		0.07	0.00		0.85	0.07
Uniform Delay, d1	50.5	7.8		57.7	18.1	9.8		43.8	43.4		49.7	43.8
Progression Factor	1.33	0.45		0.85	0.59	0.24		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.0	0.7		1.1	3.1	0.3		0.1	0.0		29.5	0.1
Delay (s)	74.0	4.2		50.2	13.8	2.6		43.9	43.4		79.2	43.9
Level of Service	E	A		D	B	A		D	D		E	D
Approach Delay (s)		11.0			12.6			43.8			65.8	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
2: 23rd Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	137	1261	6	7	1652	220	11	3	3	149	3	93
Future Volume (veh/h)	137	1261	6	7	1652	220	11	3	3	149	3	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1723	1723	1723	1723	1723	1723	1627	1723	1723	1723	1300	1723
Adj Flow Rate, veh/h	141	1300	6	7	1703	227	11	3	3	154	3	96
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	9	2	2	2	33	2
Cap, veh/h	165	1541	7	424	2049	902	54	8	242	59	0	242
Arrive On Green	0.20	0.92	0.92	0.52	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1641	3341	15	1641	3273	1440	0	47	1449	0	0	1449
Grp Volume(v), veh/h	141	637	669	7	1703	227	14	0	3	157	0	96
Grp Sat Flow(s),veh/h/ln	1641	1637	1719	1641	1637	1440	47	0	1449	0	0	1449
Q Serve(g_s), s	9.9	16.3	16.3	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	7.1
Cycle Q Clear(g_c), s	9.9	16.3	16.3	0.2	0.0	0.0	20.0	0.0	0.2	20.0	0.0	7.1
Prop In Lane	1.00		0.01	1.00		1.00	0.79		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	165	755	793	424	2049	902	61	0	242	59	0	242
V/C Ratio(X)	0.85	0.84	0.84	0.02	0.83	0.25	0.23	0.00	0.01	2.64	0.00	0.40
Avail Cap(c_a), veh/h	273	1039	1092	424	2049	902	61	0	242	59	0	242
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.67	0.67	0.67	0.61	0.61	0.61	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	47.1	3.1	3.1	21.5	0.0	0.0	49.0	0.0	41.8	60.0	0.0	44.6
Incr Delay (d2), s/veh	6.2	7.8	7.4	0.0	2.5	0.4	1.4	0.0	0.0	784.7	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	3.0	3.1	0.1	0.7	0.1	0.5	0.0	0.1	14.8	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	10.9	10.6	21.5	2.5	0.4	50.3	0.0	41.8	844.7	0.0	45.4
LnGrp LOS	D	B	B	C	A	A	D	A	D	F	A	D
Approach Vol, veh/h		1447			1937			17			253	
Approach Delay, s/veh		14.9			2.4			48.8			541.4	
Approach LOS		B			A			D			F	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	35.8	60.2	24.0	16.1	79.9	24.0
Change Period (Y+Rc), s	4.8	* 4.8	4.0	4.0	4.8	4.0
Max Green Setting (Gmax), s	11.0	* 76	20.0	20.0	67.2	20.0
Max Q Clear Time (g_c+I1), s	2.2	18.3	22.0	11.9	2.0	22.0
Green Ext Time (p_c), s	0.0	37.1	0.0	0.2	58.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	44.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

3: 20th Avenue & Baseline Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (vph)	170	1207	83	128	1633	108	78	77	86	80	123	145
Future Volume (vph)	170	1207	83	128	1633	108	78	77	86	80	123	145
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.3		4.5	5.3	4.0	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	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	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1630	3223		1630	3260	1412	1609	1543		1623	1683	1436
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.58	1.00		0.44	1.00	1.00
Satd. Flow (perm)	1630	3223		1630	3260	1412	982	1543		758	1683	1436
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)	175	1244	86	132	1684	111	80	79	89	82	127	149
RTOR Reduction (vph)	0	4	0	0	0	0	0	32	0	0	0	126
Lane Group Flow (vph)	175	1326	0	132	1684	111	80	136	0	82	127	23
Confl. Peds. (#/hr)	4		1	1		4	4		6	6		4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	5%	2%	2%	4%	2%
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						Free	8			4		4
Actuated Green, G (s)	17.5	72.3		14.4	69.2	120.0	19.0	19.0		18.5	18.5	18.5
Effective Green, g (s)	17.5	72.3		14.4	69.2	120.0	19.0	19.0		18.5	18.5	18.5
Actuated g/C Ratio	0.15	0.60		0.12	0.58	1.00	0.16	0.16		0.15	0.15	0.15
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	4.5		5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	237	1941		195	1879	1412	155	244		116	259	221
v/s Ratio Prot	c0.11	c0.41		0.08	c0.52			0.09			0.08	
v/s Ratio Perm						0.08	0.08			c0.11		0.02
v/c Ratio	0.74	0.68		0.68	0.90	0.08	0.52	0.56		0.71	0.49	0.10
Uniform Delay, d1	49.1	16.1		50.6	22.3	0.0	46.3	46.6		48.2	46.4	43.6
Progression Factor	1.00	1.00		0.75	0.93	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.4	2.0		5.0	4.7	0.1	2.2	2.2		16.6	1.1	0.2
Delay (s)	59.5	18.1		42.7	25.3	0.1	48.4	48.8		64.8	47.5	43.8
Level of Service	E	B		D	C	A	D	D		E	D	D
Approach Delay (s)		22.9			25.0			48.7			49.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
3: 20th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	170	1207	83	128	1633	108	78	77	86	80	123	145
Future Volume (veh/h)	170	1207	83	128	1633	108	78	77	86	80	123	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.99		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	1723	1723	1723	1723	1723	1709	1709	1682	1723	1723	1695	1723
Adj Flow Rate, veh/h	175	1244	86	132	1684	0	80	79	89	82	127	149
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	3	3	5	2	2	4	2
Cap, veh/h	203	2073	143	157	2095		104	80	91	63	191	162
Arrive On Green	0.12	0.67	0.67	0.19	1.00	0.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1641	3101	214	1641	3273	1448	1087	715	806	1209	1695	1437
Grp Volume(v), veh/h	175	656	674	132	1684	0	80	0	168	82	127	149
Grp Sat Flow(s),veh/h/ln	1641	1637	1678	1641	1637	1448	1087	0	1521	1209	1695	1437
Q Serve(g_s), s	12.6	26.6	26.7	9.3	0.0	0.0	4.9	0.0	13.2	0.3	8.6	12.3
Cycle Q Clear(g_c), s	12.6	26.6	26.7	9.3	0.0	0.0	13.5	0.0	13.2	13.5	8.6	12.3
Prop In Lane	1.00		0.13	1.00		1.00	1.00		0.53	1.00		1.00
Lane Grp Cap(c), veh/h	203	1094	1122	157	2095		104	0	171	63	191	162
V/C Ratio(X)	0.86	0.60	0.60	0.84	0.80		0.77	0.00	0.98	1.31	0.67	0.92
Avail Cap(c_a), veh/h	349	1094	1122	349	2095		104	0	171	63	191	162
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.47	0.47	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	11.0	11.0	47.7	0.0	0.0	58.7	0.0	53.1	60.0	51.1	52.7
Incr Delay (d2), s/veh	6.6	2.4	2.4	3.6	1.6	0.0	27.6	0.0	63.1	215.6	7.8	48.2
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	5.4	9.1	9.4	3.6	0.5	0.0	3.2	0.0	8.0	5.7	4.1	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	13.4	13.4	51.3	1.6	0.0	86.3	0.0	116.2	275.6	58.9	100.9
LnGrp LOS	E	B	B	D	A		F	A	F	F	E	F
Approach Vol, veh/h		1505			1816	A		248			358	
Approach Delay, s/veh		18.6			5.2			106.6			126.0	
Approach LOS		B			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.0	85.5		18.5	19.4	82.1		18.5
Change Period (Y+Rc), s	4.5	5.3		5.0	4.5	5.3		* 5
Max Green Setting (Gmax), s	25.5	66.7		13.0	25.5	66.7		* 14
Max Q Clear Time (g_c+I1), s	11.3	28.7		15.5	14.6	2.0		15.5
Green Ext Time (p_c), s	0.3	29.5		0.0	0.4	55.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	27.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Vol, veh/h	4	82	158	201	174	25
Future Vol, veh/h	4	82	158	201	174	25
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	0	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	87	168	214	185	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	751	201	214	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	378	840	1356	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	330	838	1353	-	-	-
Mov Cap-2 Maneuver	330	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	3.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1353	-	782	-	-
HCM Lane V/C Ratio	0.124	-	0.117	-	-
HCM Control Delay (s)	8	-	10.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.4	-	-

HCM Signalized Intersection Capacity Analysis
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	27	1299	32	101	920	37	62	42	227	6	49	36
Future Volume (vph)	27	1299	32	101	920	37	62	42	227	6	49	36
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		1.00	0.98		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		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1630	3184		1539	3167	1204		1615	1407		1489	1444
Flt Permitted	0.22	1.00		0.11	1.00	1.00		0.78	1.00		0.97	1.00
Satd. Flow (perm)	380	3184		170	3167	1204		1298	1407		1449	1444
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	31	1493	37	116	1057	43	71	48	261	7	56	41
RTOR Reduction (vph)	0	1	0	0	0	16	0	0	224	0	0	35
Lane Group Flow (vph)	31	1529	0	116	1057	27	0	119	37	0	63	6
Confl. Peds. (#/hr)									3	3		
Confl. Bikes (#/hr)			1			1			1			
Heavy Vehicles (%)	2%	4%	4%	8%	5%	21%	2%	10%	4%	80%	9%	3%
Turn Type	D.P+P	NA		D.P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2		6	8		8	4		4
Actuated Green, G (s)	72.9	64.3		72.9	63.5	63.5		14.3	14.3		14.3	14.3
Effective Green, g (s)	72.9	64.3		72.9	63.5	63.5		14.3	14.3		14.3	14.3
Actuated g/C Ratio	0.73	0.64		0.73	0.64	0.64		0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	394	2047		241	2011	764		185	201		207	206
v/s Ratio Prot	0.01	c0.48		0.04	c0.33							
v/s Ratio Perm	0.05			0.31		0.02		c0.09	0.03		0.04	0.00
v/c Ratio	0.08	0.75		0.48	0.53	0.04		0.64	0.19		0.30	0.03
Uniform Delay, d1	8.0	12.3		9.0	10.0	6.8		40.4	37.7		38.4	36.9
Progression Factor	0.63	1.01		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	2.0		0.9	1.0	0.1		6.6	0.3		0.6	0.0
Delay (s)	5.0	14.4		9.9	11.0	6.9		47.0	38.1		39.0	36.9
Level of Service	A	B		A	B	A		D	D		D	D
Approach Delay (s)		14.2			10.7			40.9			38.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	27	1299	32	101	920	37	62	42	227	6	49	36
Future Volume (veh/h)	27	1299	32	101	920	37	62	42	227	6	49	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	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	1723	1695	1695	1641	1682	1463	1723	1614	1695	658	1627	1709
Adj Flow Rate, veh/h	31	1493	37	116	1057	43	71	48	261	7	56	41
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	4	4	8	5	21	2	10	4	80	9	3
Cap, veh/h	533	2007	50	242	1368	520	192	113	282	55	301	288
Arrive On Green	0.24	0.63	0.63	0.05	0.43	0.43	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1641	3210	79	1563	3195	1214	674	565	1412	76	1505	1442
Grp Volume(v), veh/h	31	748	782	116	1057	43	119	0	261	63	0	41
Grp Sat Flow(s),veh/h/ln	1641	1611	1679	1563	1598	1214	1239	0	1412	1581	0	1442
Q Serve(g_s), s	0.0	32.5	32.7	2.6	28.3	2.1	6.3	0.0	18.1	0.0	0.0	2.3
Cycle Q Clear(g_c), s	0.0	32.5	32.7	2.6	28.3	2.1	9.5	0.0	18.1	3.2	0.0	2.3
Prop In Lane	1.00		0.05	1.00		1.00	0.60		1.00	0.11		1.00
Lane Grp Cap(c), veh/h	533	1007	1050	242	1368	520	305	0	282	356	0	288
V/C Ratio(X)	0.06	0.74	0.74	0.48	0.77	0.08	0.39	0.00	0.92	0.18	0.00	0.14
Avail Cap(c_a), veh/h	533	1007	1050	434	1476	561	305	0	282	356	0	288
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)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.4	13.1	13.1	14.1	24.4	16.9	36.2	0.0	39.3	33.3	0.0	32.9
Incr Delay (d2), s/veh	0.0	3.8	3.7	0.9	4.3	0.3	0.6	0.0	34.0	0.2	0.0	0.2
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	10.9	11.4	1.1	10.7	0.6	2.7	0.0	8.9	1.3	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	16.9	16.8	15.0	28.7	17.3	36.8	0.0	73.3	33.5	0.0	33.1
LnGrp LOS	C	B	B	B	C	B	D	A	E	C	A	C
Approach Vol, veh/h		1561			1216			380			104	
Approach Delay, s/veh		16.9			27.0			61.9			33.3	
Approach LOS		B			C			E			C	

Timer - Assigned Phs	1	2	4	5	6	8
Phs Duration (G+Y+Rc), s	8.7	67.3	24.0	28.4	47.6	24.0
Change Period (Y+Rc), s	4.0	4.8	4.0	4.8	* 4.8	4.0
Max Green Setting (Gmax), s	17.0	50.2	20.0	21.0	* 46	20.0
Max Q Clear Time (g_c+I1), s	4.6	34.7	5.2	2.0	30.3	20.1
Green Ext Time (p_c), s	0.2	14.4	0.3	0.0	12.6	0.0

Intersection Summary	
HCM 6th Ctrl Delay	26.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
2: 23rd Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	106	1168	13	9	878	152	16	4	5	150	4	54
Future Volume (vph)	106	1168	13	9	878	152	16	4	5	150	4	54
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99		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		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.95	1.00
Satd. Flow (prot)	1599	3192		1630	3167	1411		1651	1438		1634	1417
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.78	1.00		0.72	1.00
Satd. Flow (perm)	1599	3192		1630	3167	1411		1347	1438		1225	1417
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	122	1343	15	10	1009	175	18	5	6	172	5	62
RTOR Reduction (vph)	0	1	0	0	0	76	0	0	5	0	0	50
Lane Group Flow (vph)	122	1357	0	10	1009	99	0	23	1	0	177	12
Confl. Peds. (#/hr)	1					1			2	2		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	4%	2%	2%	5%	4%	2%	2%	2%	2%	2%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	11.3	66.4		1.4	56.5	56.5		19.4	19.4		19.4	19.4
Effective Green, g (s)	11.3	66.4		1.4	56.5	56.5		19.4	19.4		19.4	19.4
Actuated g/C Ratio	0.11	0.66		0.01	0.56	0.56		0.19	0.19		0.19	0.19
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.3		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	180	2119		22	1789	797		261	278		237	274
v/s Ratio Prot	0.08	c0.43		0.01	c0.32							
v/s Ratio Perm						0.07		0.02	0.00		c0.14	0.01
v/c Ratio	0.68	0.64		0.45	0.56	0.12		0.09	0.00		0.75	0.04
Uniform Delay, d1	42.6	9.8		48.9	13.9	10.2		33.0	32.5		38.0	32.8
Progression Factor	1.21	0.53		0.72	0.70	0.51		1.00	1.00		1.00	1.00
Incremental Delay, d2	6.2	1.1		7.6	1.2	0.3		0.1	0.0		11.5	0.0
Delay (s)	57.6	6.3		43.0	10.9	5.5		33.2	32.5		49.5	32.8
Level of Service	E	A		D	B	A		C	C		D	C
Approach Delay (s)		10.6			10.3			33.0			45.1	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
2: 23rd Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	106	1168	13	9	878	152	16	4	5	150	4	54
Future Volume (veh/h)	106	1168	13	9	878	152	16	4	5	150	4	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1695	1695	1723	1723	1682	1695	1723	1723	1723	1723	1723	1682
Adj Flow Rate, veh/h	122	1343	15	10	1009	175	18	5	6	172	5	62
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	4	4	2	2	5	4	2	2	2	2	2	5
Cap, veh/h	146	1540	17	364	1953	878	64	10	247	71	0	241
Arrive On Green	0.18	0.94	0.94	0.22	0.61	0.61	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1615	3262	36	1641	3195	1436	0	56	1455	0	0	1420
Grp Volume(v), veh/h	122	663	695	10	1009	175	23	0	6	177	0	62
Grp Sat Flow(s),veh/h/ln	1615	1611	1688	1641	1598	1436	56	0	1455	0	0	1420
Q Serve(g_s), s	7.3	13.0	13.1	0.5	17.9	5.4	0.0	0.0	0.3	0.0	0.0	3.8
Cycle Q Clear(g_c), s	7.3	13.0	13.1	0.5	17.9	5.4	17.0	0.0	0.3	17.0	0.0	3.8
Prop In Lane	1.00		0.02	1.00		1.00	0.78		1.00	0.97		1.00
Lane Grp Cap(c), veh/h	146	760	797	364	1953	878	74	0	247	71	0	241
V/C Ratio(X)	0.83	0.87	0.87	0.03	0.52	0.20	0.31	0.00	0.02	2.49	0.00	0.26
Avail Cap(c_a), veh/h	210	953	999	364	1953	878	74	0	247	71	0	241
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.63	0.63	0.63	0.86	0.86	0.86	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.2	1.8	1.8	30.5	11.0	8.6	43.0	0.0	34.6	50.0	0.0	36.0
Incr Delay (d2), s/veh	9.4	8.8	8.5	0.0	0.8	0.4	1.8	0.0	0.0	712.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	2.7	2.7	0.2	5.7	1.6	0.6	0.0	0.1	15.8	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	10.7	10.3	30.5	11.9	9.0	44.8	0.0	34.6	762.1	0.0	36.4
LnGrp LOS	D	B	B	C	B	A	D	A	C	F	A	D
Approach Vol, veh/h		1480			1194			29			239	
Approach Delay, s/veh		13.7			11.6			42.7			573.8	
Approach LOS		B			B			D			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	27.0	52.0		21.0	13.1	65.9		21.0
Change Period (Y+Rc), s	4.8	* 4.8		4.0	4.0	4.8		4.0
Max Green Setting (Gmax), s	11.0	* 59		17.0	13.0	57.2		17.0
Max Q Clear Time (g_c+I1), s	2.5	15.1		19.0	9.3	19.9		19.0
Green Ext Time (p_c), s	0.0	32.1		0.0	0.1	25.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	58.7
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (vph)	89	1096	70	51	851	90	81	110	107	71	56	86
Future Volume (vph)	89	1096	70	51	851	90	81	110	107	71	56	86
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.3		4.5	5.3	4.0	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1599	3129		1614	3167	1362	1581	1555		1568	1636	1398
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.72	1.00		0.40	1.00	1.00
Satd. Flow (perm)	1599	3129		1614	3167	1362	1193	1555		661	1636	1398
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	99	1218	78	57	946	100	90	122	119	79	62	96
RTOR Reduction (vph)	0	4	0	0	0	0	0	33	0	0	0	75
Lane Group Flow (vph)	99	1292	0	57	946	100	90	208	0	79	62	21
Confl. Peds. (#/hr)							2		1	1		2
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	4%	5%	8%	3%	5%	7%	5%	5%	2%	6%	7%	5%
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						Free	8			4		4
Actuated Green, G (s)	9.7	56.0		7.3	53.6	100.0	22.4	22.4		21.9	21.9	21.9
Effective Green, g (s)	9.7	56.0		7.3	53.6	100.0	22.4	22.4		21.9	21.9	21.9
Actuated g/C Ratio	0.10	0.56		0.07	0.54	1.00	0.22	0.22		0.22	0.22	0.22
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	4.5		5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	155	1752		117	1697	1362	267	348		144	358	306
v/s Ratio Prot	c0.06	c0.41		0.04	0.30			c0.13			0.04	
v/s Ratio Perm						c0.07	0.08			0.12		0.02
v/c Ratio	0.64	0.74		0.49	0.56	0.07	0.34	0.60		0.55	0.17	0.07
Uniform Delay, d1	43.5	16.5		44.6	15.4	0.0	32.6	34.8		34.7	31.7	31.0
Progression Factor	1.00	1.00		0.84	1.02	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.9	2.8		1.6	1.2	0.1	0.5	2.3		3.3	0.2	0.1
Delay (s)	50.4	19.3		39.0	16.8	0.1	33.1	37.1		38.0	31.9	31.0
Level of Service	D	B		D	B	A	C	D		D	C	C
Approach Delay (s)		21.5			16.4			36.0			33.6	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	89	1096	70	51	851	90	81	110	107	71	56	86
Future Volume (veh/h)	89	1096	70	51	851	90	81	110	107	71	56	86
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	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	1695	1682	1641	1709	1682	1654	1682	1682	1723	1668	1654	1682
Adj Flow Rate, veh/h	99	1218	78	57	946	0	90	122	119	79	62	96
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	5	8	3	5	7	5	5	2	6	7	5
Cap, veh/h	125	1988	127	72	1980		218	121	118	72	256	220
Arrive On Green	0.08	0.65	0.65	0.09	1.00	0.00	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1615	3045	195	1628	3195	1402	1196	780	761	1101	1654	1420
Grp Volume(v), veh/h	99	638	658	57	946	0	90	0	241	79	62	96
Grp Sat Flow(s),veh/h/ln	1615	1598	1642	1628	1598	1402	1196	0	1541	1101	1654	1420
Q Serve(g_s), s	6.0	23.1	23.2	3.4	0.0	0.0	7.1	0.0	15.5	0.0	3.3	6.1
Cycle Q Clear(g_c), s	6.0	23.1	23.2	3.4	0.0	0.0	10.4	0.0	15.5	15.5	3.3	6.1
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.49	1.00		1.00
Lane Grp Cap(c), veh/h	125	1043	1072	72	1980		218	0	239	72	256	220
V/C Ratio(X)	0.79	0.61	0.61	0.79	0.48		0.41	0.00	1.01	1.10	0.24	0.44
Avail Cap(c_a), veh/h	412	1043	1072	415	1980		218	0	239	72	256	220
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.82	0.82	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	10.0	10.0	45.1	0.0	0.0	41.7	0.0	42.3	50.0	37.1	38.3
Incr Delay (d2), s/veh	6.8	2.7	2.6	9.5	0.7	0.0	0.9	0.0	60.5	135.1	0.4	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	2.6	7.5	7.7	1.5	0.2	0.0	2.1	0.0	9.8	4.5	1.3	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.2	12.7	12.7	54.6	0.7	0.0	42.6	0.0	102.7	185.1	37.4	39.3
LnGrp LOS	D	B	B	D	A		D	A	F	F	D	D
Approach Vol, veh/h		1395			1003	A		331			237	
Approach Delay, s/veh		15.5			3.7			86.4			87.4	
Approach LOS		B			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.9	70.6		20.5	12.2	67.3		20.5
Change Period (Y+Rc), s	4.5	5.3		5.0	4.5	5.3		* 5
Max Green Setting (Gmax), s	25.5	44.7		15.0	25.5	44.7		* 16
Max Q Clear Time (g_c+I1), s	5.4	25.2		17.5	8.0	2.0		17.5
Green Ext Time (p_c), s	0.1	16.5		0.0	0.2	23.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

4: 23rd Avenue & Burger King Driveway

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑	↱		✥	
Traffic Vol, veh/h	0	0	33	16	0	4	85	158	25	7	163	5
Future Vol, veh/h	0	0	33	16	0	4	85	158	25	7	163	5
Conflicting Peds, #/hr	0	0	1	1	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	-	-	-	-	-	-	0	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	3	2	2	2	2	4	2	2	3	2
Mvmt Flow	0	0	37	18	0	4	96	178	28	8	183	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	589	601	188	592	576	178	190	0	0	206	0	0
Stage 1	203	203	-	370	370	-	-	-	-	-	-	-
Stage 2	386	398	-	222	206	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.23	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.327	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	420	414	851	418	428	865	1384	-	-	1365	-	-
Stage 1	799	733	-	650	620	-	-	-	-	-	-	-
Stage 2	637	603	-	780	731	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	393	383	849	376	395	865	1383	-	-	1365	-	-
Mov Cap-2 Maneuver	393	383	-	376	395	-	-	-	-	-	-	-
Stage 1	743	727	-	605	577	-	-	-	-	-	-	-
Stage 2	590	561	-	740	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	14	2.5	0.3
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1383	-	-	849	424	1365	-	-
HCM Lane V/C Ratio	0.069	-	-	0.044	0.053	0.006	-	-
HCM Control Delay (s)	7.8	-	-	9.4	14	7.7	0	-
HCM Lane LOS	A	-	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	0.2	0	-	-

HCM 6th TWSC
5: 23rd Avenue & Davis Street

10/21/2021

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	20	13	21	7	9	45
Future Vol, veh/h	20	13	21	7	9	45
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	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	15	24	8	10	51

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	99	28	0	0	32	0
Stage 1	28	-	-	-	-	-
Stage 2	71	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	900	1047	-	-	1580	-
Stage 1	995	-	-	-	-	-
Stage 2	952	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	894	1047	-	-	1580	-
Mov Cap-2 Maneuver	894	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	945	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	949	1580	-
HCM Lane V/C Ratio	-	-	0.039	0.006	-
HCM Control Delay (s)	-	-	8.9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

HCM Signalized Intersection Capacity Analysis
1: 26th Avenue & Baseline Street

10/21/2021

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (vph)	81	1312	71	197	1833	85	42	10	119	5	18	75
Future Volume (vph)	81	1312	71	197	1833	85	42	10	119	5	18	75
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		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	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)	1630	3231		1614	3260	1422		1574	1437		1553	1458
Flt Permitted	0.07	1.00		0.14	1.00	1.00		0.75	1.00		0.95	1.00
Satd. Flow (perm)	127	3231		235	3260	1422		1228	1437		1488	1458
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)	84	1353	73	203	1890	88	43	10	123	5	19	77
RTOR Reduction (vph)	0	2	0	0	0	14	0	0	112	0	0	70
Lane Group Flow (vph)	84	1424	0	203	1890	74	0	53	11	0	24	7
Confl. Peds. (#/hr)	2					2						
Confl. Bikes (#/hr)			1			1			1			
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	8%	2%	2%	2%	14%	2%
Turn Type	D.P+P	NA		D.P+P	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	6			2		6	8		8	4		4
Actuated Green, G (s)	96.0	83.1		96.0	89.8	89.8		11.2	11.2		11.2	11.2
Effective Green, g (s)	96.0	83.1		96.0	89.8	89.8		11.2	11.2		11.2	11.2
Actuated g/C Ratio	0.80	0.69		0.80	0.75	0.75		0.09	0.09		0.09	0.09
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	179	2237		336	2439	1064		114	134		138	136
v/s Ratio Prot	0.02	c0.44		0.06	c0.58							
v/s Ratio Perm	0.35			0.42		0.05		c0.04	0.01		0.02	0.00
v/c Ratio	0.47	0.64		0.60	0.77	0.07		0.46	0.09		0.17	0.05
Uniform Delay, d1	23.0	10.1		8.1	9.0	4.0		51.6	49.7		50.1	49.6
Progression Factor	0.71	0.54		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	1.1		2.4	2.5	0.1		2.2	0.2		0.4	0.1
Delay (s)	17.2	6.6		10.5	11.5	4.1		53.7	49.9		50.6	49.7
Level of Service	B	A		B	B	A		D	D		D	D
Approach Delay (s)		7.2			11.1			51.1			49.9	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
1: 26th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	81	1312	71	197	1833	85	42	10	119	5	18	75
Future Volume (veh/h)	81	1312	71	197	1833	85	42	10	119	5	18	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1709	1723	1723	1641	1723	1723	1723	1559	1723
Adj Flow Rate, veh/h	84	1353	73	203	1890	88	43	10	123	5	19	77
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	3	2	2	8	2	2	2	14	2
Cap, veh/h	398	2332	126	417	1888	823	154	30	150	53	139	152
Arrive On Green	0.41	1.00	1.00	0.05	0.58	0.58	0.10	0.10	0.10	0.10	0.10	0.10
Sat Flow, veh/h	1641	3154	170	1628	3273	1427	957	287	1439	161	1339	1460
Grp Volume(v), veh/h	84	700	726	203	1890	88	53	0	123	24	0	77
Grp Sat Flow(s),veh/h/ln	1641	1637	1688	1628	1637	1427	1244	0	1439	1499	0	1460
Q Serve(g_s), s	0.0	0.0	0.0	3.6	69.2	3.3	3.8	0.0	10.0	0.0	0.0	6.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.6	69.2	3.3	5.5	0.0	10.0	1.7	0.0	6.0
Prop In Lane	1.00		0.10	1.00		1.00	0.81		1.00	0.21		1.00
Lane Grp Cap(c), veh/h	398	1210	1248	417	1888	823	184	0	150	192	0	152
V/C Ratio(X)	0.21	0.58	0.58	0.49	1.00	0.11	0.29	0.00	0.82	0.12	0.00	0.51
Avail Cap(c_a), veh/h	398	1210	1248	525	1888	823	280	0	252	295	0	255
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.81	0.81	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	0.0	3.0	25.4	11.5	51.0	0.0	52.6	48.9	0.0	50.8
Incr Delay (d2), s/veh	0.1	1.6	1.6	0.5	21.0	0.3	0.6	0.0	8.0	0.2	0.0	1.9
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	1.5	0.6	0.6	0.9	29.6	1.1	1.5	0.0	4.0	0.7	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	1.6	1.6	3.6	46.4	11.7	51.6	0.0	60.6	49.1	0.0	52.8
LnGrp LOS	C	A	A	A	F	B	D	A	E	D	A	D
Approach Vol, veh/h		1510			2181			176			101	
Approach Delay, s/veh		3.1			41.0			57.9			51.9	
Approach LOS		A			D			E			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	93.5		16.5	29.5	74.0		16.5
Change Period (Y+Rc), s	4.0	4.8		4.0	4.8	* 4.8		4.0
Max Green Setting (Gmax), s	14.0	72.2		21.0	17.0	* 69		21.0
Max Q Clear Time (g_c+I1), s	5.6	2.0		8.0	2.0	71.2		12.0
Green Ext Time (p_c), s	0.4	50.5		0.3	0.2	0.0		0.5

Intersection Summary	
HCM 6th Ctrl Delay	27.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
2: 23rd Avenue & Baseline Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (vph)	176	1247	6	7	1634	307	11	3	3	218	3	132
Future Volume (vph)	176	1247	6	7	1634	307	11	3	3	218	3	132
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	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	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	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.95	1.00
Satd. Flow (prot)	1630	3257		1630	3260	1458		1563	1458		1628	1434
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.80	1.00		0.72	1.00
Satd. Flow (perm)	1630	3257		1630	3260	1458		1299	1458		1229	1434
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)	181	1286	6	7	1685	316	11	3	3	225	3	136
RTOR Reduction (vph)	0	0	0	0	0	96	0	0	2	0	0	110
Lane Group Flow (vph)	181	1292	0	7	1685	220	0	14	1	0	228	26
Confl. Peds. (#/hr)			2	2			4					4
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%	33%	2%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	16.8	81.5		2.7	67.4	67.4		23.0	23.0		23.0	23.0
Effective Green, g (s)	16.8	81.5		2.7	67.4	67.4		23.0	23.0		23.0	23.0
Actuated g/C Ratio	0.14	0.68		0.02	0.56	0.56		0.19	0.19		0.19	0.19
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	2.3	4.3		2.3	4.7	4.7		2.5	2.5		2.5	2.5
Lane Grp Cap (vph)	228	2212		36	1831	818		248	279		235	274
v/s Ratio Prot	c0.11	0.40		0.00	c0.52							
v/s Ratio Perm						0.15		0.01	0.00		c0.19	0.02
v/c Ratio	0.79	0.58		0.19	0.92	0.27		0.06	0.00		0.97	0.10
Uniform Delay, d1	49.9	10.2		57.6	23.9	13.6		39.6	39.2		48.2	39.9
Progression Factor	1.30	0.35		0.87	0.65	0.31		1.00	1.00		1.00	1.00
Incremental Delay, d2	12.4	0.8		1.0	6.3	0.5		0.1	0.0		50.1	0.1
Delay (s)	77.1	4.4		51.1	21.8	4.7		39.7	39.2		98.3	40.0
Level of Service	E	A		D	C	A		D	D		F	D
Approach Delay (s)		13.4			19.2			39.6			76.5	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
2: 23rd Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	176	1247	6	7	1634	307	11	3	3	218	3	132
Future Volume (veh/h)	176	1247	6	7	1634	307	11	3	3	218	3	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	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	1723	1723	1723	1723	1723	1723	1627	1723	1723	1723	1300	1723
Adj Flow Rate, veh/h	181	1286	6	7	1685	316	11	3	3	225	3	136
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	9	2	2	2	33	2
Cap, veh/h	204	1532	7	429	1971	878	54	8	242	60	0	242
Arrive On Green	0.25	0.92	0.92	0.52	1.00	1.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1641	3340	16	1641	3273	1458	0	47	1449	0	0	1449
Grp Volume(v), veh/h	181	630	662	7	1685	316	14	0	3	228	0	136
Grp Sat Flow(s),veh/h/ln	1641	1637	1719	1641	1637	1458	47	0	1449	0	0	1449
Q Serve(g_s), s	12.8	16.6	16.6	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	10.4
Cycle Q Clear(g_c), s	12.8	16.6	16.6	0.2	0.0	0.0	20.0	0.0	0.2	20.0	0.0	10.4
Prop In Lane	1.00		0.01	1.00		1.00	0.79		1.00	0.99		1.00
Lane Grp Cap(c), veh/h	204	751	789	429	1971	878	61	0	242	60	0	242
V/C Ratio(X)	0.89	0.84	0.84	0.02	0.86	0.36	0.23	0.00	0.01	3.83	0.00	0.56
Avail Cap(c_a), veh/h	273	1039	1092	429	1971	878	61	0	242	60	0	242
HCM Platoon Ratio	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.65	0.65	0.58	0.58	0.58	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	44.2	3.4	3.4	21.2	0.0	0.0	49.0	0.0	41.8	60.0	0.0	46.0
Incr Delay (d2), s/veh	14.3	7.4	7.1	0.0	3.0	0.7	1.4	0.0	0.0	1311.0	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	3.0	3.1	0.1	0.8	0.2	0.5	0.0	0.1	23.5	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.5	10.8	10.4	21.2	3.0	0.7	50.3	0.0	41.8	1371.0	0.0	48.5
LnGrp LOS	E	B	B	C	A	A	D	A	D	F	A	D
Approach Vol, veh/h		1473			2008			17			364	
Approach Delay, s/veh		16.5			2.7			48.8			876.9	
Approach LOS		B			A			D			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	36.2	59.8		24.0	19.0	77.0		24.0
Change Period (Y+Rc), s	4.8	* 4.8		4.0	4.0	4.8		4.0
Max Green Setting (Gmax), s	11.0	* 76		20.0	20.0	67.2		20.0
Max Q Clear Time (g_c+I1), s	2.2	18.6		22.0	14.8	2.0		22.0
Green Ext Time (p_c), s	0.0	36.4		0.0	0.2	59.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	90.5
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis
3: 20th Avenue & Baseline Street

10/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (vph)	170	1226	83	133	1649	108	78	77	92	80	123	145
Future Volume (vph)	170	1226	83	133	1649	108	78	77	92	80	123	145
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.3		4.5	5.3	4.0	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	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	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1630	3224		1630	3260	1412	1609	1540		1623	1683	1436
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.58	1.00		0.42	1.00	1.00
Satd. Flow (perm)	1630	3224		1630	3260	1412	975	1540		715	1683	1436
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)	175	1264	86	137	1700	111	80	79	95	82	127	149
RTOR Reduction (vph)	0	4	0	0	0	0	0	35	0	0	0	127
Lane Group Flow (vph)	175	1346	0	137	1700	111	80	139	0	82	127	22
Confl. Peds. (#/hr)	4		1	1		4	4		6	6		4
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	3%	3%	5%	2%	2%	4%	2%
Turn Type	Prot	NA		Prot	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						Free	8			4		4
Actuated Green, G (s)	17.5	72.5		14.7	69.7	120.0	18.5	18.5		18.0	18.0	18.0
Effective Green, g (s)	17.5	72.5		14.7	69.7	120.0	18.5	18.5		18.0	18.0	18.0
Actuated g/C Ratio	0.15	0.60		0.12	0.58	1.00	0.15	0.15		0.15	0.15	0.15
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	4.5		5.0	5.0	5.0
Vehicle Extension (s)	2.3	4.7		2.3	4.7		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	237	1947		199	1893	1412	150	237		107	252	215
v/s Ratio Prot	c0.11	0.42		0.08	c0.52			0.09			0.08	
v/s Ratio Perm						c0.08	0.08			c0.11		0.02
v/c Ratio	0.74	0.69		0.69	0.90	0.08	0.53	0.59		0.77	0.50	0.10
Uniform Delay, d1	49.1	16.1		50.5	22.0	0.0	46.8	47.2		49.0	46.9	44.0
Progression Factor	1.00	1.00		0.67	1.16	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.4	2.0		4.7	4.2	0.1	2.8	3.1		26.3	1.2	0.2
Delay (s)	59.5	18.2		38.4	29.7	0.1	49.6	50.3		75.3	48.1	44.2
Level of Service	E	B		D	C	A	D	D		E	D	D
Approach Delay (s)		22.9			28.6			50.1			52.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰	↑	↱
Traffic Volume (veh/h)	170	1226	83	133	1649	108	78	77	92	80	123	145
Future Volume (veh/h)	170	1226	83	133	1649	108	78	77	92	80	123	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	0.99		0.98	0.99		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	1723	1723	1723	1723	1723	1709	1709	1682	1723	1723	1695	1723
Adj Flow Rate, veh/h	175	1264	86	137	1700	0	80	79	95	82	127	149
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	3	3	5	2	2	4	2
Cap, veh/h	203	2066	140	162	2095		104	77	93	60	191	162
Arrive On Green	0.12	0.67	0.67	0.20	1.00	0.00	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1641	3105	211	1641	3273	1448	1087	689	828	1203	1695	1437
Grp Volume(v), veh/h	175	665	685	137	1700	0	80	0	174	82	127	149
Grp Sat Flow(s),veh/h/ln	1641	1637	1679	1641	1637	1448	1087	0	1517	1203	1695	1437
Q Serve(g_s), s	12.6	27.5	27.7	9.7	0.0	0.0	4.9	0.0	13.5	0.0	8.6	12.3
Cycle Q Clear(g_c), s	12.6	27.5	27.7	9.7	0.0	0.0	13.5	0.0	13.5	13.5	8.6	12.3
Prop In Lane	1.00		0.13	1.00		1.00	1.00		0.55	1.00		1.00
Lane Grp Cap(c), veh/h	203	1089	1117	162	2095		104	0	171	60	191	162
V/C Ratio(X)	0.86	0.61	0.61	0.85	0.81		0.77	0.00	1.02	1.37	0.67	0.92
Avail Cap(c_a), veh/h	349	1089	1117	349	2095		104	0	171	60	191	162
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.36	0.36	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	11.3	11.3	47.3	0.0	0.0	58.7	0.0	53.3	60.0	51.1	52.7
Incr Delay (d2), s/veh	6.6	2.6	2.5	2.8	1.3	0.0	27.6	0.0	74.1	241.4	7.8	48.2
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	5.4	9.5	9.8	3.6	0.4	0.0	3.2	0.0	8.6	5.8	4.1	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.2	13.9	13.9	50.1	1.3	0.0	86.3	0.0	127.4	301.4	58.9	100.9
LnGrp LOS	E	B	B	D	A		F	A	F	F	E	F
Approach Vol, veh/h		1525			1837	A		254			358	
Approach Delay, s/veh		18.9			4.9			114.4			131.9	
Approach LOS		B			A			F			F	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	16.3	85.2		18.5	19.4	82.1		18.5
Change Period (Y+Rc), s	4.5	5.3		5.0	4.5	5.3		* 5
Max Green Setting (Gmax), s	25.5	66.7		13.0	25.5	66.7		* 14
Max Q Clear Time (g_c+I1), s	11.7	29.7		15.5	14.6	2.0		15.5
Green Ext Time (p_c), s	0.3	29.3		0.0	0.4	55.5		0.0

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑	↱		✥	
Traffic Vol, veh/h	4	0	82	23	0	5	158	300	27	5	259	25
Future Vol, veh/h	4	0	82	23	0	5	158	300	27	5	259	25
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	87	24	0	5	168	319	29	5	276	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	974	986	292	998	970	319	305	0	0	348	0	0
Stage 1	302	302	-	655	655	-	-	-	-	-	-	-
Stage 2	672	684	-	343	315	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	231	248	747	223	253	722	1256	-	-	1211	-	-
Stage 1	707	664	-	455	463	-	-	-	-	-	-	-
Stage 2	445	449	-	672	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	205	213	746	176	218	722	1254	-	-	1211	-	-
Mov Cap-2 Maneuver	205	213	-	176	218	-	-	-	-	-	-	-
Stage 1	611	659	-	394	401	-	-	-	-	-	-	-
Stage 2	383	389	-	590	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.3	25.8	2.7	0.1
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1254	-	-	664	203	1211	-	-
HCM Lane V/C Ratio	0.134	-	-	0.138	0.147	0.004	-	-
HCM Control Delay (s)	8.3	-	-	11.3	25.8	8	0	-
HCM Lane LOS	A	-	-	B	D	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.5	0.5	0	-	-

5: 23rd Avenue & Davis Street

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	10	10	97	14	12	92
Future Vol, veh/h	10	10	97	14	12	92
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	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	11	103	15	13	98

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	235	111	0	0	118	0
Stage 1	111	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	753	942	-	-	1470	-
Stage 1	914	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	746	942	-	-	1470	-
Mov Cap-2 Maneuver	746	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	894	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	833	1470	-
HCM Lane V/C Ratio	-	-	0.026	0.009	-
HCM Control Delay (s)	-	-	9.4	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Appendix E

Queueing Reports

Intersection: 1: 26th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	54	318	340	122	249	304	67	311	79	122	59
Average Queue (ft)	13	92	99	46	76	95	8	110	64	42	17
95th Queue (ft)	38	224	243	95	181	219	44	240	91	93	45
Link Distance (ft)		873	873		3124	3124		1770		1582	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315			250			200		50		90
Storage Blk Time (%)		0			0	2		20	19	2	0
Queuing Penalty (veh)		0			0	1		34	15	1	0

Intersection: 2: Fred Meyer Driveway & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	154	230	268	53	237	228	62	69	37	130	49
Average Queue (ft)	61	51	62	10	72	82	15	20	6	57	13
95th Queue (ft)	122	155	175	35	167	181	45	54	28	111	40
Link Distance (ft)		824	824		873	873		339	339	179	179
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)	290			185			200				
Storage Blk Time (%)		0			0	0					
Queuing Penalty (veh)		0			0	0					

Intersection: 3: 20th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	245	338	318	103	310	296	136	163	240	103	106	100
Average Queue (ft)	69	149	124	36	105	115	6	59	102	40	35	40
95th Queue (ft)	155	266	254	81	228	239	74	120	199	88	83	76
Link Distance (ft)		1061	1061		824	824			1506		596	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			200			180	100		160		130
Storage Blk Time (%)	0	4			2	3		3	12		0	0
Queuing Penalty (veh)	0	3			1	2		5	8		0	0

Intersection: 4: Fred Meyer Driveway & Burger King Driveway

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	48	50
Average Queue (ft)	21	6
95th Queue (ft)	47	30
Link Distance (ft)	338	179
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: 23rd Avenue & Davis Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 70

Queuing and Blocking Report
Weekday PM Peak Hour - 2021 Existing Conditions

10/21/2021

Intersection: 1: 26th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	135	241	281	335	686	704	325	189	79	103	111
Average Queue (ft)	51	61	72	82	231	264	40	60	51	13	45
95th Queue (ft)	112	168	193	195	504	537	189	146	88	57	88
Link Distance (ft)		873	873		3124	3124		1770		1582	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315			250			200		50		90
Storage Blk Time (%)		0		0	6	11		15	8	1	2
Queuing Penalty (veh)		0		0	8	9		13	3	1	0

Intersection: 2: 23rd Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	373	591	571	83	561	585	329	71	31	194	187
Average Queue (ft)	142	137	152	11	184	195	61	15	3	127	79
95th Queue (ft)	280	421	427	50	427	445	225	50	17	206	173
Link Distance (ft)		824	824		873	873		339	339	179	179
Upstream Blk Time (%)		0	0							6	2
Queuing Penalty (veh)		0	0							8	3
Storage Bay Dist (ft)	290			185			200				
Storage Blk Time (%)	0	3			8	7					
Queuing Penalty (veh)	2	5			1	16					

Intersection: 3: 20th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	279	514	467	364	775	799	315	166	294	154	253	200
Average Queue (ft)	170	244	202	142	425	442	61	77	104	40	94	87
95th Queue (ft)	286	441	397	319	759	786	263	153	224	103	190	161
Link Distance (ft)		1061	1061		824	824			1506		596	
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	1						
Storage Bay Dist (ft)	180			200			180	100		160		130
Storage Blk Time (%)	11	11		1	22	25		12	16	0	7	4
Queuing Penalty (veh)	66	17		11	19	19		15	11	0	13	5

Intersection: 4: 23rd Avenue & Burger King Driveway

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	67	94	9	145
Average Queue (ft)	33	29	0	16
95th Queue (ft)	55	73	7	86
Link Distance (ft)	338	179	179	635
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: 23rd Avenue & Davis Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 245

Queuing and Blocking Report
Weekday AM Peak Hour - 2023 Without Project Conditions

10/21/2021

Intersection: 1: 26th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	102	472	487	212	322	377	134	404	79	117	61
Average Queue (ft)	16	149	162	63	103	131	13	174	71	43	19
95th Queue (ft)	68	347	376	145	239	280	79	332	84	97	46
Link Distance (ft)		873	873		3124	3124		1770		1582	
Upstream Blk Time (%)		0	0								
Queuing Penalty (veh)		0	0								
Storage Bay Dist (ft)	315			250			200		50		90
Storage Blk Time (%)		1		0	1	3		27	28	3	0
Queuing Penalty (veh)		0		1	1	1		62	30	1	0

Intersection: 2: Fred Meyer Driveway & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	251	332	368	55	331	371	131	72	35	146	73
Average Queue (ft)	66	60	74	12	91	107	16	20	6	60	16
95th Queue (ft)	156	199	217	39	225	250	75	57	28	119	49
Link Distance (ft)		824	824		873	873		339	339	179	179
Upstream Blk Time (%)										0	0
Queuing Penalty (veh)										0	0
Storage Bay Dist (ft)	290			185			200				
Storage Blk Time (%)		1			1	2					
Queuing Penalty (veh)		1			0	2					

Intersection: 3: 20th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	204	384	361	136	340	356	144	169	317	156	122	105
Average Queue (ft)	70	181	158	47	140	152	12	80	142	63	45	43
95th Queue (ft)	147	322	295	107	285	293	107	158	267	129	99	82
Link Distance (ft)		1061	1061		824	824			1506		596	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			200			180	100		160		130
Storage Blk Time (%)	0	7			4	6		6	21	1	1	0
Queuing Penalty (veh)	2	6			2	6		13	17	1	1	0

Intersection: 4: Fred Meyer Driveway & Burger King Driveway

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	45	59	7
Average Queue (ft)	21	8	0
95th Queue (ft)	47	35	6
Link Distance (ft)	338	179	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: 23rd Avenue & Davis Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 146

Intersection: 1: 26th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	176	338	300	361	752	1007	325	248	77	120	128
Average Queue (ft)	59	88	102	146	320	362	65	85	57	30	48
95th Queue (ft)	133	235	241	321	620	764	255	194	91	82	100
Link Distance (ft)		873	873		3124	3124		1770		1582	
Upstream Blk Time (%)		0				0					
Queuing Penalty (veh)		0				0					
Storage Bay Dist (ft)	315			250			200		50		90
Storage Blk Time (%)		0		1	10	17		19	14	1	3
Queuing Penalty (veh)		0		9	20	14		23	8	1	1

Intersection: 2: 23rd Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	392	696	702	97	715	736	330	65	30	197	179
Average Queue (ft)	159	140	158	12	258	275	81	18	4	133	84
95th Queue (ft)	298	459	464	58	588	620	276	53	22	206	176
Link Distance (ft)		824	824		873	873		339	339	179	179
Upstream Blk Time (%)		0	0		0	0				7	2
Queuing Penalty (veh)		1	0		0	0				10	3
Storage Bay Dist (ft)	290			185			200				
Storage Blk Time (%)	0	4			14	14					
Queuing Penalty (veh)	1	6			1	31					

Intersection: 3: 20th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	280	613	570	365	808	819	315	170	490	211	365	219
Average Queue (ft)	186	309	264	200	531	544	106	102	190	88	137	98
95th Queue (ft)	306	538	483	384	843	865	348	188	409	188	297	194
Link Distance (ft)		1061	1061		824	824			1506		596	
Upstream Blk Time (%)					0	1					0	
Queuing Penalty (veh)					2	5					0	
Storage Bay Dist (ft)	180			200			180	100		160		130
Storage Blk Time (%)	14	16		5	27	30		24	33	3	16	6
Queuing Penalty (veh)	82	27		45	35	33		39	26	8	35	12

Intersection: 4: 23rd Avenue & Burger King Driveway

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	79	84	150
Average Queue (ft)	35	27	20
95th Queue (ft)	60	65	105
Link Distance (ft)	338	179	635
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: 23rd Avenue & Davis Street

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 476

Intersection: 1: 26th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	99	477	506	179	299	355	114	445	84	133	79
Average Queue (ft)	16	158	171	59	116	149	11	187	72	42	18
95th Queue (ft)	67	350	382	122	245	290	62	356	87	102	50
Link Distance (ft)		873	873		3124	3124		1770		1582	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315			250			200		50		90
Storage Blk Time (%)		2			1	5		27	33	3	0
Queuing Penalty (veh)		0			1	2		61	35	1	0

Intersection: 2: 23rd Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	233	454	450	83	313	356	256	64	35	182	161
Average Queue (ft)	90	95	113	13	112	129	36	19	5	106	34
95th Queue (ft)	183	283	295	53	237	265	126	53	24	178	96
Link Distance (ft)		824	824		873	873		339	339	172	172
Upstream Blk Time (%)		0	0							3	0
Queuing Penalty (veh)		0	0							3	0
Storage Bay Dist (ft)	290			185			200				
Storage Blk Time (%)		1			3	3					
Queuing Penalty (veh)		2			0	5					

Intersection: 3: 20th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	221	360	332	139	340	347	183	169	326	134	122	92
Average Queue (ft)	69	172	145	48	141	152	9	73	147	55	43	41
95th Queue (ft)	150	297	273	107	285	298	90	152	286	112	98	78
Link Distance (ft)		1061	1061		824	824			1506		596	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	180			200			180	100		160		130
Storage Blk Time (%)	0	6			4	7		5	21	0	0	0
Queuing Penalty (veh)	2	6			2	6		11	17	0	0	0

Intersection: 4: 23rd Avenue & Burger King Driveway

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	T	LTR
Maximum Queue (ft)	53	38	60	19	72
Average Queue (ft)	22	13	13	1	8
95th Queue (ft)	51	35	44	13	50
Link Distance (ft)	339	532	172	172	642
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 5: 23rd Avenue & Davis Street

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	52	17
Average Queue (ft)	22	1
95th Queue (ft)	52	8
Link Distance (ft)	620	1245
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 154

Queuing and Blocking Report
Weekday PM Peak Hour - 2023 With Project Conditions

10/21/2021

Intersection: 1: 26th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	172	299	341	370	895	935	325	215	76	132	139
Average Queue (ft)	60	95	119	165	371	412	59	79	59	28	47
95th Queue (ft)	128	226	272	352	744	780	242	174	90	86	100
Link Distance (ft)		873	873		3124	3124		1770		1582	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	315			250			200		50		90
Storage Blk Time (%)		0		0	13	20		17	15	2	2
Queuing Penalty (veh)		0		2	26	17		21	8	2	1

Intersection: 2: 23rd Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	LT	R	LT	R
Maximum Queue (ft)	400	686	688	92	801	807	330	68	24	211	193
Average Queue (ft)	207	171	171	9	354	372	140	16	2	172	134
95th Queue (ft)	373	483	472	56	753	785	366	51	16	217	224
Link Distance (ft)		824	824		873	873		339	339	172	172
Upstream Blk Time (%)		0	0		0	0				37	12
Queuing Penalty (veh)		1	1		2	2				67	23
Storage Bay Dist (ft)	290			185			200				
Storage Blk Time (%)	7	3			21	21	0				
Queuing Penalty (veh)	42	6			1	65	0				

Intersection: 3: 20th Avenue & Baseline Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	TR	L	T	R
Maximum Queue (ft)	280	714	662	365	808	820	315	170	553	210	388	220
Average Queue (ft)	201	355	301	223	543	559	114	109	231	84	146	109
95th Queue (ft)	317	636	582	411	827	851	360	200	495	178	291	199
Link Distance (ft)		1061	1061		824	824			1506		596	
Upstream Blk Time (%)		0			0	1						
Queuing Penalty (veh)		0			3	6						
Storage Bay Dist (ft)	180			200			180	100		160		130
Storage Blk Time (%)	21	16		7	30	33		25	38	4	16	7
Queuing Penalty (veh)	130	27		57	40	35		42	29	10	36	14

Intersection: 4: 23rd Avenue & Burger King Driveway

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	T	LTR
Maximum Queue (ft)	104	147	117	55	379
Average Queue (ft)	43	50	32	2	157
95th Queue (ft)	85	150	82	29	371
Link Distance (ft)	339	532	172	172	642
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (ft)					
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 5: 23rd Avenue & Davis Street

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	42	36
Average Queue (ft)	19	2
95th Queue (ft)	47	18
Link Distance (ft)	620	1245
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 715

Appendix F

Turn Lane Evaluation

2023 With Project Conditions at 23rd Avenue / Davis Street (Southbound Left Turn Lane)

Left Turn Lane Evaluation Process

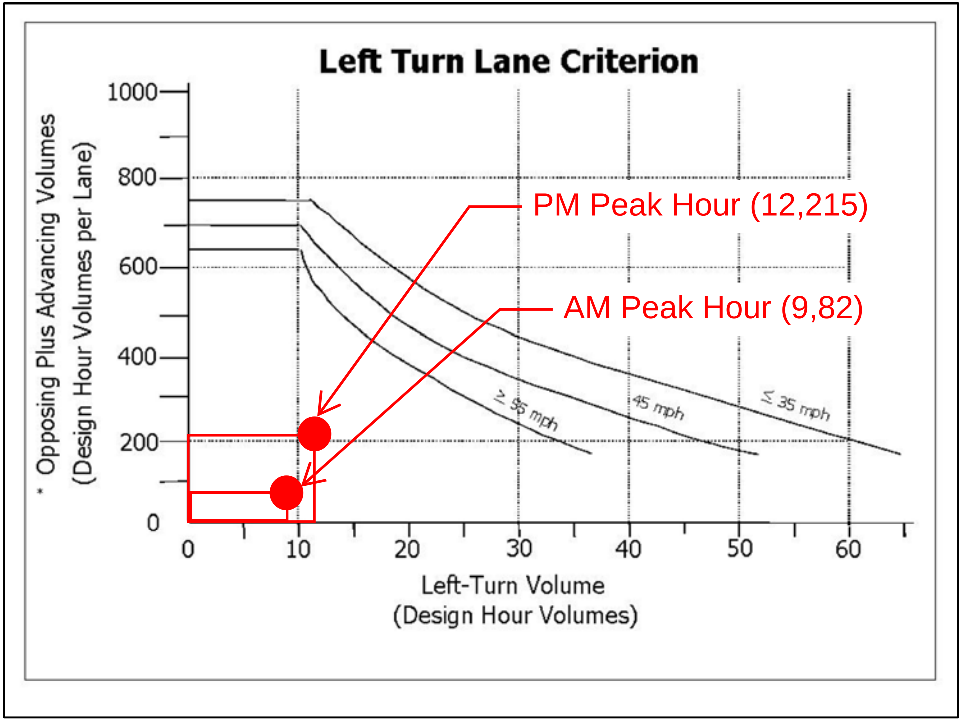
- A left turn lane should be installed, if criterion 1 (Volume) or 2 (Crash) or 3 (Special Cases) are met, unless a subsequent evaluation eliminate it as an option; and
- The Region Traffic Engineer must approve all proposed left turn lanes on state highways, regardless of funding source; and
- Left turn lane complies with Access Management Spacing Standards; and
- Left turn lane conforms to applicable local, regional and state plans.

Criterion 1: Vehicular Volume

The vehicular volume criterion is intended for application where the volume of intersecting traffic is the principal reason for considering installation of a left turn lane. The volume criterion is determined by the Texas Transportation Institute (TTI) curves in Exhibit 12-1.

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

Exhibit 12-1 Left Turn Lane Criterion (TTI)

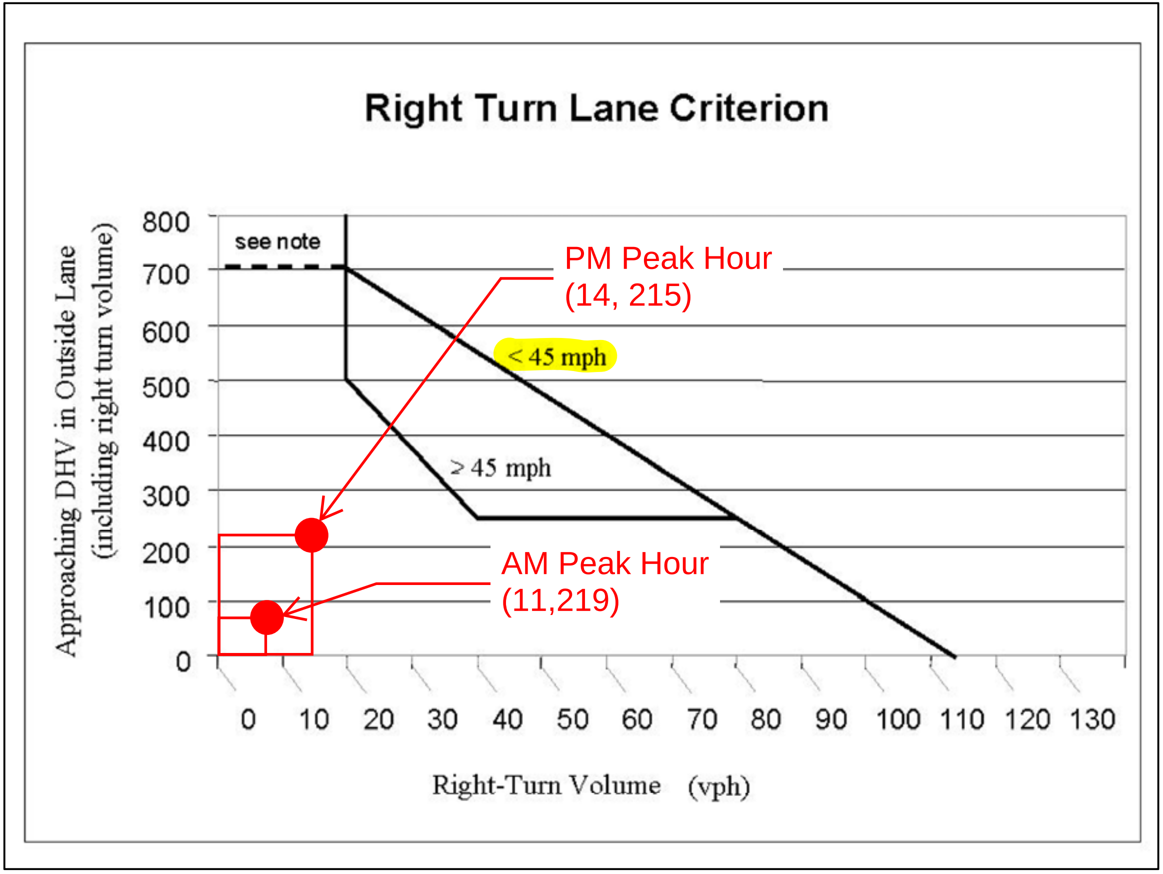


*(Advancing Volume/Number of Advancing Through Lanes) + (Opposing Volume/Number of Opposing Through Lanes)
Opposing left turns are not counted as opposing volumes

2023 With Project Conditions at 23rd Avenue / Davis Street

(Northbound Right Turn Lane)

Exhibit 12-2 Right Turn Lane Criterion



Note: If there is no right turn lane, a shoulder needs to be provided. If this intersection is in a rural area and is a connection to a public street, a right turn lane is needed.

Criterion 2: Crash Experience

The crash experience criterion is satisfied when:

1. Adequate trial of other remedies with satisfactory observance and enforcement has failed to reduce the accident frequency; **and**
2. A history of crashes of the type susceptible to correction by a right turn lane; **and**
3. The safety benefits outweigh the associated improvements costs; **and**
4. The installation of the right turn lane minimizes impacts to the safety of vehicles, bicycles or pedestrians along the roadway.

Criterion 3: Special Cases

1. **Railroad Crossings**: If a railroad is parallel to the roadway and adversely affects right turns, a worst case scenario should be used in determining the storage requirements for the right turn lane design. The right turn lane storage length depends on the amount of time the roadway is closed, the expected number of vehicle arrivals and the location of the crossing or other obstruction. The analysis should consider all of the variables influencing the design of the right turn lane and may allow a design for conditions other than the worst case storage requirements, providing safety is not

Appendix G

Collision Rate Calculations and Data

Collision Rate Calculations at
N 26th Avenue / E Baseline Street

Intersection:	N 26th Avenue / E Baseline Street	Date	10/21/2021

Ra =	System Wide Average collision rate =	0.6
K =	Statistical Constant =	1.645
Average Daily cars passing Through intersection		
	ADT	13060
		18840
		1250
		800
M=	Millions of Vehicles for a five year period =	**61.95875**
Rc=	Critical Rate =	**0.75**

Collision Rate

Number of collisions =	31
Number of years =	5
Collision Rate =	**0.50**

Rc= Ra+(K*Ra/M)^.5)-1/(2*M)

ADT = 2021 PM Count X 10
PM Peak Hour= Approx. 10% ADT

Collision Rate Calculations at
N 23rd Avenue / E Baseline Street

Intersection:	N 23rd Avenue / E Baseline Street	Date 10/21/2021
Ra =	System Wide Average collision rate =	0.6
K =	Statistical Constant =	1.645
Average Daily cars passing Through intersection		
	ADT	13050
		17710
		170
		2450
M=	Millions of Vehicles for a five year period =	**60.9185**
Rc=	Critical Rate =	**0.76**

Collision Rate

Number of collisions =	5
Number of years =	5
Collision Rate =	**0.08**

Rc= Ra+(K*Ra/M)^.5)-1/(2*M)

ADT = 2021 PM Count X 10
PM Peak Hour= Approx. 10% ADT

PBS Engineering and Environmental Inc.
74217.000

Collision Rate Calculations at
N 20th Avenue / E Baseline Street

Intersection: N 20th Avenue / E Baseline Street Date 10/21/2021

Ra = System Wide Average collision rate = 0.6
K = Statistical Constant = 1.645
Average Daily cars passing Through intersection
ADT 13900
17560
1870
2710
M= Millions of Vehicles for a five year period = **65.773**

Rc= Critical Rate = **0.75**

Collision Rate

Number of collisions = 18
Number of years = 5

Collision Rate = **0.27**

Rc= Ra+(K*Ra/M)^.5)-1/(2*M)

ADT = 2021 PM Count X 10
PM Peak Hour= Approx. 10% ADT

Highway 029
ALL ROAD TYPES, MP 15.71 to 15.73, Both Add and Non-Add mileage, 01/01/2015 to 12/31/2019

N 26th Avenue / E Baseline Street (OR 8)

CRASH_ID	SER_NO	INVSTG_AGY_SHORT_DESC	CRASH_DT	CNTY_NM	CITY_SECT_NM	URB_AREA_SHORT_NM	HWY_NO	HWY_MED_NM	LRS VAL	MP_NO	ST_NO	ST_NM	ISECT_ST_NO	ISECT_ST_NM	RD_CHAR_CD	RD_CHAR_SHORT_DESC	ISECT_TYP_SHORT_DESC	TRAF_CNTL_DEVICE_SHORT_DESC	WTHR_COND_SHORT_DESC	RD_SURF_SHORT_DESC	LGT_COND_SHORT_DESC	CRASH_TYP_SHORT_DESC	COLLIS_TYP_SHORT_DESC	CRASH_SVRTY_SHORT_DESC	VHCL_TYP_SHORT_DESC	VHCL_OWNSHP_SHORT_DESC	VHCL_MVMNT_SHORT_DESC	VHCL_CMPSS_DIR_FROM_SHORT_DESC	VHCL_CMPSS_DIR_TO_SHORT_DESC	PARTIC_TYP_SHORT_DESC	PARTIC_MVMNT_SHORT_DESC	PARTIC_CMPSS_DIR_FROM_SHORT_DESC	PARTIC_CMPSS_DIR_TO_SHORT_DESC	INJ_SVRTY_SHORT_DESC
1829391	01126	COUNTY	3/5/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				NONE
1829391	01126	COUNTY	3/5/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	E	W	DRVR				INJC
1829391	01126	COUNTY	3/5/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	E	W	PSNG				INJC
1829391	01126	COUNTY	3/5/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	E	W	PSNG				INJC
1605313	01080	CITY	2/27/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DLIT	PED	PED	INJ	PSNGR CAR	PRVTE	TURN-L	E	S	DRVR				NONE
1605313	01080	CITY	2/27/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DLIT	PED	PED	INJ						PED	STRGHT	E	W	INJA
1733905	04770	CITY	8/5/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-STP	TURN	INJ	PSNGR CAR	PRVTE	TURN-R	W	S	DRVR				NONE
1733905	04770	CITY	8/5/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-STP	TURN	INJ	PSNGR CAR	PRVTE	STOP	S	N	DRVR				INJC
1821884	05746	CITY	10/26/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DAY	S-STRGHT	REAR	PDO	PSNGR CAR	N/A	STRGHT	E	W	DRVR				NONE
1821884	05746	CITY	10/26/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DAY	S-STRGHT	REAR	PDO	PSNGR CAR	N/A	STRGHT	E	W	DRVR				NONE
1823671	07233	CITY	12/31/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	PDO	PSNGR CAR	N/A	STRGHT	W	E	DRVR				NONE
1823671	07233	CITY	12/31/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	PDO	PSNGR CAR	N/A	STOP	W	E	DRVR				NONE
1858045	03036	NONE	6/14/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	PDO	PSNGR CAR	N/A	STRGHT	W	E	DRVR				NONE
1858045	03036	NONE	6/14/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	PDO	PSNGR CAR	N/A	STOP	W	E	DRVR				NONE
1606479	01640	CITY	3/29/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	N	S	DRVR				INJC
1606479	01640	CITY	3/29/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	S	W	DRVR				INJC
1760334	05018	COUNTY	8/16/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	PDO	PSNGR CAR	N/A	TURN-R	N	W	DRVR				NONE
1760334	05018	COUNTY	8/16/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	PDO	TRUCK	N/A	STRGHT	E	W	DRVR				NONE
1802819	06259	CITY	11/18/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-R	N	W	DRVR				NONE
1802819	06259	CITY	11/18/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1802819	06259	CITY	11/18/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1802819	06259	CITY	11/18/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1802819	06259	CITY	11/18/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1604836	00826	NO RPT	2/13/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				NONE
1604836	00826	NO RPT	2/13/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	S	W	DRVR				INJC
1728286	01665	CITY	3/24/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1728286	01665	CITY	3/24/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1728286	01665	CITY	3/24/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	PRVTE	STRGHT	S	N	DRVR				INJC
1732572	04134	CITY	7/9/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	W	N	DRVR				INJC
1732572	04134	CITY	7/9/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJB
1738071	07698	CITY	12/3/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1738071	07698	CITY	12/3/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJB
1738071	07698	CITY	12/3/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	W	N	DRVR				INJC
1829164	00476	CITY	1/29/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				NONE
1829164	00476	CITY	1/29/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	S	W	DRVR				INJC
1830113	02761	CITY	6/1/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1830113	02761	CITY	6/1/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1830113	02761	CITY	6/1/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1830113	02761	CITY	6/1/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1830113	02761	CITY	6/1/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	W	N	DRVR				NONE
1867020	06706	CITY	12/17/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	FOG	WET	DLIT	O-1 L-TURN	TURN	PDO	PSNGR CAR	N/A	STRGHT	E	W	DRVR				NONE
1867020	06706	CITY	12/17/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	FOG	WET	DLIT	O-1 L-TURN	TURN	PDO	PSNGR CAR	N/A	TURN-L	W	N	DRVR				NONE
1656897	00304	COUNTY	1/12/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	W	E	DRVR				INJC
1656897	00304	COUNTY	1/12/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	E	S	DRVR				NONE
1656897	00304	COUNTY	1/12/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STOP	S	N	DRVR				NONE
1796107	03504	CITY	7/9/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	W	E	DRVR				INJC
1796107	03504	CITY	7/9/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	E	S	DRVR				NONE
1833056	04980	CITY	9/28/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DUSK	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	N	E	DRVR				NONE
1833056	04980	CITY	9/28/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DUSK	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	S	N	DRVR				INJC
1833056	04980	CITY	9/28/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DUSK	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	S	N	PSNG				INJC
1604734	00763	COUNTY	2/11/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.73	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	W	E	DRVR				NONE
1604734	00763	COUNTY	2/11/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.73	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	W	E	DRVR				INJC
1604734	00763	COUNTY	2/11/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.73	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	W	E	PSNG				INJC
1604734	00763	COUNTY	2/11/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.73	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	W	E	DRVR				NONE
1604734	00763	COUNTY	2/11/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.73	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	W	E	DRVR				NONE
1612338	04345	NONE	8/1/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	N	S	DRVR				NONE
1612338	04345	NONE	8/1/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	N	S	DRVR				INJC
1668317	03625	CITY	6/3/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				NONE
1668317	03625	CITY	6/3/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	RENTL	STOP	E	W	DRVR				INJC
1668317	03625	CITY	6/3/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	RENTL	STOP	E	W	PSNG				NO<5
1670988	04739	COUNTY	7/19/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-STRGHT	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJB
1670988	04739	COUNTY	7/19/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-STRGHT	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	PSNG				INJC
1670988	04739	COUNTY	7/19/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-STRGHT	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1670988	04739	COUNTY	7/19/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	S-STRGHT	REAR	INJ	PSNGR CAR	PRVTE	STOP	E	W	DRVR				NONE
1678912	07528	CITY	11/3/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1678912	07528	CITY	11/3/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	E	W	DRVR				NONE
1689376	00998	NONE	2/12/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	S-1STOP	REAR	PDO	PSNGR CAR	N/A	STRGHT	E	W	DRVR				NONE
1689376	00998	NONE	2/12/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	S-1STOP	REAR	PDO	PSNGR CAR	N/A	STOP	E	W	DRVR				NONE
1615618	05928	NONE	10/9/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	UNK	UNK	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STRGHT	S	N	DRVR				NONE
1615618	05928	NONE	10/9/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	UNK	UNK	S-1STOP	REAR	INJ	PSNGR CAR	PRVTE	STOP	S	N	DRVR				INJC
1680224	08177	CITY	11/29/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DLIT	PED	PED	INJ	PSNGR CAR	PRVTE	TURN-R	N	W	DRVR				NONE
1680224	08177	CITY	11/29/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	DRY	DLIT	PED	PED	INJ						PED	STRGHT	N	S	INJB
1608777	02723	CITY	5/19/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJA
1608777	02723	CITY	5/19/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	W	N	DRVR				INJA
1620363	07766	CITY	12/16/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	E	W	DRVR				INJC
1620363	07766	CITY	12/16/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	W	N	DRVR				INJC
1679628	07951	CITY	11/21/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DLIT	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	N	E	DRVR				INJC
1679628	07951	CITY	11/21/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DLIT	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	N	E	PSNG				INJC
1679628	07951	CITY	11/21/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	00201	BASELINE ST	05526	S 26TH AVE	1	INTER	CROSS	TRF SIGNAL	CLD	WET	DLIT	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	W	E	DRVR				NONE
1616781	06389	CITY	10/29/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	STRGHT	W	E	DRVR				INJC
1616781	06389	CITY	10/29/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	S	W	DRVR				INJC
1616781	06389	CITY	10/29/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.72	02301	SW TUALATIN VALLEY HY	05026	N 26TH AVE	1	INTER	CROSS	TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	PRVTE	TURN-L	S	W	PSNG				INJC

Highway 029
ALL ROAD TYPES, MP 15.89 to 15.91, Both Add and Non-Add mileage, 01/01/2015 to 12/31/2019

Collision Data

N 23rd Avenue / E Baseline Street (OR 8)

CRASH_ID	SER_NO	INVSTG_AGY_SHORT_DESC	CRASH_DT	CNTY_NM	CITY_SECT_NM	URB_AREA_SHORT_NM	HWY_NO	HWY_MED_NM	LRS VAL	MP_NO	ST_NO	ST_NM	ISECT_ST_NO	ISECT_ST_NM	RD_CHAR_CD	RD_CHAR_SHORT_DESC	ISECT_TYP_SHORT_DESC	TRAF_CNTL_DEVICE_SHORT_DESC	WTHR_COND_SHORT_DESC	RD_SURF_SHORT_DESC	LGT_COND_SHORT_DESC	CRASH_TYP_SHORT_DESC	COLLIS_TYP_SHORT_DESC	CRASH_SVRTY_SHORT_DESC	VHCL_TYP_SHORT_DESC	VHCL_USE_SHORT_DESC	TRLR_QTY	VHCL_OWNSHP_SHORT_DESC	VHCL_MVMNT_SHORT_DESC	VHCL_CMPSS_DIR_FROM_SHORT_DESC	VHCL_CMPSS_DIR_TO_SHORT_DESC	PARTIC_TYP_SHORT_DESC	PARTIC_MVMNT_SHORT_DESC	PARTIC_CMPSS_DIR_FROM_SHORT_DESC	PARTIC_CMPSS_DIR_TO_SHORT_DESC	INJ_SVRTY_SHORT_DESC
1661075	01056	CITY	2/16/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	4-LEG	TRF SIGNAL	RAIN	WET	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	DRVR				INJC
1661075	01056	CITY	2/16/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	4-LEG	TRF SIGNAL	RAIN	WET	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-L	W	N	DRVR				NONE
1679877	07983	CITY	11/19/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLD	DRY	DAY	PED	PED	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-L	W	N	DRVR				NONE
1679877	07983	CITY	11/19/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLD	DRY	DAY	PED	PED	INJ								PED	STRGHT	E	W	INJC
1678661	07467	CITY	10/30/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER		TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	DRVR				INJC
1678661	07467	CITY	10/30/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER		TRF SIGNAL	RAIN	WET	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	N	S	DRVR				NONE
1604323	00572	COUNTY	2/1/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLD	WET	DLIT	S-1TURN	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	N	S	DRVR				NONE
1604323	00572	COUNTY	2/1/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLD	WET	DLIT	S-1TURN	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	N	E	DRVR				INJC
1604323	00572	COUNTY	2/1/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLD	WET	DLIT	S-1TURN	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	N	E	PSNG				INJC
1607259	02059	CITY	4/15/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-L	N	E	DRVR				NONE
1607259	02059	CITY	4/15/2015	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	15.9	00201	E BASELINE ST	02301	SW TUALATIN VALLEY HY	1	INTER	3-LEG	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	W	E	DRVR				INJC

N 20th Avenue / E Baseline Street (OR 8)

CRASH_ID	SER_NO	INVSTG_AGY_SHORT_DESC	CRASH_DT	CNTY_NM	CITY_SECT_NM	URB_AREA_SHORT_NM	HWY_NO	HWY_MED_NM	LRS VAL	MP_NO	ST_NO	ST_NM	ISECT_ST_NO	ISECT_ST_NM	RD_CHAR_CD	RD_CHAR_SHORT_DESC	ISECT_TYP_SHORT_DESC	TRAF_CNTL_DEVICE_SHORT_DESC	WTHR_COND_SHORT_DESC	RD_SURF_SHORT_DESC	LGT_COND_SHORT_DESC	CRASH_TYP_SHORT_DESC	COLLIS_TYP_SHORT_DESC	CRASH_SVRTY_SHORT_DESC	VHCL_TYP_SHORT_DESC	VHCL_USE_SHORT_DESC	TRLR_QTY	VHCL_OWNSHP_SHORT_DESC	VHCL_MVMNT_SHORT_DESC	VHCL_CMPSS_DIR_FROM_SHORT_DESC	VHCL_CMPSS_DIR_TO_SHORT_DESC	PARTIC_TYP_SHORT_DESC	PARTIC_MVMNT_SHORT_DESC	PARTIC_CMPSS_DIR_FROM_SHORT_DESC	PARTIC_CMPSS_DIR_TO_SHORT_DESC	INJ_SVRTY_SHORT_DESC
1791664	02433	CITY	5/14/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	BIKE	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-R	N	W	DRVR				NONE
1791664	02433	CITY	5/14/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	BIKE	TURN	INJ								BIKE	STRGHT	W	E	INJB
1799503	04816	CITY	9/13/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLD	UNK	DAY	PED	PED	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-L	N	E	DRVR				NONE
1799503	04816	CITY	9/13/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLD	UNK	DAY	PED	PED	INJ								PED	STRGHT	UN	UN	INJB
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	DRVR				NONE
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	DRVR				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	PSNG				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	PSNG				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	PSNG				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	PSNG				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	PSNG				INJA
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	DRVR				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	DRVR				NONE
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	PSNG				INJC
1671735	04886	CITY	7/25/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	DRVR				INJC
1734611	05094	COUNTY	8/19/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DUSK	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	DRVR				NONE
1734611	05094	COUNTY	8/19/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DUSK	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	DRVR				INJC
1802772	07014	NO RPT	12/20/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	02301	TUALATIN VALLEY HY	05120	N 20TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DARK	S-1STOP	REAR	INJ	UNKNOWN	NONE	0	UNKN	STRGHT	E	W	DRVR				NONE
1802772	07014	NO RPT	12/20/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	02301	TUALATIN VALLEY HY	05120	N 20TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DARK	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	E	W	DRVR				INJC
1831804	00497	CITY	1/30/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DLIT	PED	PED	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-R	N	W	DRVR				NONE
1831804	00497	CITY	1/30/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DLIT	PED	PED	INJ								PED	STRGHT	S	N	INJB
1700764	07443	CITY	10/31/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DAY	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	TURN-L	S	W	DRVR				NONE
1700764	07443	CITY	10/31/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DAY	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	N	S	DRVR				NONE
1702848	08905	CITY	12/24/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	FOG	WET	DLIT	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	N	S	DRVR				NONE
1702848	08905	CITY	12/24/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	FOG	WET	DLIT	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	TURN-L	S	W	DRVR				NONE
1802835	07289	CITY	12/2/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	CROSS	L-GRN-SIG	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	TURN-L	S	W	DRVR				INJC
1802835	07289	CITY	12/2/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	CROSS	L-GRN-SIG	CLR	DRY	DAY	O-1 L-TURN	TURN	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	N	S	DRVR				NONE
1834350	05453	CITY	10/22/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	DRVR				INJC
1834350	05453	CITY	10/22/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	PSNG				INJC
1834350	05453	CITY	10/22/2019	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	N	S	DRVR				NONE
1700476	07058	CITY	10/17/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	E	W	DRVR				NONE
1700476	07058	CITY	10/17/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DLIT	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	TURN-L	W	N	DRVR				NONE
1778495	00717	CITY	2/11/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DUSK	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	DRVR				INJC
1778495	00717	CITY	2/11/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DUSK	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	E	W	PSNG				NONE
1778495	00717	CITY	2/11/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	CROSS	TRF SIGNAL	CLR	DRY	DUSK	ANGL-OTH	ANGL	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	S	N	DRVR				NONE
1819873	03226	CITY	6/24/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAWN	ANGL-OTH	ANGL	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	E	W	DRVR				NONE
1819873	03226	CITY	6/24/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900100S00	16.06	00104	N ADAIR ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAWN	ANGL-OTH	ANGL	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	S	N	DRVR				NONE
1733595	07591	CITY	11/29/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	W	E	DRVR				NONE
1733595	07591	CITY	11/29/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DLIT	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	W	E	DRVR				INJC
1764390	07509	COUNTY	11/26/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DLIT	S-1STOP	REAR	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	W	E	DRVR				NONE
1764390	07509	COUNTY	11/26/2017	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	RAIN	WET	DLIT	S-1STOP	REAR	PDO	PSNGR CAR	NONE	9	N/A	STOP	W	E	DRVR				NONE
1802742	06170	CITY	11/14/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	W	E	DRVR				NONE
1802742	06170	CITY	11/14/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	W	E	DRVR				INJC
1802742	06170	CITY	11/14/2018	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	W	E	PSNG				INJC
1687326	01387	CITY	2/28/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLD	WET	DAY	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	TURN-L	N	E	DRVR				NONE
1687326	01387	CITY	2/28/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05120	N 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLD	WET	DAY	O-1 L-TURN	TURN	PDO	PSNGR CAR	NONE	9	N/A	STRGHT	S	N	DRVR				NONE
1658794	00713	CITY	2/1/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STRGHT	W	E	DRVR				NONE
1658794	00713	CITY	2/1/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	W	E	DRVR				NONE
1658794	00713	CITY	2/1/2016	Washington	Cornelius	PORTLAND UA	029	TUALATIN VALLEY	002900200S00	16.07	00201	E BASELINE ST	05520	S 20TH AVE	1	INTER	6-LEG	TRF SIGNAL	CLR	DRY	DAY	S-1STOP	REAR	INJ	PSNGR CAR	NONE	0	PRVTE	STOP	W	E	DRVR				INJC

Geotechnical Engineering Report

Cornelius Multi-Family Development
2220 E Baseline Street
Cornelius, Oregon

Prepared for:

The Calida Group
5000 Carillon Point, Suite 400
Kirkland, Washington 98033

October 6, 2021
PBS Project 74217.000

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Prepared by:

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Table of Contents

Supporting Data

TABLES

FIGURES

APPENDICES

Appendix A: Field Explorations

Appendix B: Laboratory Testing

1 INTRODUCTION

1.1 General

This report presents results of PBS Engineering and Environmental Inc. (PBS) geotechnical engineering services for the proposed development located at 2220 E Baseline Street in Cornelius, Oregon (site). The general site location is shown on the Vicinity Map, Figure 1. The locations of PBS' explorations in relation to existing and proposed site features are shown on the Site Plan, Figure 2.

1.2 Purpose and Scope

The purpose of PBS' services was to develop geotechnical design and construction recommendations in support of the planned new development. This was accomplished by performing the following scope of services.

1.2.1 Literature and Records Review

PBS reviewed various published geologic maps of the area for information regarding geologic conditions and hazards at or near the site. PBS also reviewed previously completed reports for the project site and vicinity.

1.2.2 Subsurface Explorations

Subsurface conditions were explored by advancing four borings to depths of approximately 41.5 feet below the existing ground surface (bgs) within the development footprint and six pavement core borings to depths of up to 4 feet bgs along the existing roadway alignment. The borings were logged and representative soil samples collected by a member of the PBS geotechnical engineering staff. The approximate boring locations are shown on the Site Plan, Figure 2. The interpreted boring logs are presented as Figures A1 through A10 in Appendix A, Field Explorations.

PBS excavated eight test pits within the proposed development footprint to depths of up to 13 feet bgs. The test pits were logged and representative soil samples collected by a member of the PBS geotechnical engineering staff. Interpreted test pit logs are included as Figures A11 through A18 in Appendix A, Field Explorations.

Two cone penetration tests (CPT) probes were advanced to depths of approximately 100 and 81 feet bgs. The CPT logs are presented as Figures A19 and A20 in Appendix A, Field Explorations. Shear wave velocities collected in CPT-1 and CPT-2 are presented as Figure A21.

1.2.3 Field Infiltration Testing

Cased-hole, falling-head field infiltration tests were completed in test pits TP-4, TP-5, and TP-6 at depths of 4 to 5 feet bgs. Infiltration testing was monitored by PBS geotechnical engineering staff.

1.2.4 Soils Testing

Soil samples were returned to our laboratory and classified in general accordance with the Unified Soil Classification System (ASTM D2487) and/or the Visual-Manual Procedure (ASTM D2488). Laboratory tests included natural moisture contents, grain-size analyses, one-dimensional consolidation, and Atterberg limits. Laboratory test results are included in the exploration logs in Appendix A, Field Explorations; and in Appendix B, Laboratory Testing.

1.2.5 Geotechnical Engineering Analysis

Data collected during the subsurface exploration, literature research, and testing were used to develop site-specific geotechnical design parameters and construction recommendations.

1.2.6 Report Preparation

This Geotechnical Engineering Report summarizes the results of our explorations, testing, and analyses, including information relating to the following:

- Field exploration logs and site plan showing approximate exploration locations
- Laboratory test results
- Infiltration test results
- Groundwater considerations
- Liquefaction potential
- Discussion of foundation alternatives
- Shallow foundation recommendations:
  - Minimum embedment
  - Allowable bearing pressure
  - Estimated settlement (total and differential)
  - Sliding coefficient
- Mat foundation recommendations
  - Modulus of subgrade reaction
  - Allowable bearing pressure
- Lateral earth pressures for retaining wall design including:
  - Active, passive, and at-rest earth pressures
  - Seismic lateral force
  - Sliding coefficient
  - Groundwater and drainage considerations
- Earthwork and grading, cut, and fill recommendations:
  - Structural fill materials and preparation, and reuse of on-site soils
  - Wet weather considerations
  - Utility trench excavation and backfill requirements
  - Temporary and permanent slope inclinations
- Seismic design criteria in accordance with the 2019 Oregon Structural Specialty Code (OSSC)
- Slab and pavement subgrade preparation recommendations
- Asphalt concrete (AC) pavement section recommendations

1.3 Project Understanding

PBS understands that the client plans to develop the approximately 15-acre, undeveloped site with 15 new, three-story, wood-frame apartment buildings (384 units) and a single-story commercial development along Baseline Street. The development will also include drive lanes, parking areas, utilities, and stormwater facilities.

Based on our experience with similar projects, estimated maximum building loads (three-story, wood-frame) will be on the order of 250 kips for columns, 3 kips per linear foot for walls, and less than 250 pounds per square foot (psf) for floors. The extent of site grading is currently unknown; however, based on the relatively flat site topography we estimate cuts and fill will be less than 5 feet.

2 SITE CONDITIONS

2.1 Surface Description

The site is roughly "L" shaped and is generally made up of two linear rectangles forming the parcel perimeter around the north and east sides of a Fred Meyer supermarket and parking area. It is bordered to the west by the Fred Meyer and undeveloped grassland, to the north by train tracks, to the east by developed business structures and partially open grassland, and to the south by Baseline Street and the Fred Meyer. The site is currently undeveloped and consists of grass and trees primarily within the southern half of the parcel. Based on review of available Oregon Department of Geology and Mineral Industries (DOGAMI) light detection and ranging data (LiDAR), the site is generally flat, with ground surface elevations ranging from a maximum of about 189 feet above mean sea level (amsl) to 186 feet amsl at (NAVD88; DOGAMI, 2021). Outside of the site, the ground surface is relatively flat.

2.2 Geologic Setting

The site is located within the Tualatin Basin, a tectonic depression within the physiographic province of the Puget-Willamette Lowland that separates the Cascade Range from the Coast Range, and extends from the Puget Sound in Washington to Eugene, Oregon (Yeats et al, 1996). The Puget-Willamette Lowland is situated along the Cascadia Subduction Zone (CSZ) where oceanic rocks of the Juan de Fuca Plate are subducting beneath the North American Plate, resulting in deformation and uplift of the Coast Range and volcanism in the Cascade Range. Northwest-trending faults accommodating clockwise rotation of the North American Plate are found throughout the Puget-Willamette lowland (Brocher et al., 2017; USGS, 2020).

Numerous northwest-trending faults govern the topography within the basin. Uplift and down dropping of crustal blocks have created topographic high points by offsetting regional scale flood basalts and down dropping basement rocks, creating infilled depressions and sediment basins. Cyclical Pleistocene cataclysmic floods deposited sediments and recarved the landscape within the Portland Basin more than 40 times over a 3,000-year timespan (Burns and Coe, 2012). As floodwaters entered the basin from the Columbia River Gorge, they slowed, depositing suspended sediments and bed loads. Topographic highpoints within the basin deflected floodwaters and generated areas that were scoured and eroded into older sediments and bedrock. These geomorphic features dominate the modern-day landscape and are indistinguishable within the Portland Basin LiDAR data (WADNR 2021; DOGAMI, 2021).

Published geologic maps of the area (Deacon et al., 1967) show the site is mantled with Quaternary (Upper Pleistocene) Willamette Silt, consisting of bedded silt and fine sand deposited during catastrophic floods, with occasional layers of clay, lenses of pebbly, fine-to-medium sand, and locally scattered granite and quartzite cobbles. The unit is generally reported to be approximately 50 feet thick.

2.3 Subsurface Conditions

The site was explored by a combination of drilled borings and test pit excavations. Deeper drilled borings, designated B-1 through B-4, were advanced to depths of 41.5 feet bgs on September 23, 2021. The drilling was performed by Western States Soil Conservation, Inc., using a track-mounted CME550X drill rig and mud rotary drilling techniques. Pavement core borings, identified as C-1 through C-6, were drilled to depths between 4 and 4.5 feet bgs on September 18, 2021, by Dan J. Fischer Excavating, Inc., using a trailer-mounted Buck Rodgers 160 drill rig, 5-inch diameter pavement core, and solid-stem auger drilling techniques. Test pit excavations TP-1 through TP-8 were excavated to depths between 11.5 and 13.0 feet bgs on September 22, 2021, using a Case 580 Super-N backhoe equipped with a 24-inch toothed bucket operated by Dan J. Fischer Excavating, Inc. Two additional cone penetration tests (CPTs) were completed to depths of approximately 100 and 81 feet bgs by Oregon Geotechnical Explorations, Inc., on September 14, 2021, using a track-mounted Geoprobe Model 6622 CPT rig.

PBS has summarized the subsurface units as follows:

TOPSOIL:	An approximate 12-inch-thick zone of silt topsoil containing organics was observed in our test pit explorations. This may be locally thicker, on the order of 24 inches, in the vicinity of trees, particularly in more densely treed areas of the site.
SILT:	Silt with varying amounts of fine-grained sand was encountered from the ground surface to the termination depth in all the explorations and generally increased in consistency with increasing depth from soft to hard. The sand content varied throughout, but tended to increase with depth, grading to silt with sand at approximately 7 to 15 feet bgs. This layer was generally brown to gray with low to medium plasticity.

2.4 Groundwater

Static groundwater was measured in borings B-1 and B-3, which were left open upon completion, at depths of 14.5 feet bgs and 12.5 feet bgs. Pore pressure dissipation testing in the CPTs indicated groundwater could be present at depth of 15 to 16 feet bgs. Based on a review of regional groundwater logs available from the Oregon Water Resources Department (OWRD), static groundwater in the area could be present at depths of less than 10 feet bgs during the winter months. Please note that groundwater levels can fluctuate during the year depending on climate, irrigation season, extended periods of precipitation, drought, and other factors.

2.5 Infiltration Testing

PBS completed three cased-hole, falling-head infiltration tests in test pits TP-4 through TP-6. The infiltration tests were conducted within 6-inch inside diameter PVC pipes embedded approximately 6 inches into the soil at depths of 4 feet bgs in TP-4 and TP-5 and 5 feet bgs in TP-6. The pipes were filled with water to achieve a minimum 1-foot-high column of water. After a period of saturation, the height of the water column in the pipes was then measured initially and at regular, timed intervals. Results of our field infiltration testing are presented in Table 1.

Table 1. Infiltration Test Results

Test Location	Depth (feet bgs)	Field Measured Infiltration Rate (in/hr)	Soil Classification
TP-4	4	0.6	SILT (ML)
TP-5	4	0	SILT (ML)
TP-6	5	0.1	SILT (ML)

The infiltration rates listed in Table 1 are not permeabilities/hydraulic conductivities, but field-measured rates, and do not include correction factors related to long-term infiltration rates. The design engineer should determine the appropriate correction factors to account for the planned level of pre-treatment, maintenance, vegetation, siltation, etc. Field-measured infiltration rates are typically reduced by a minimum factor of 2 to 4 for use in design.

Soil types can vary significantly over relatively short distances. The infiltration rates noted above are representative of one discrete location and depth. Installation of infiltration systems within the layer the field rate was measured is considered critical to proper performance of the systems.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Geotechnical Design Considerations

The project site is underlain by silt with variable amounts of sand and interbedded sand to silty sand lenses at depth. Several zones of soil encountered below groundwater at the site are susceptible to liquefaction during a code-based earthquake. Conventional foundation support on shallow foundations, such as footings or a mat, is not feasible without some consideration of earthquake risk. For the purpose of our evaluation, we have considered two options for foundation support—each of which has different levels of risk associated with damage during an earthquake. Excavation with conventional equipment is feasible at the site. Silt soils are susceptible to disturbance, especially when wet, and reuse of on-site soils as structural fill during wet conditions may not be feasible.

3.1.1 Liquefaction Potential

Liquefaction is defined as a decrease in the shear resistance of loose, saturated, cohesionless soil (e.g., sand) or low plasticity silt soils, due to the buildup of excess pore pressures generated during an earthquake. This results in a temporary transformation of the soil deposit into a viscous fluid. Liquefaction can result in ground settlement, foundation bearing capacity failure, and lateral spreading of ground.

Based on a review of the Oregon Statewide Geohazard Viewer (HazVu), the site is mapped in an area with low to moderate liquefaction susceptibility. Based on the results of our analyses, we estimate approximately 2 inches of total liquefaction settlement could occur, with 1 to 2 inches of differential seismic settlement occurring across the site.

3.2 Foundation Alternatives

The soils at the site present a challenge for support of the proposed facility during a code-based earthquake. The site is underlain by zones of loose to medium dense, granular soils that are susceptible to liquefaction. The presence of liquefaction-susceptible soils and the associated potential of seismically induced liquefaction settlement would affect footings, mats, and slabs.

We have developed two different foundation alternatives, which are discussed in the following paragraphs.

- Use of shallow spread footings with grade beams or a mat foundation on the non-liquefiable crust.
- Use of soil improvement to mitigate the effects of liquefaction and support structures on shallow foundations.

3.2.1 Mat Foundation on Non-Liquefiable Crust

Use of a mat foundation would help reduce the risks of possible differential settlement resulting from liquefaction. The presence of the crust does not reduce the risk of liquefaction below that depth and up to about 2 inches of liquefaction settlement would still occur at the site. Specific recommendations for design and construction are included in the following sections.

3.2.1.1 Design Bearing Pressure

Mat foundations can be designed using a maximum allowable bearing pressure of 1,000 pounds per square foot (psf). The recommended allowable bearing pressure applies to the total of dead plus long-term live loads. Allowable bearing pressures may be increased by one-third for seismic and wind loads.

Foundations will settle in response to column and wall loads. Based on our evaluation of the subsurface conditions and our analysis, we estimate post-construction static settlement will be less than approximately 1 inch. Differential settlement will be on the order of one-half of the total settlement.

3.2.1.2 Foundation Embedment Depths

PBS recommends that the perimeter of mat foundations be founded a minimum of 18 inches below the lowest adjacent grade. This can be accomplished with a thickened edge if the mat thickness is less than 18 inches.

3.2.1.3 Foundation Preparation

Excavations for foundations should be carefully prepared to a neat and undisturbed state. A representative from PBS should confirm suitable bearing conditions and evaluate all exposed footing subgrades. Observations should also confirm that loose or soft materials have been removed from new footing excavations and concrete slab-on-grade areas. Localized deepening of the excavations may be required to penetrate loose, wet, or deleterious materials. We suggest recompacting the exposed subgrade prior to forming and pouring concrete footings.

Satisfactory subgrade support for building mat foundations can be obtained from the on-site soil subgrade prepared in accordance with our recommendations presented in the Site Preparation, Wet/Freezing Weather and Wet Soil Conditions, and Imported Granular Materials sections of this report. A minimum 12-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade. Thicker aggregate sections may be necessary where undocumented fill is present, loose soils are present at subgrade elevation, and/or during wet conditions. Imported granular material should be composed of crushed rock or crushed gravel that is relatively well graded between coarse and fine, contains no deleterious materials, has a maximum particle size of 1½ inch, and has less than 5% by dry weight passing the US Standard No. 200 Sieve.

Mats supported on a subgrade and base course prepared in accordance with the preceding recommendations may be designed using a modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci).

3.2.1.4 Lateral Resistance

Lateral loads can be resisted by passive earth pressure on the sides of the mat and by friction on the base of the mat. A passive earth pressure of 250 pounds per cubic foot (pcf) may be used for footings confined by native soils and new structural fills. The allowable passive pressure has been reduced by a factor of two to account for the large amount of deformation required to mobilize full passive resistance. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent unpaved areas should not be considered when calculating passive resistance. For footings supported on native soils or new structural fills, use a coefficient of friction equal to 0.35 when calculating resistance to sliding. These values do not include a factor of safety (FS).

3.2.2 Shallow Footings with Grade Beams on Non-Liquefiable Crust

Shallow spread footings connected with grade beams and bearing on the existing, non-liquefiable crust may be used to support loads associated with the proposed development. The presence of the crust does not reduce the risk of liquefaction below that depth and up to about 2 inches of liquefaction settlement would still occur at the site. Specific recommendations for design and construction are included in the following sections.

3.2.2.1 Minimum Footing Widths/Design Bearing Pressure

Continuous wall and spread footings should be at least 18 and 24 inches wide, respectively. Footings should be sized using a maximum allowable bearing pressure of 2,000 pounds per square foot (psf). The recommended allowable bearing pressure applies to the total of dead plus long-term live loads. Allowable bearing pressures may be increased by one-third for wind loads.

Footings will settle in response to column and wall loads. Based on our evaluation of the subsurface conditions and our analysis, we estimate post-construction static settlement will be less than approximately 1 inch for the column and perimeter foundation loads. Differential static settlement will be on the order of one-half of the total settlement. Seismic settlement of approximately 2 inches should be anticipated.

3.2.2.2 Footing Embedment Depths

PBS recommends that all footings be founded a minimum of 18 inches below the lowest adjacent grade. The footings should be founded below an imaginary line projecting upward at a 1H:1V (horizontal to vertical) slope from the base of any adjacent, parallel utility trenches or deeper excavations.

3.2.2.3 Footing Preparation

Excavations for footings should be carefully prepared to a neat and undisturbed state. A representative from PBS should confirm suitable bearing conditions and evaluate all exposed footing subgrades. Observations should also confirm that loose or soft materials have been removed from new footing excavations and concrete slab-on-grade areas. Localized deepening of footing excavations may be required to penetrate loose, wet, or deleterious materials.

PBS recommends a 12-inch-thick layer of compacted, crushed rock be placed over the footing subgrades to help protect them from disturbance due to foot traffic and the elements. The footing subgrade should be in a dense or stiff condition prior to pouring concrete.

3.2.2.4 Lateral Resistance

Lateral loads can be resisted by passive earth pressure on the sides of footings and grade beams, and by friction at the base of the footings. A passive earth pressure of 250 pcf may be used for footings confined by native soils and new structural fills. The allowable passive pressure has been reduced by a factor of two to account for the large amount of deformation required to mobilize full passive resistance. Adjacent floor slabs, pavements, or the upper 12-inch depth of adjacent unpaved areas should not be considered when calculating passive resistance. For footings supported on native soils or new structural fills, use a coefficient of friction equal to 0.35 when calculating resistance to sliding. These values do not include a factor of safety (FS).

3.2.2.5 Grade Beams

Grade beams, or seismic ties, are not intended to vertically support column footings, but to help hold the building structure together during a code-based earthquake to provide for life safety. Grade beams between footings should be designed in accordance with the requirements of the 2019 OSSC and ASCE 7-16.

3.3 Floor Slabs

Satisfactory subgrade static support for building floor slabs can be obtained from the native soil subgrades prepared in accordance with our recommendations presented in the Site Preparation, Wet/Freezing Weather and Wet Soil Conditions, and Select Granular Fill sections of this report. A minimum 6-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade. Thicker aggregate sections may be necessary where undocumented fill is present, soft/loose soils are present at subgrade elevation, and/or during wet conditions. Imported granular material should be composed of crushed rock or crushed gravel that is relatively well graded between coarse and fine, contains no deleterious materials, has a maximum particle size of 1 inch, and has less than 5% by dry weight passing the US Standard No. 200 Sieve.

Floor slabs supported on a subgrade and base course prepared in accordance with the preceding recommendations may be designed using a modulus of subgrade reaction (k) of 150 pounds per cubic inch (pci).

3.4 Soil Improvement

If the proposed structures cannot tolerate the estimated total and differential liquefaction settlement, soil improvement may be considered to adequately support structure foundations during a code-based earthquake. The detailed design for soil improvement is typically completed by a design-build contractor. The type and extent of soil improvement should be determined by the specialty contractor based on the required project performance criteria.

3.5 Retaining Walls

The proposed new development may include retaining walls less than 5 feet tall. We recommend any retaining walls founded on native soil or compacted structural fill be provided with adequate drainage and backfilled with clean, angular, crushed rock fill, in accordance with the recommendations provided in the following sections of this report. Retaining wall footings should be designed in accordance with the recommendations for shallow foundations.

3.5.1 Soil Parameters for Retaining Wall Design

The soil parameters commonly used for the design of retaining wall structures are soil moist unit weight "γ_m," soil saturated unit weight "γ_{sat}," soil internal friction angle "φ," and soil cohesion "c." The soil parameters recommended for use in the retaining structure design are presented in the following Table 2, Soil Parameters for Retaining Wall Design.

Table 2. Soil Parameters for Retaining Wall Design

Soil Material	Moist Unit Weight, γ_m (pcf)	Saturated Unit Weight, γ_{sat} (pcf)	Friction Angle, φ (degrees)	Cohesion, c (psf)	Lateral Earth Pressure Coefficient*		
					Active, K_a	Passive, K_p	At-Rest, K_o
Native Soil	110	120	28	0	0.32	4.3	0.53
ODOT Granular Wall Backfill	130	135	35	0	0.27	N/A	0.43

*These parameters assume flat ground surface conditions in front and behind the wall. The passive lateral earth pressure coefficients should be reduced by a factor of two to account for the amount of deflection required to engage full passive pressures.

Lateral loads may be resisted by friction along the base of the wall footing using a friction coefficient of 0.35. For seismic loading, we recommend using an inverted triangular distribution (seismic surcharge) equivalent to 22H psf, where H is the height of the wall. The wall should be designed by applying the active earth pressure plus the seismic loading, or at-rest earth pressures, whichever is greater. Seismic lateral earth pressures were computed using the Mononobe-Okabe equation.

If vertical surcharge loads, q, are present within 0.5H of the wall, a lateral surcharge of 0.32q (for walls allowed to rotate) and 0.53q (for restrained walls) should be applied as a uniform horizontal surcharge active over the full height of the wall. These values assume that the wall is vertical and the backfill behind the wall is horizontal. Recommended lateral earth pressure distributions are shown on Figure 3, Retaining Wall Earth Pressure Diagram. Additional lateral pressures due to surcharge loads can be estimated using the guidelines shown on Figure 4, Lateral Surcharge Detail.

3.5.2 Drainage

Recommended lateral earth pressures assume that walls are fully drained and no hydrostatic pressures develop. For cantilevered concrete walls, a minimum 2-foot-wide zone of free-draining material meeting the requirements of ODOT SS 00430.11 – Granular Drain Backfill Material should be installed immediately behind the wall. A 4-inch diameter, perforated drain pipe should be installed at the base of the drain rock and routed to a suitable discharge point approved by the civil engineer.

3.6 Seismic Design Considerations

3.6.1 Code-Based Seismic Design Parameters

The current seismic design criteria for this project are based on the 2019 OSSC. Due to the potential for liquefaction of site soils, the site should be considered Site Class F. However, in accordance with ASCE 7-16, for structures having a fundamental period of less than 0.5 second, a site-response analysis is not required to determine the spectral accelerations of liquefied soils and seismic design parameters can be determined using the pre-liquefaction site class, Site Class D. The seismic design criteria, in accordance with the 2019 OSSC, are summarized in Table 3.

Table 3. 2019 OSSC Seismic Design Parameters

Parameter	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	S_s = 0.90 g	S_1 = 0.44 g
Site Class	D*	
Site Coefficient	F_a = 1.14	F_v = 1.86**
Adjusted Spectral Acceleration	S_{MS} = 1.03 g	S_{M1} = ***
Design Spectral Response Acceleration Parameters	S_{DS} = 0.68 g	S_{D1} = ***
MCE_G Peak Ground Acceleration	PGA = 0.42 g	
Site Amplification Factor at PGA	F_{PGA} = 1.18	
Site Modified Peak Ground Acceleration	PGA_M = 0.49 g	

g= Acceleration due to gravity

* Site Class D can be used if the fundamental period of the new structure is less than 0.5 second.

** This value of F_v shall only be used to calculate T_s

*** Site-specific site response analysis is not required for structures on Site Class D sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Eq. (12.8-2) for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \geq T > 1.5T_s$ or Eq. (12.8-4) for $T > T_L$.

3.7 Temporary and Permanent Slopes

All temporary cut slopes should be excavated with a smooth-bucket excavator, with the slope surface repaired if disturbed. In addition, upslope surface runoff should be rerouted to not run down the face of the slopes. Equipment should not be allowed to induce vibration or infiltrate water above the slopes, and no surcharges are allowed within 25 feet of the slope crest.

Permanent cut and fill slopes up to 10 feet high can be inclined at 2H:1V in medium dense or better silty sand and sand or compacted structural fill. If slow seepage is present, use of a rock blanket or a suitably revegetated, reinforced erosion control blanket may be required. PBS should be consulted if seepage is present; additional erosion control measures, such as additional drainage elements, and/or flatter slopes, may also be required. Exposed soils that are soft or loose may also require these measures. Fill slopes should be over-built and cut back into compacted structural fill at the design inclination using a smooth-bucket excavator. Erosion control is critical to maintaining slopes.

3.8 Ground Moisture

3.8.1 General

The perimeter ground surface and hard-scape should be sloped to drain away from all structures and away from adjacent slopes. Gutters should be tight-lined to a suitable discharge and maintained as free-flowing. All crawl spaces should be adequately ventilated and sloped to drain to a suitable, exterior discharge.

3.8.2 Perimeter Footing Drains

Due to the relatively low permeability of site soils and the potential for perched groundwater at the site, we recommend perimeter foundation drains be installed around all proposed structures.

The foundation subdrainage system should include a minimum 4-inch diameter perforated pipe in a drain rock envelope. A non-woven geotextile filter fabric, such as Mirafi 140N or equivalent, should be used to completely wrap the drain rock envelope, separating it from the native soil and footing backfill materials. The invert of the perimeter drain lines should be placed approximately at the bottom of footing elevation. Also, the subdrainage system should be sealed at the ground surface. The perforated subdrainage pipe should be laid to drain by gravity into a non-perforated solid pipe and finally connected to the site drainage stem at a suitable location. Water from downspouts and surface water should be independently collected and routed to a storm sewer or other positive outlet. This water must not be allowed to enter the bearing soils.

3.8.3 Vapor Flow Retarder

A continuous, impervious barrier must be installed over the ground surface in the crawl space and under slabs of all structures. Barriers should be installed per the manufacturer’s recommendations.

3.9 Pavement Design

3.9.1 Existing Pavement Evaluation

Pavement conditions were evaluated by coring the existing AC and drilling six borings, designated C-1 through C-6, to depths of up to 4.5 feet bgs at the approximate locations shown in Figure 2.

PBS evaluated the existing asphalt condition to select appropriate structural layer coefficients. The structural numbers for the existing pavement section were calculated to determine whether the existing pavement capacity was consistent with the City of Cornelius Public Work Standards for Local Streets and Collectors. The City of Cornelius standard pavement details correspond to structural numbers of 3.2 and 4.6 for Local Streets and Collectors, respectively.

A summary of our evaluation of the existing pavement is included in Table 4 below.

Table 4. Summary of Existing AC and Base Course Thicknesses

Boring	Roadway Classification	Existing AC Thickness (inches)	Existing Base Course Thickness (inches)	Structural Number of Existing Pavement	Capacity in Accordance
C-1	Collector	6.5	5.0	3.0	No
C-2	Collector	6.75	5.0	3.2	No
C-3	Collector	7.5	5.0	3.5	No
C-4	Collector	7.5	7.0	3.5	No
C-5	Local	8.0	7.5	3.8	Yes
C-6	Local	7.75	7.75	3.9	Yes

3.9.2 On-Site Pavement Design

The provided pavement recommendations for the site were developed based on our experience with similar developments and references the associated Oregon Department of Transportation (ODOT) specifications for construction. Our evaluation considered a 20-year design life.

The minimum recommended pavement section thicknesses are provided in Table 5. Depending on weather conditions at the time of construction, a thicker aggregate base course section could be required to support construction traffic during preparation and placement of the pavement section.

Table 5. Minimum AC Pavement Sections

Traffic Loading	AC (inches)	Base Course (inches)	Subgrade
Pull-in Car Parking Only	3	12	Stiff subgrade as verified by PBS personnel*
Drive Lanes and Access Roads	4	12	

* Subgrade must pass proofroll

The asphalt cement binder should be selected following ODOT SS 00744.11 – Asphalt Cement and Additives. The AC should consist of ½-inch hot mix asphalt concrete (HMAC) with a maximum lift thickness of 3 inches. The AC should conform to ODOT SS 00744.13 and 00744.14 and be compacted to 91% of the maximum theoretical density (Rice value) of the mix, as determined in accordance with ASTM D2041.

Heavy construction traffic on new pavements or partial pavement sections (such as base course over the prepared subgrade) will likely exceed the design loads and could potentially damage or shorten the pavement life; therefore, we recommend construction traffic not be allowed on new pavements, or that the contractor take appropriate precautions to protect the subgrade and pavement during construction.

If construction traffic is to be allowed on newly constructed road sections, an allowance for this additional traffic will need to be made in the design pavement section.

4 CONSTRUCTION RECOMMENDATIONS

4.1 Site Preparation

Construction of the proposed development will involve clearing and grubbing of the existing vegetation and large trees and possible demolition of existing pavement or structures. Demolition should include removal of existing pavement, utilities, etc., throughout the proposed new development. Underground utility lines or other abandoned structural elements should also be removed. The voids resulting from removal of foundations or loose soil in utility lines should be backfilled with compacted structural fill. The base of these excavations should be excavated to firm native subgrade before filling, with sides sloped at a minimum of 1H:1V to allow for uniform compaction. Materials generated during demolition should be transported off site or stockpiled in areas designated by the owner's representative.

4.1.1 Proofrolling/Subgrade Verification

Following site preparation and prior to placing aggregate base over shallow foundation, floor slab, and pavement subgrades, the exposed subgrade should be evaluated either by proofrolling or another method of subgrade verification. The subgrade should be proofrolled with a fully loaded dump truck or similar heavy, rubber-tire construction equipment to identify unsuitable areas. If evaluation of the subgrades occurs during wet conditions, or if proofrolling the subgrades will result in disturbance, they should be evaluated by PBS using a steel foundation probe. We recommend that PBS be retained to observe the proofrolling and perform the subgrade verifications. Unsuitable areas identified during the field evaluation should be compacted to a firm condition or be excavated and replaced with structural fill.

4.1.2 Wet/Freezing Weather and Wet Soil Conditions

Due to the presence of fine-grained silt at the site, construction equipment may have difficulty operating on the near-surface soils when the moisture content of the surface soil is more than a few percentage points above the optimum moisture required for compaction. Soils disturbed during site preparation activities, or unsuitable areas identified during proofrolling or probing, should be removed and replaced with compacted structural fill.

Site earthwork and subgrade preparation should not be completed during freezing conditions, except for mass excavation to the subgrade design elevations.

Protection of the subgrade is the responsibility of the contractor. Construction of granular haul roads to the project site entrance may help reduce further damage to the pavement and disturbance of site soils. The actual thickness of haul roads and staging areas should be based on the contractors' approach to site development, and the amount and type of construction traffic. The imported granular material should be placed in one lift over the prepared undisturbed subgrade and compacted using a smooth-drum, non-vibratory roller. A geotextile fabric should be used to separate the subgrade from the imported granular material in areas of repeated construction traffic. The geotextile should meet the specifications of ODOT SS Section 02320.10 and SS 02320.20, Table 02320-4 for soil separation. The geotextile should be installed in conformance with ODOT SS Section 00350 – Geosynthetic Installation.

4.1.3 Compacting Test Pit Locations

The test pit excavations were backfilled using the excavator bucket and relatively minimal compactive effort; therefore, soft spots can be expected at these locations. We recommend that the relatively uncompacted soil be removed from the test pits to a depth of at least 3 feet below finished subgrade elevation in pavement areas and to full depth in building areas. The resulting excavation should be backfilled with structural fill.

4.2 Excavation

The near-surface soils at the site can be excavated with conventional earthwork equipment. Sloughing and caving should be anticipated. All excavations should be made in accordance with applicable Occupational Safety and Health Administration (OSHA) and state regulations. The contractor is solely responsible for adherence to the OSHA requirements. Trench cuts should stand relatively vertical to a depth of approximately 4 feet bgs, provided no groundwater seepage is present in the trench walls. Open excavation techniques may be used provided the excavation is configured in accordance with the OSHA requirements, groundwater seepage is not present, and with the understanding that some sloughing may occur. Trenches/excavations should be flattened if sloughing occurs or seepage is present. Use of a trench shield or other approved temporary shoring is recommended if vertical walls are desired for cuts deeper than 4 feet bgs. If dewatering is used, we recommend that the type and design of the dewatering system be the responsibility of the contractor, who is in the best position to choose systems that fit the overall plan of operation.

4.3 Structural Fill

The extent of site grading is currently unknown; however, PBS estimates that cuts and fills will be less than about 2 feet. Structural fill should be placed over subgrade that has been prepared in conformance with the Site Preparation and Wet/Freezing Weather and Wet Soil Conditions sections of this report. Structural fill material should consist of relatively well-graded soil, or an approved rock product that is free of organic material and debris, and contains particles not greater than 3 inches nominal dimension.

The suitability of soil for use as compacted structural fill will depend on the gradation and moisture content of the soil when it is placed. As the amount of fines (material finer than the US Standard No. 200 Sieve) increases, soil becomes increasingly sensitive to small changes in moisture content and compaction becomes more difficult to achieve. Soils containing more than about 5% fines cannot consistently be compacted to a dense, non-yielding condition when the water content is significantly greater (or significantly less) than optimum.

4.3.1 On-Site Soil

On-site soils encountered in our explorations are generally suitable for placement as structural fill for mass grading to raise the site during dry weather when moisture contents can be maintained by air drying and/or addition of water. The fine-grained fraction of the site soils are moisture sensitive, and during wet weather, may become unworkable because of excess moisture content. In order to reduce moisture content, some aerating and drying of fine-grained soils may be required. The material should be placed in lifts with a maximum uncompacted thickness of approximately 8 inches and compacted to at least 92% of the maximum dry density, as determined by ASTM D1557.

4.3.2 Borrow Material

Borrow material for general structural fill construction should meet the requirements set forth in ODOT SS 00330.12 – Borrow Material. When used as structural fill, borrow material should be placed in lifts with a maximum uncompacted thickness of approximately 8 inches and compacted to not less than 92% of the maximum dry density, as determined by ASTM D1557.

4.3.3 Select Granular Fill

Selected granular backfill used during periods of wet weather for structural fill construction should meet the specifications provided in ODOT SS 00330.14 – Selected Granular Backfill. The imported granular material should be uniformly moisture conditioned to within about 2% of the optimum moisture content and compacted in relatively thin lifts using suitable mechanical compaction equipment. Selected granular backfill should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and be compacted to not less than 95% of the maximum dry density, as determined by ASTM D1557.

4.3.4 Crushed Aggregate Base

Crushed aggregate base course below floor slabs, spread footings, and asphalt concrete pavements should be clean crushed rock or crushed gravel that contains no deleterious materials and meets the specifications provided in ODOT SS 02630.10 – Dense-Graded Aggregate, and has less than 5% by dry weight passing the US Standard No. 200 Sieve. The crushed aggregate base course should be placed in lifts with a maximum uncompacted thickness of 8 to 12 inches and be compacted to at least 95% of the maximum dry density, as determined by ASTM D1557.

4.3.5 Retaining Wall Backfill

Backfill material placed behind retaining walls and extending a horizontal distance of 0.5H should consist of granular material meeting ODOT SS 00510.12 – Granular Wall Backfill, which recommends ODOT SS 02630.11 – Open-Graded Aggregate. We recommend the granular wall backfill be separated from general fill, native soil, and/or topsoil using a geotextile fabric that meets the requirements provided in ODOT SS 02320.10 – Geosynthetics, Acceptance, and ODOT SS 02320.20 – Geotextile Property Values, Table 02320-1 for separation geotextile. The geotextile should be installed in conformance with ODOT SS Section 00350 – Geosynthetic Installation.

The wall backfill should be compacted to a minimum of 92% of the maximum dry density, as determined by ASTM D1557. However, backfill located within a horizontal distance of 3 feet from the retaining walls should only be compacted to approximately 90% of the maximum dry density, as determined by ASTM D1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as jumping jack or vibratory plate compactors).

4.3.6 Utility Trench Backfill

Pipe bedding placed to uniformly support the barrel of pipe should meet specifications provided in ODOT SS 00405.12 – Bedding. The pipe zone that extends from the top of the bedding to at least 8 inches above utility lines should consist of material prescribed by ODOT SS 00405.13 – Pipe Zone Material. The pipe zone material should be compacted to at least 90% of the maximum dry density, as determined by ASTM D1557, or as required by the pipe manufacturer.

Under pavements, paths, slabs, or beneath building pads, the remainder of the trench backfill should consist of well-graded granular material with less than 10% by dry weight passing the US Standard No. 200 Sieve, and should meet standards prescribed by ODOT SS 00405.14 – Trench Backfill, Class B or D. This material should be compacted to at least 92% of the maximum dry density, as determined by ASTM D1557 or as required by the pipe manufacturer. The upper 2 feet of the trench backfill should be compacted to at least 95% of the maximum dry density, as determined by ASTM D1557. Controlled low-strength material (CLSM), ODOT SS 00405.14 – Trench Backfill, Class E, can be used as an alternative.

Outside of structural improvement areas (e.g., pavements, sidewalks, or building pads), trench material placed above the pipe zone may consist of general structural fill materials that are free of organics and meet ODOT SS 00405.14 – Trench Backfill, Class A. This general trench backfill should be compacted to at least 90% of the maximum dry density, as determined by ASTM D1557, or as required by the pipe manufacturer or local jurisdictions.

Within the public right of way, utility trench backfill should be placed and compacted in accordance with the City of Cornelius Public Work Standards Standard Detail S-3.

4.3.7 Stabilization Material

Stabilization rock should consist of pit or quarry run rock that is well-graded, angular, crushed rock consisting of 4- or 6-inch-minus material with less than 5% passing the US Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material. ODOT SS 00330.16 – Stone Embankment Material can be used as a general specification for this material with the stipulation of limiting the maximum size to 6 inches.

5 ADDITIONAL SERVICES AND CONSTRUCTION OBSERVATIONS

In most cases, other services beyond completion of a final geotechnical engineering report are necessary or desirable to complete the project. Occasionally, conditions or circumstances arise that require additional work that was not anticipated when the geotechnical report was written. PBS offers a range of environmental, geological, geotechnical, and construction services to suit the varying needs of our clients.

PBS should be retained to review the plans and specifications for this project before they are finalized. Such a review allows us to verify that our recommendations and concerns have been adequately addressed in the design.

Satisfactory earthwork performance depends on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. We recommend that PBS be retained to observe general excavation, stripping, fill placement, footing subgrades, and/or pile installation. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

6 LIMITATIONS

This report has been prepared for the exclusive use of the addressee, and their architects and engineers, for aiding in the design and construction of the proposed development and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without express written consent of the client and PBS. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials, and contractors to ensure correct implementation of the recommendations.

The opinions, comments, and conclusions presented in this report are based upon information derived from our literature review, field explorations, laboratory testing, and engineering analyses. It is possible that soil, rock, or groundwater conditions could vary between or beyond the points explored. If soil, rock, or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that PBS is notified immediately so that we may reevaluate the recommendations of this report.

Unanticipated fill, soil and rock conditions, and seasonal soil moisture and groundwater variations are commonly encountered and cannot be fully determined by merely taking soil samples or completing explorations such as soil borings or test pits. Such variations may result in changes to our recommendations and may require additional funds for expenses to attain a properly constructed project; therefore, we recommend a contingency fund to accommodate such potential extra costs.

The scope of work for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, if conditions have changed due to natural causes or construction operations at or adjacent to the site, or if the basic project scheme is significantly modified from that assumed, this report should be reviewed to determine the applicability of the conclusions and recommendations presented herein. Land use, site conditions (both on and off site), or other factors may change over time and could materially affect our findings; therefore, this report should not be relied upon after three years from its issue, or in the event that the site conditions change.

7 REFERENCES

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will <u>not</u> likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will <u>not</u> be adequate to develop geotechnical design recommendations for the project.

Do <u>not</u> rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do <u>not</u> rely on an executive summary. Do <u>not</u> read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL
BUSINESS
ASSOCIATION

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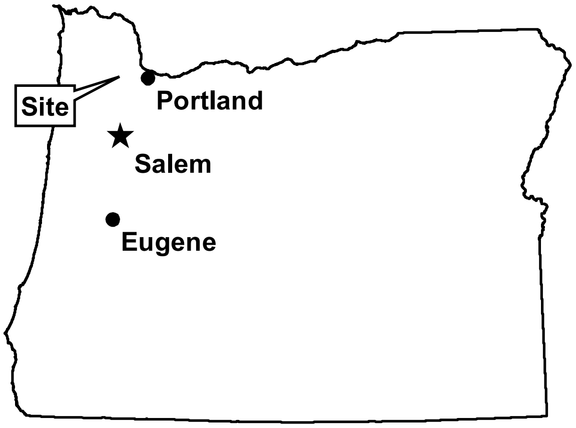
e-mail: info@geoprofessional.org www.geoprofessional.org

Figures



VICINITY MAP

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

DATE: OCT 2021 · PROJECT: 74217.000

PBS

FIGURE

1

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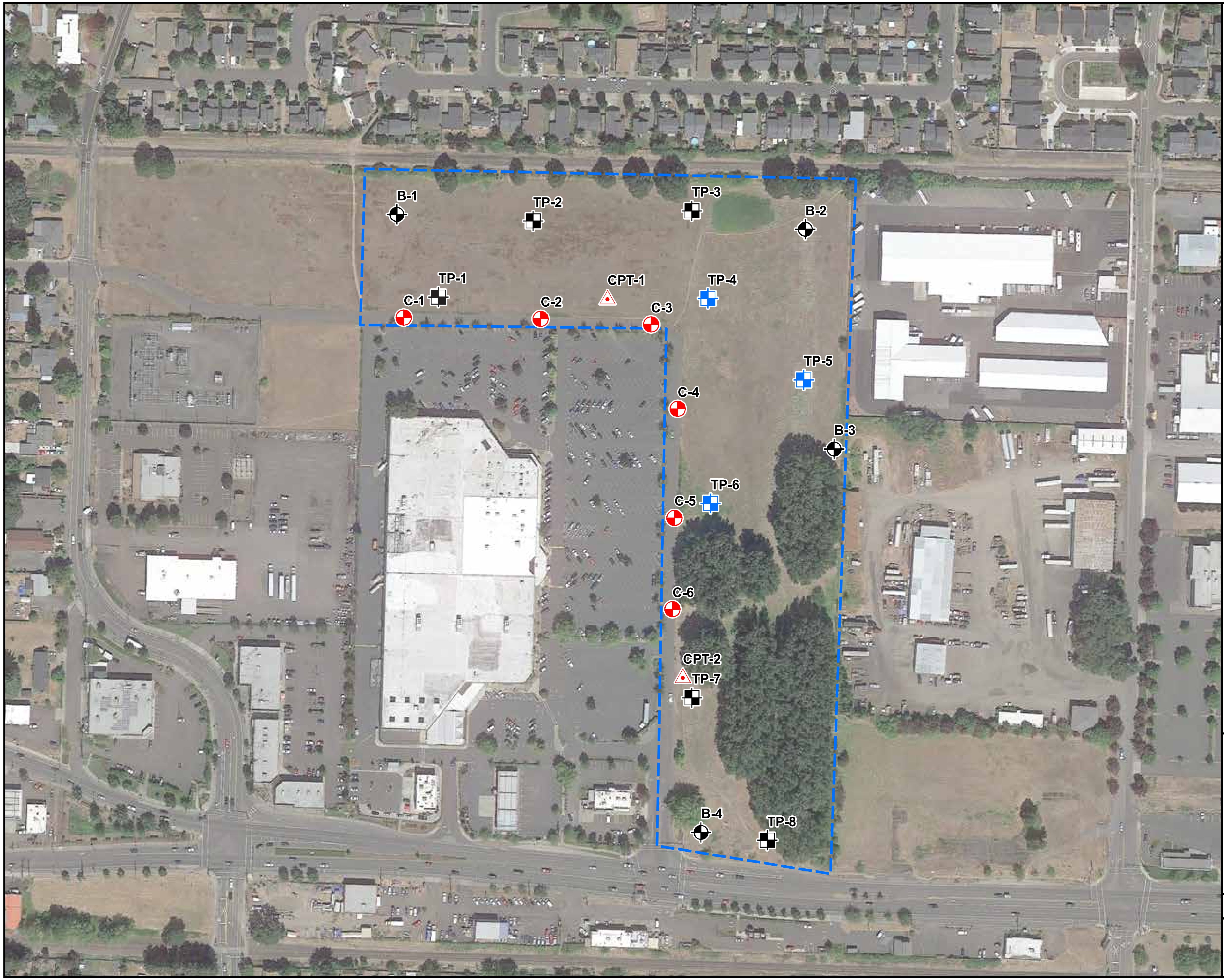


EXPLANATION

⊕	B-1 - Boring name and approximate location
△	CPT-1 - Cone penetration test name and approximate location
◐	C-1 - Pavement core name and approximate location
⊞	TP-4 - Test pit name and approximate location with infiltration test
⊞	TP-2 - Test pit name and approximate location
⬚	Approximate site boundary

SOURCES: Google Earth 2020

1 inch = 200 feet

0 100 200 400 Feet

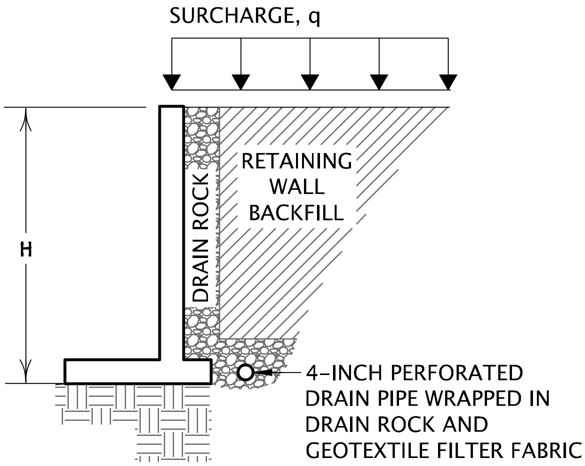
SITE PLAN

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

DATE: OCT 2021 · PROJECT: 74217.000

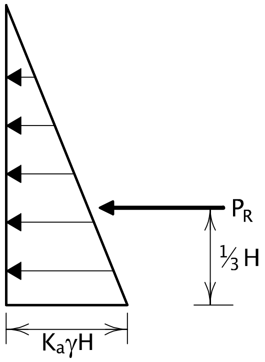
PBS

FIGURE
2



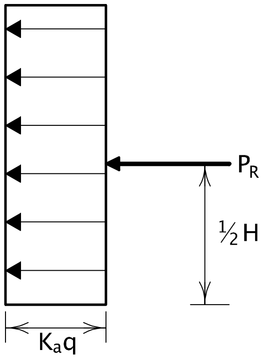
PARAMETER	VALUE
K_a	0.32
K_o	0.53
ΔK_{ae}	0.2
γ	110 pcf

ACTIVE EARTH PRESSURE



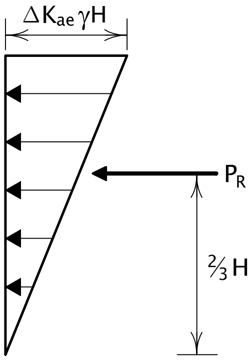
$$P_R=K_a\gamma\frac{H^2}{2}$$

SURCHARGE PRESSURE (ACTIVE)



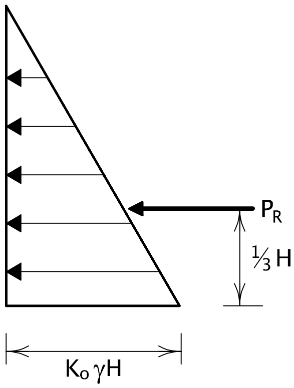
$$P_R=K_a q H$$

SEISMIC SURCHARGE PRESSURE



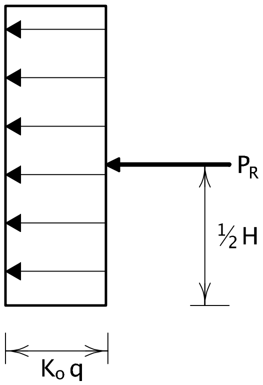
$$P_R=\Delta K_{ae}\gamma\frac{H^2}{2}$$

AT-REST EARTH PRESSURE



$$P_R=K_o\gamma\frac{H^2}{2}$$

SURCHARGE PRESSURE (AT-REST)



$$P_R=K_o q H$$

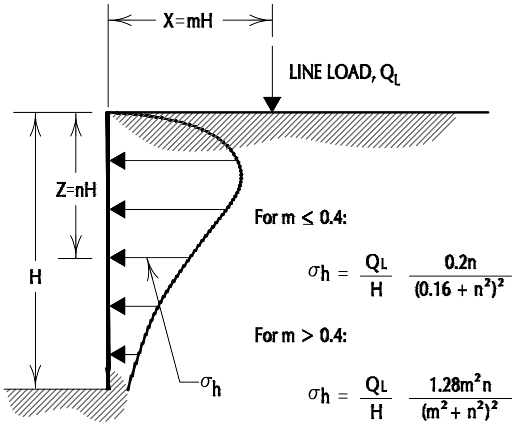
PBS

RETAINING WALL EARTH PRESSURE DIAGRAM

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

OCT 2021
74217.000

FIGURE
3



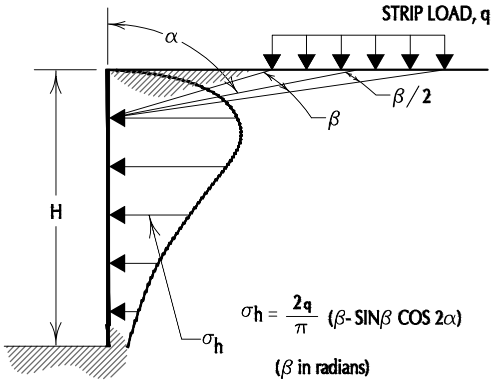
For m ≤ 0.4:

$$\sigma_h = \frac{Q_L}{H}\ \frac{0.2n}{(0.16 + n^2)^2}$$

For m > 0.4:

$$\sigma_h = \frac{Q_L}{H}\ \frac{1.28m^2n}{(m^2 + n^2)^2}$$

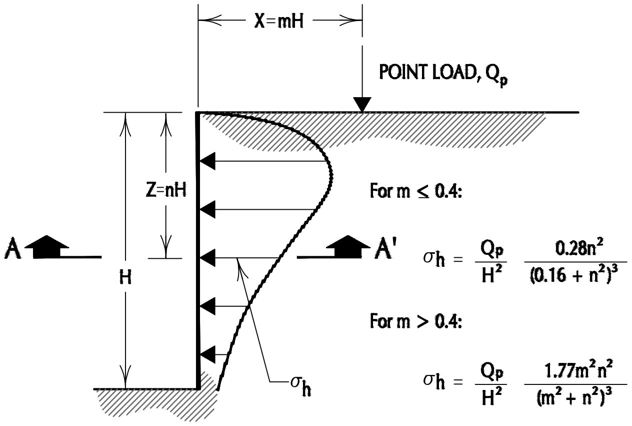
LINE LOAD PARALLEL TO WALL



$$\sigma_h = \frac{2q}{\pi}\ (\beta - \text{SIN}\beta\ \text{COS}\ 2\alpha)$$

(β in radians)

STRIP LOAD PARALLEL TO WALL

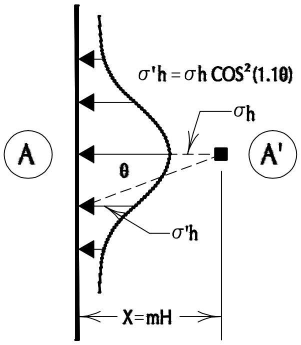


For m ≤ 0.4:

$$\sigma_h = \frac{Q_P}{H^2}\ \frac{0.28n^2}{(0.16 + n^2)^3}$$

For m > 0.4:

$$\sigma_h = \frac{Q_P}{H^2}\ \frac{1.77m^2n^2}{(m^2 + n^2)^3}$$



DISTRIBUTION OF HORIZONTAL PRESSURES

VERTICAL POINT LOAD

NOTES:

1. THESE GUIDELINES APPLY TO RIGID WALLS WITH POISSON'S RATIO ASSUMED TO BE 0.5 FOR BACKFILL MATERIALS.
2. LATERAL PRESSURES FROM ANY COMBINATION OF ABOVE LOADS MAY BE DETERMINED BY THE PRINCIPLE OF SUPERPOSITION.

PBS

LATERAL SURCHARGE DETAIL

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

OCT 2021
74217.000

FIGURE
4

Appendix A

Field Explorations

Appendix A: Field Explorations

A1 GENERAL

PBS explored subsurface conditions at the project site by advancing four drilled borings to depths of approximately 41.5 feet bgs on September 23, 2021, and six cores with shallow borings to depths of up to 4 feet bgs along the existing roadway alignment on September 18, 2021. In addition, eight test pits were excavated to depths between 11.5 and 13.0 feet bgs on September 22, 2021. Two cone penetration test (CPT) probes were also completed to depths of approximately 81 and 100 feet bgs on September 14, 2021. The approximate locations of the explorations are shown on Figure 2, Site Plan. The procedures used to advance the borings and test pits, collect samples, and other field techniques are described in detail in the following paragraphs. Unless otherwise noted, all soil sampling and classification procedures followed engineering practices in general accordance with relevant ASTM procedures. "General accordance" means that certain local drilling/excavation and descriptive practices and methodologies have been followed.

A2 BORINGS

A2.1 Mud Rotary Drilling

Mud rotary borings were advanced using a track-mounted CME-550X drill rig provided and operated by Western States Soil Conservation, Inc., of Hubbard, Oregon, using mud rotary drilling techniques. The borings were observed by a member of the PBS geotechnical staff, who maintained a detailed log of the subsurface conditions and materials encountered during the course of the work.

A2.2 Pavement Cores

Pavement core borings were advanced using a trailer-mounted Buck Rodgers 160 drill rig provided and operated by Dan J. Fischer Excavating, Inc., of Forest Grove, Oregon, using a 5-inch diameter pavement core bit and solid stem-auger drilling techniques. The borings were observed by a member of the PBS geotechnical staff, who maintained a detailed log of the subsurface conditions and materials encountered during the course of the work.

A2.3 Sampling

Disturbed soil samples were taken in the borings at selected depth intervals. The samples were obtained using a standard 2-inch outside diameter, split-spoon sampler following procedures prescribed for the standard penetration test (SPT). Using the SPT, the sampler is driven 18 inches into the soil using a 140-pound hammer dropped 30 inches. The number of blows required to drive the sampler the last 12 inches is defined as the standard penetration resistance (N-value). The N-value provides a measure of the relative density of granular soils such as sands and gravels, and the consistency of cohesive soils such as clays and plastic silts. The disturbed soil samples were examined by a member of the PBS geotechnical staff and then sealed in plastic bags for further examination and physical testing in our laboratory.

A2.4 Boring Logs

The boring logs show the various types of materials that were encountered in the borings and the depths where the materials and/or characteristics of these materials changed, although the changes may be gradual. Where material types and descriptions changed between samples, the contacts were interpreted. The types of samples taken during drilling, along with their sample identification number, are shown to the right of the classification of materials. The N-values and natural water (moisture) contents are shown farther to the right.

A3 TEST PITS

A3.1 Excavation

Test pits were excavated using a Case 580 Super-N excavator equipped with a 24-inch-wide, toothed bucket provided and operated by Dan J. Fisher Excavating, Inc., of Forest Grove, Oregon. The test pits were observed by a member of the PBS geotechnical staff, who maintained a detailed log of the subsurface conditions and materials encountered during the course of the work.

A3.2 Sampling

Representative disturbed samples were taken at selected depths in the test pits. The disturbed soil samples were examined by a member of the PBS geotechnical staff and sealed in plastic bags for further examination.

A3.3 Test Pit Logs

The test pit logs show the various types of materials that were encountered in the excavations and the depths where the materials and/or characteristics of these materials changed, although the changes may be gradual. Where material types and descriptions changed between samples, the contacts were interpreted. The types of samples taken during excavation, along with their sample identification number, are shown to the right of the classification of materials. The natural water (moisture) contents are shown farther to the right. Measured seepage levels, if observed, are noted in the column to the right.

A4 CONE PENETRATION TESTS (CPTs)

A4.1 Field Procedures

Explorations CPT-1 and CPT-2 were advanced using a track-mounted Geoprobe Model 6622 CPT rig. CPTs were performed by Oregon Geotechnical Explorations, Inc., of Keizer, Oregon, and results were reviewed and used for site specific seismic design calculations.

Before the start of testing, the truck is jacked up and leveled on four pads to provide a stable reaction for the cone thrust. During the test, the instrumented cone is hydraulically pushed into the ground at the rate of about 2 centimeters per second (cm/s), and readings of cone tip resistance, sleeve friction, and pore pressure are digitally recorded every second. As the cone advances, additional cone rods are added such that a “string” of rods continuously advances through the soil. As the test progresses, the CPT operator monitors the cone resistance and its deviation from vertical alignment.

For CPT soundings in which seismic data were collected, conventional CPT testing is temporarily halted at 2-meter intervals to collect seismic data. A seismograph integrated with the CPT is used to record the arrival time of seismic waves generated by striking a steel beam positioned at least 10 feet from the cone rods and coupled to the ground surface by the weight of the beam and operator to prevent the beam from moving when struck.

Each side of the beam is struck several times, and each signal produced by a blow is closely examined for signal and noise content, after which the waveform is selected and the arrival time of the shear wave is determined and recorded. After a complete set of seismic data are recorded, the cone is advanced to the next depth, and the procedure is repeated until the hole is complete.

A4.2 CPT Logs

In accordance with the applicable ASTM standard, the vertical axis is designated for the depth, while the horizontal axis displays the magnitude of the test values recorded. Recorded values include tip and shaft resistance and pore pressure. Final plotting scales are determined after all the tests are complete and take into consideration maximum test values and depths recorded for the project. This information is used to calculate the friction ratio and is correlated to material types, which are presented graphically in a column to the right. The CPT logs are included as Figures A19 and A20. The results of shear wave velocity testing are included on Figure A21.

A5 MATERIAL DESCRIPTION

Initially, samples were classified visually in the field. Consistency, color, relative moisture, degree of plasticity, and other distinguishing characteristics of the soil samples were noted. Afterward, the samples were reexamined in the PBS laboratory, various standard classification tests were conducted, and the field classifications were modified where necessary. The terminology used in the soil classifications and other modifiers are defined in Table A-1, Terminology Used to Describe Soil.

Table A-1
Terminology Used to Describe Soil

Soil Descriptions

Soils exist in mixtures with varying proportions of components. The predominant soil, i.e., greater than 50 percent based on total dry weight, is the primary soil type and is capitalized in our log descriptions (SAND, GRAVEL, SILT, or CLAY). Smaller percentages of other constituents in the soil mixture are indicated by use of modifier words in general accordance with the ASTM D2488-06 Visual-Manual Procedure. "General Accordance" means that certain local and common descriptive practices may have been followed. In accordance with ASTM D2488-06, group symbols (such as GP or CH) are applied on the portion of soil passing the 3-inch (75mm) sieve based on visual examination. The following describes the use of soil names and modifying terms used to describe fine- and coarse-grained soils.

Fine-Grained Soils (50% or greater fines passing 0.075 mm, No. 200 sieve)
The primary soil type, i.e., SILT or CLAY is designated through visual-manual procedures to evaluate soil toughness, dilatency, dry strength, and plasticity. The following outlines the terminology used to describe fine-grained soils, and varies from ASTM D2488 terminology in the use of some common terms.

Primary soil NAME, Symbols, and Adjectives			Plasticity Description	Plasticity Index (PI)
SILT (ML & MH)	**CLAY (CL & CH)**	**ORGANIC SOIL (OL & OH)**		
SILT		Organic SILT	Non-plastic	0 – 3
SILT		Organic SILT	Low plasticity	4 – 10
SILT/Elastic SILT	Lean CLAY	Organic SILT/ Organic CLAY	Medium Plasticity	10 – 20
Elastic SILT	Lean/Fat CLAY	Organic CLAY	High Plasticity	20 – 40
Elastic SILT	Fat CLAY	Organic CLAY	Very Plastic	>40

Modifying terms describing secondary constituents, estimated to 5 percent increments, are applied as follows:

Description	% Composition	
With Sand	% Sand ≥ % Gravel	15% to 25% plus No. 200
With Gravel	% Sand < % Gravel	
Sandy	% Sand ≥ % Gravel	≤30% to 50% plus No. 200
Gravelly	% Sand < % Gravel	

Borderline Symbols, for example CH/MH, are used when soils are not distinctly in one category or when variable soil units contain more than one soil type. **Dual Symbols,** for example CL-ML, are used when two symbols are required in accordance with ASTM D2488.

Soil Consistency terms are applied to fine-grained, plastic soils (i.e., PI ≥ 7). Descriptive terms are based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84, as follows. SILT soils with low to non-plastic behavior (i.e., PI < 7) may be classified using relative density.

Consistency Term	SPT N-value	Unconfined Compressive Strength	
		tsf	kPa
Very soft	Less than 2	Less than 0.25	Less than 24
Soft	2 – 4	0.25 – 0.5	24 – 48
Medium stiff	5 – 8	0.5 – 1.0	48 – 96
Stiff	9 – 15	1.0 – 2.0	96 – 192
Very stiff	16 – 30	2.0 – 4.0	192 – 383
Hard	Over 30	Over 4.0	Over 383

Table A-1
Terminology Used to Describe Soil
2 of 2

Soil Descriptions

Coarse - Grained Soils (less than 50% fines)

Coarse-grained soil descriptions, i.e., SAND or GRAVEL, are based on the portion of materials passing a 3-inch (75mm) sieve. Coarse-grained soil group symbols are applied in accordance with ASTM D2488-06 based on the degree of grading, or distribution of grain sizes of the soil. For example, well-graded sand containing a wide range of grain sizes is designated SW; poorly graded gravel, GP, contains high percentages of only certain grain sizes. Terms applied to grain sizes follow.

Material NAME	Particle Diameter	
	Inches	Millimeters
SAND (SW or SP)	0.003 – 0.19	0.075 – 4.8
GRAVEL (GW or GP)	0.19 – 3	4.8 – 75
Additional Constituents:		
Cobble	3 – 12	75 – 300
Boulder	12 – 120	300 – 3050

The primary soil type is capitalized, and the fines content in the soil are described as indicated by the following examples. Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5 percent. Other soil mixtures will have similar descriptive names.

Example: Coarse-Grained Soil Descriptions with Fines

>5% to < 15% fines (Dual Symbols)	≥15% to < 50% fines
Well graded GRAVEL with silt: GW-GM	Silty GRAVEL: GM
Poorly graded SAND with clay: SP-SC	Silty SAND: SM

Additional descriptive terminology applied to coarse-grained soils follow.

Example: Coarse-Grained Soil Descriptions with Other Coarse-Grained Constituents

Coarse-Grained Soil Containing Secondary Constituents	
With sand or with gravel	≥ 15% sand or gravel
With cobbles; with boulders	Any amount of cobbles or boulders.

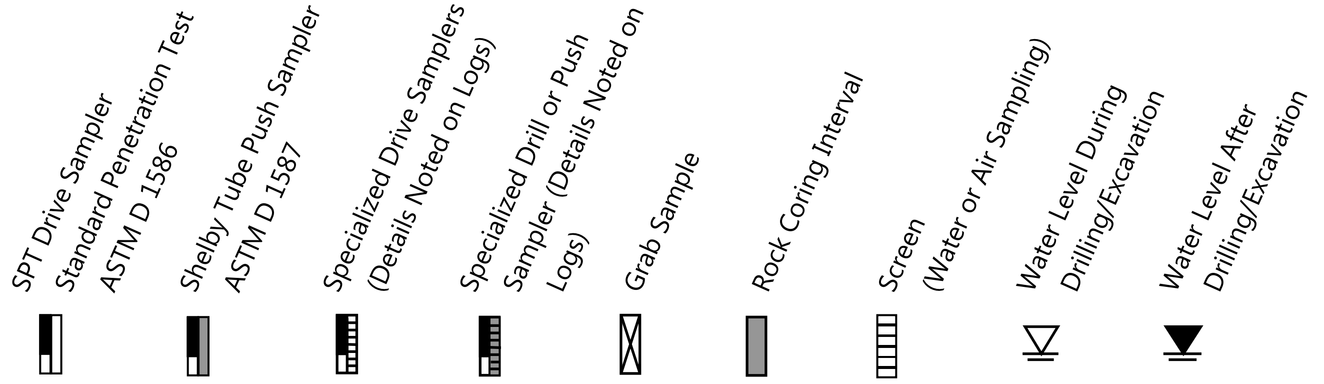
Cobble and boulder deposits may include a description of the matrix soils, as defined above.

Relative Density terms are applied to granular, non-plastic soils based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84.

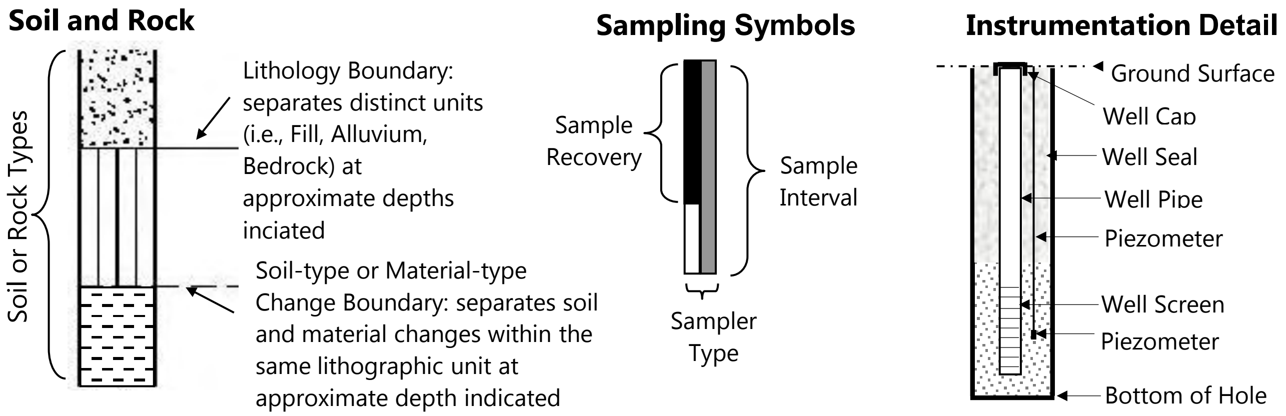
Relative Density Term	SPT N-value
Very loose	0 – 4
Loose	5 – 10
Medium dense	11 – 30
Dense	31 – 50
Very dense	> 50

Table A-2
Key To Test Pit and Boring Log Symbols

SAMPLING DESCRIPTIONS



LOG GRAPHICS



Geotechnical Testing Acronym Explanations

PP	Pocket Penetrometer	HYD	Hydrometer Gradation
TOR	Torvane	SIEV	Sieve Gradation
DCP	Dynamic Cone Penetrometer	DS	Direct Shear
ATT	Atterberg Limits	DD	Dry Density
PL	Plasticity Limit	CBR	California Bearing Ratio
LL	Liquid Limit	RES	Resilient Modulus
PI	Plasticity Index	VS	Vane Shear
P200	Percent Passing US Standard No. 200 Sieve	bgs	Below ground surface
OC	Organic Content	MSL	Mean Sea Level
CON	Consolidation	HCL	Hydrochloric Acid
UC	Unconfined Compressive Strength		

Details of soil and rock classification systems are available on request.

Rev. 02/2017

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

BORING B-1

PBS PROJECT NUMBER:
74217.000

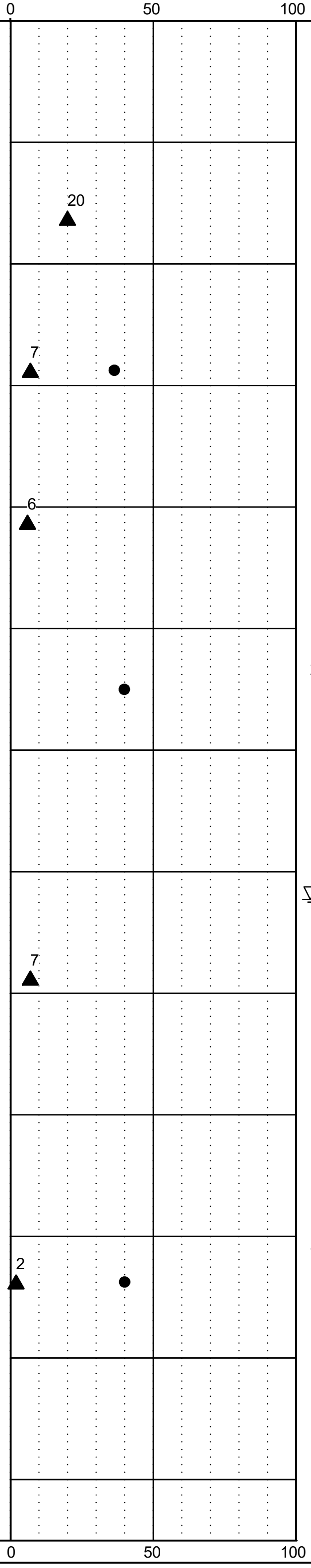
APPROX. BORING B-1 LOCATION:
(See Site Plan)
Lat: 45.523873 Long: -123.045873

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	INSTALLATION AND COMMENTS
0.0	Very stiff, brown SILT (ML) with trace sand and minor roots; low plasticity; fine sand; moist	0.0			
2.0				S-1	
4.0	becomes medium stiff			S-2	
6.0				S-3	
8.0	becomes brown-gray; low to medium plasticity				
10.0	becomes moist to wet		DD CON	S-4	DD = 78 pcf 200 psi
12.0					
14.0					∇ 09/23/21
	Medium stiff, brown-gray SILT (ML) with sand; low plasticity; fine sand; wet	15.0		S-5	
16.0					
18.0					
20.0	becomes soft, gray; low to medium plasticity			S-6	Slight organic odor
22.0					
24.0					



DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A1

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

BORING B-1
(continued)

APPROX. BORING B-1 LOCATION:
(See Site Plan)
Lat: 45.523873 Long: -123.045873

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

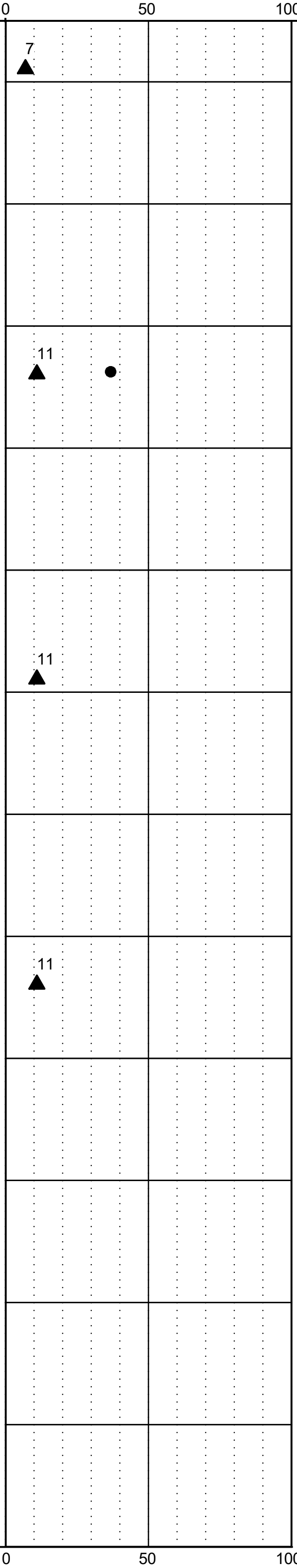
▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE	INSTALLATION AND COMMENTS
	Medium stiff, gray SILT (ML) with sand; low to medium plasticity; fine sand; wet	25.0		S-7	7	
30.0	becomes stiff; low plasticity		P200	S-8	11	P200 = 85%
				S-9	11	
40.0				S-10	11	
	Final depth 41.5 feet bgs; boring backfilled with bentonite.	41.5				

26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0



DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A1

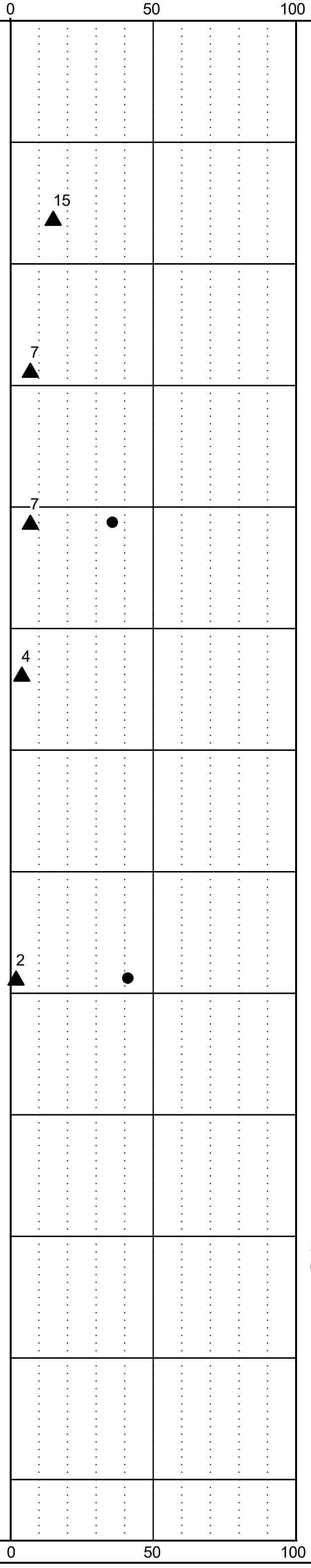
CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	**BORING B-2**
PBS PROJECT NUMBER: 74217.000	APPROX. BORING B-2 LOCATION: (See Site Plan) Lat: 45.523777 Long: -123.042467

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD%
▨ CORE REC%

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE	INSTALLATION AND COMMENTS
0.0	Stiff, brown to gray-orange SILT (ML) with trace sand; low plasticity; fine sand; dry	0.0				
				S-1	15	
	becomes medium stiff; low to medium plasticity; moist			S-2	7	
	becomes brown-gray			S-3	7	
	becomes soft; moist to wet			S-4	4	
15.0	Soft, brown-gray SILT (ML) with sand; low plasticity; fine sand; wet	15.0	P200	S-5	2	P200 = 86%
				S-6		350 psi for 12 inches 600 psi for 6 inches



DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A2

PBS

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

BORING B-2
(continued)

APPROX. BORING B-2 LOCATION:
(See Site Plan)
Lat: 45.523777 Long: -123.042467

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✦ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE (0–100)
25.0	Stiff, brown-gray SILT (ML) with sand; low plasticity; fine sand; wet	25.0		S-7	11
30.0	becomes gray			S-8	11
35.0				S-9	11
40.0	becomes hard			S-10	31
41.5	Final depth 41.5 feet bgs; boring backfilled with bentonite. Groundwater not measured due to mud rotary drilling.	41.5			

DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A2
Page 2 of 2

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

BORING B-3

PBS PROJECT NUMBER:
74217.000

APPROX. BORING B-3 LOCATION:
(See Site Plan)
Lat: 45.522572 Long: -123.042224

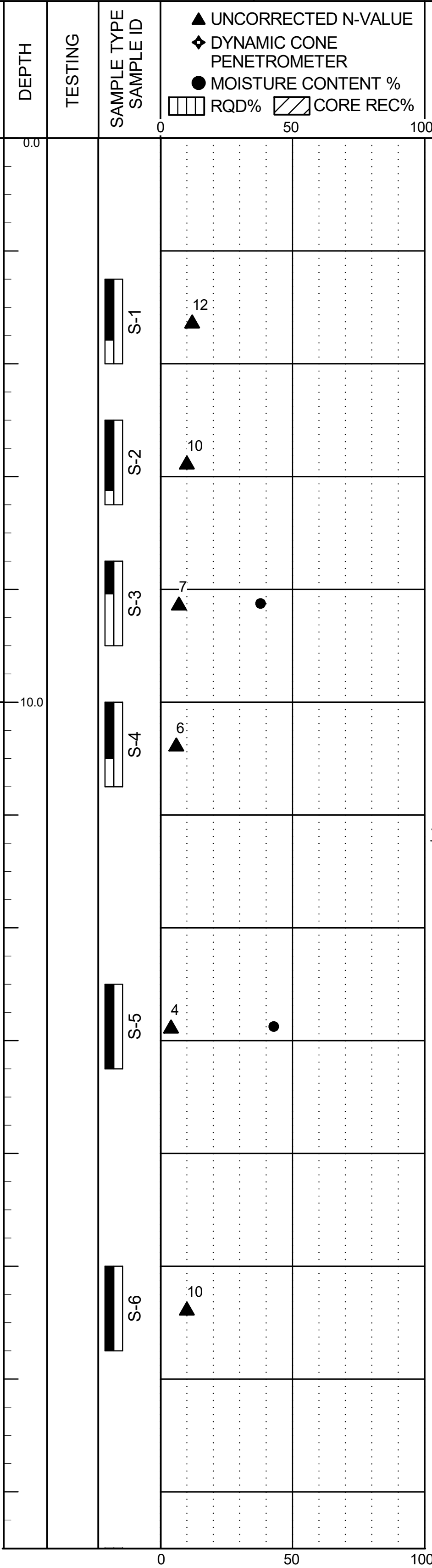
DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

INSTALLATION AND COMMENTS

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION
0.0	Stiff, gray, brown, and orange SILT (ML) with trace sand; low plasticity; fine sand; dry
2.0	
4.0	
	becomes brown-gray; low to medium plasticity; moist
6.0	
	becomes medium stiff; moist to wet
8.0	
10.0	Medium stiff, brown-gray SILT (ML) with sand; low to medium plasticity; fine sand; moist to wet
12.0	
14.0	
	becomes soft, brown; low plasticity; wet
16.0	
18.0	
20.0	becomes stiff
22.0	
24.0	



▽ 09/23/21

DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A3

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

BORING B-3
(continued)

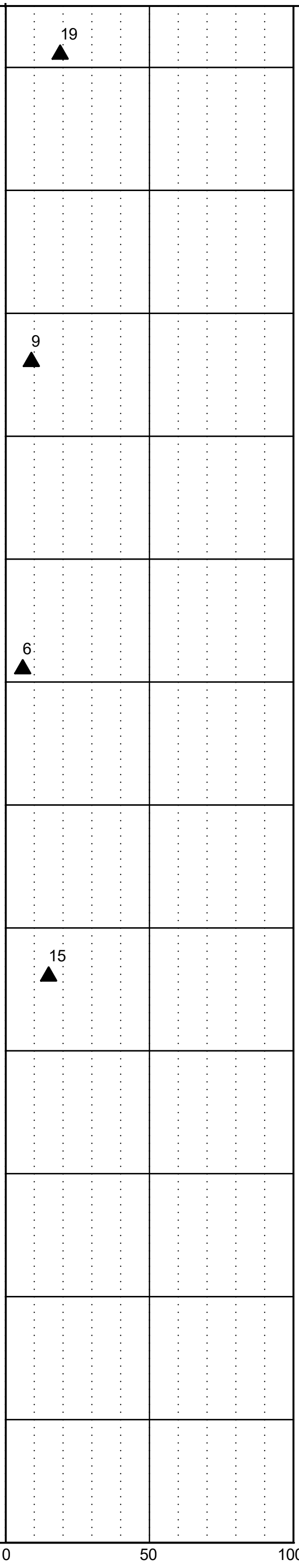
APPROX. BORING B-3 LOCATION:
(See Site Plan)
Lat: 45.522572 Long: -123.042224

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

Surface Conditions: Grass

▲ UNCORRECTED N-VALUE
✦ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

DEPTH	MATERIAL DESCRIPTION	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE	INSTALLATION AND COMMENTS
25.0	Very stiff, gray SILT (ML) with sand; low plasticity; fine sand; wet		S-7	19	
	becomes stiff; low to medium plasticity		S-8	9	
			S-9	6	Slight organic odor
			S-10	15	
41.5	Final depth 41.5 feet bgs; boring backfilled with bentonite.				



DEPTH FEET: 26.0, 28.0, 30.0, 32.0, 34.0, 36.0, 38.0, 40.0, 42.0, 44.0, 46.0, 48.0, 50.0

DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A3
Page 2 of 2

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

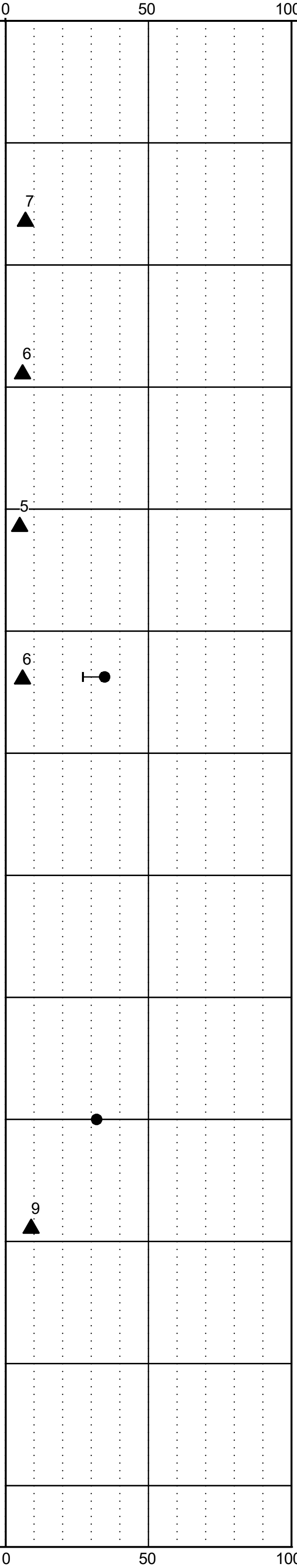
PBS PROJECT NUMBER:
74217.000

BORING B-4

APPROX. BORING B-4 LOCATION:
(See Site Plan)
Lat: 45.520324 Long: -123.043142

DEPTH FEET	MATERIAL DESCRIPTION	TESTING	SAMPLE TYPE SAMPLE ID	INSTALLATION AND COMMENTS
	NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.			Surface Conditions: Grass
0.0	Medium stiff, brown to gray-orange SILT (ML) with sand and gravel; low plasticity; fine sand; fine, subangular gravel; dry		S-1	
5.0	Medium stiff, brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist		S-2 S-3	
10.0	Medium stiff, gray SILT (ML) with sand; low plasticity; fine sand; moist to wet	ATT	S-4	LL = 34 PL = 27 PI = 7
				Pushed shelby; no recovery 200 psi
		DD	S-5	DD = 90 pcf 400 psi
20.0	becomes stiff, brown		S-6	

▲ UNCORRECTED N-VALUE
✦ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%



DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A4

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

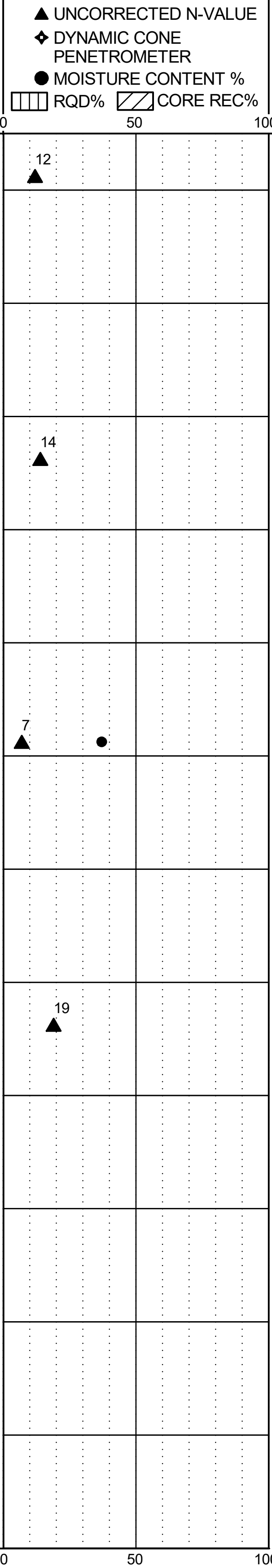
BORING B-4
(continued)

APPROX. BORING B-4 LOCATION:
(See Site Plan)
Lat: 45.520324 Long: -123.043142

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE	INSTALLATION AND COMMENTS
25.0	Stiff, gray SILT (ML) with sand; low plasticity; fine sand; wet	25.0		S-7	12	
30.0				S-8	14	
35.0	becomes medium stiff		P200	S-9	7	P200 = 72%
40.0	becomes very stiff			S-10	19	
41.5	Final depth 41.5 feet bgs; boring backfilled with bentonite. Groundwater not measured due to mud rotary drilling.	41.5				



DRILLING METHOD: Mud Rotary
DRILLED BY: Western States Soil Conservation, Inc.
LOGGED BY: J. Powell

BIT DIAMETER:
HAMMER EFFICIENCY PERCENT: 85.6
LOGGING COMPLETED: 9/23/2021

FIGURE A4

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

BORING C-1

PBS PROJECT NUMBER:
74217.000

APPROX. BORING C-1 LOCATION:
(See Site Plan)
Lat: 45.523228 Long: -123.045673

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	▲ UNCORRECTED N-VALUE (0 – 50 – 100)	INSTALLATION AND COMMENTS
0.0	ASPHALT (6.5 inches; 3 lifts)	0.0		C-1		
	BASE ROCK (5 inches)	0.5				
	Stiff, light brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	0.9		S-1	12	
2.0	becomes very stiff			S-2	22	
4.0	Final depth 4.0 feet bgs; boring backfilled with AC cold patch.	4.0				
6.0						
8.0						
10.0						
12.0						
14.0						

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A5

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

BORING C-2

PBS PROJECT NUMBER:
74217.000

APPROX. BORING C-2 LOCATION:
(See Site Plan)
Lat: 45.523208 Long: -123.044620

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE
0.0	ASPHALT (6.75 inches; 3 lifts)	0.0	C-1	
	BASE ROCK (5 inches)	0.6		
	Stiff, brown to gray SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.0	S-1	10
2.0	becomes very stiff, brown to gray-orange		S-2	17
4.0	Final depth 4.0 feet bgs; boring backfilled with AC cold patch.	4.0		
6.0				
8.0				
10.0				
12.0				
14.0				

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A6
Page 1 of 1

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

BORING C-3

APPROX. BORING C-3 LOCATION:
(See Site Plan)
Lat: 45.523217 Long: -123.043766

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

Legend: ▲ UNCORRECTED N-VALUE; ✦ DYNAMIC CONE PENETROMETER; ● MOISTURE CONTENT %; ▥ RQD%; ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE
0.0	ASPHALT (7.5 inches; 3 lifts)	0.0		C-1	
	BASE ROCK (5 inches)	0.6			
	Medium stiff, brown SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.0		S-1	6
2.0	becomes very stiff, brown to gray-orange			S-2	16
4.0	Final depth 4.0 feet bgs; boring backfilled with AC cold patch.	4.0			

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A7
Page 1 of 1

PBS	CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	**BORING C-4**
	PBS PROJECT NUMBER: 74217.000	APPROX. BORING C-4 LOCATION: (See Site Plan) Lat: 45.422748 Long: -123.043512

MATERIAL DESCRIPTION

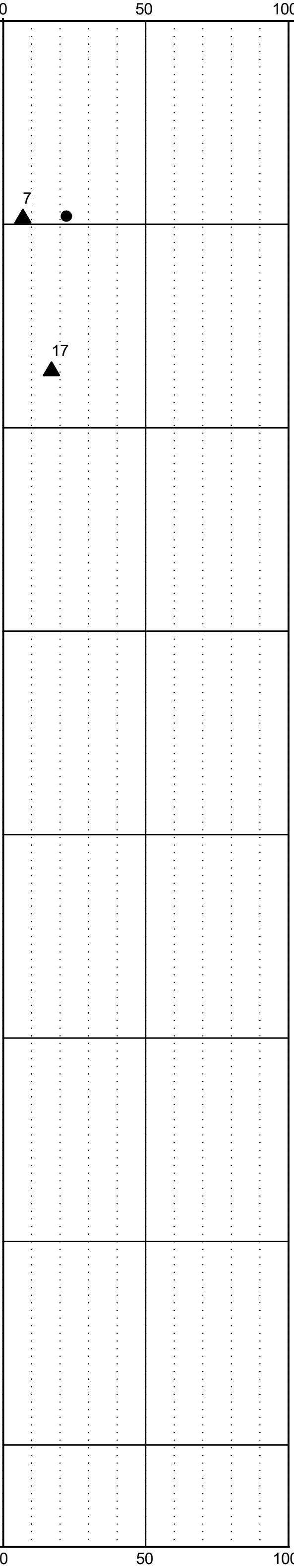
NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✦ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID
0.0	ASPHALT (7.5 inches; 3 lifts)	0.0		C-1
	BASE ROCK (7 inches)	0.6		
	Medium stiff, brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.2		S-1
2.0				
	becomes very stiff			S-2
4.0				
	Final depth 4.17 feet bgs; boring backfilled with AC cold patch.	4.2		
6.0				
8.0				
10.0				
12.0				
14.0				



DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A8

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

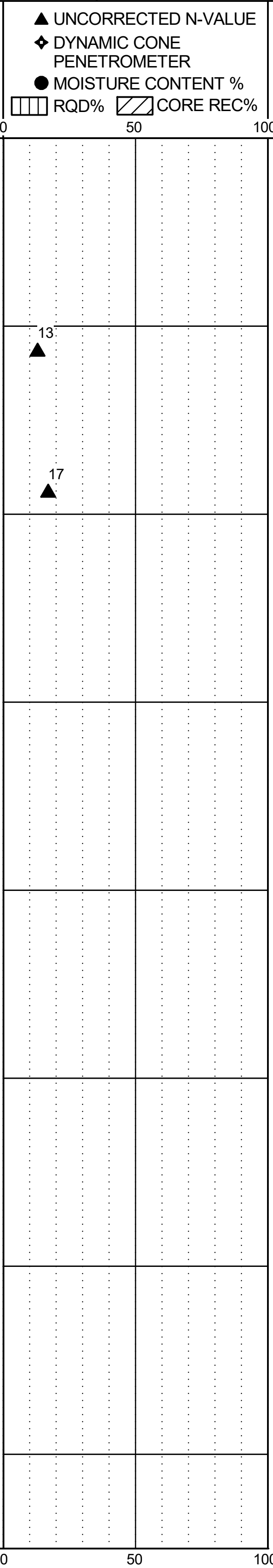
PBS PROJECT NUMBER:
74217.000

BORING C-5

APPROX. BORING C-5 LOCATION:
(See Site Plan)
Lat: 45.522095 Long: -123.043515

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	INSTALLATION AND COMMENTS
0.0	ASPHALT (8.0 inches; 3 lifts)	0.0		C-1	Surface Conditions: Asphalt
	BASE ROCK (7.5 inches)	0.6			
	Stiff, gray to orange-brown SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.3		S-1	
	becomes very stiff, with increased sand			S-2	
	Final depth 4.5 feet bgs; boring backfilled with AC cold patch.	4.5			

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.



DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

PBS	CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	**BORING C-6**
	PBS PROJECT NUMBER: 74217.000	APPROX. BORING C-6 LOCATION: (See Site Plan) Lat: 45.521548 Long: -123.043457

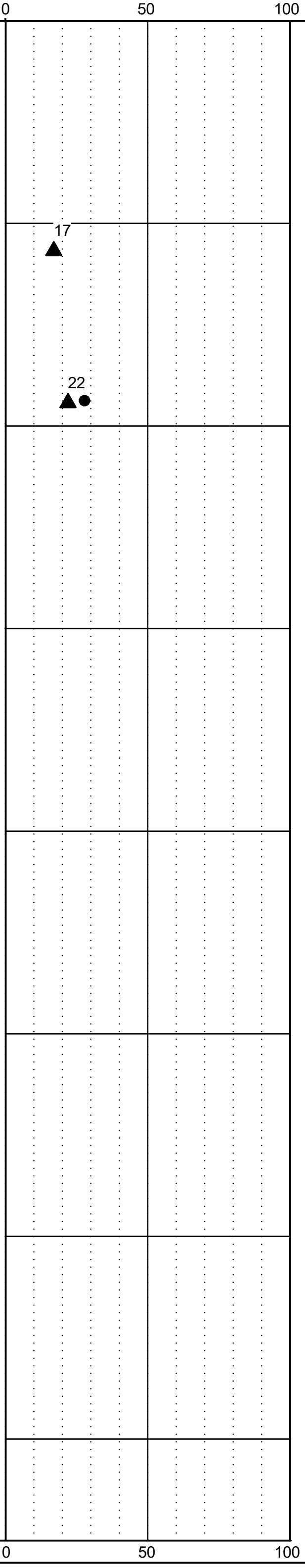
NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✦ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID
0.0	ASPHALT (7.75 inches; 3 lifts)	0.0		C-1
	BASE ROCK (7.75 inches)	0.6		
	Very stiff, brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.3		
2.0				S-1
	becomes very stiff, with increased sand			S-2
4.0				
	Final depth 4.5 feet bgs; boring backfilled with AC cold patch.	4.5		
6.0				
8.0				
10.0				
12.0				
14.0				



DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A10

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

TEST PIT TP-1

PBS PROJECT NUMBER:
74217.000

APPROX. TEST PIT TP-1 LOCATION:
(See Site Plan)
Lat: 45.523382 Long: -123.045426

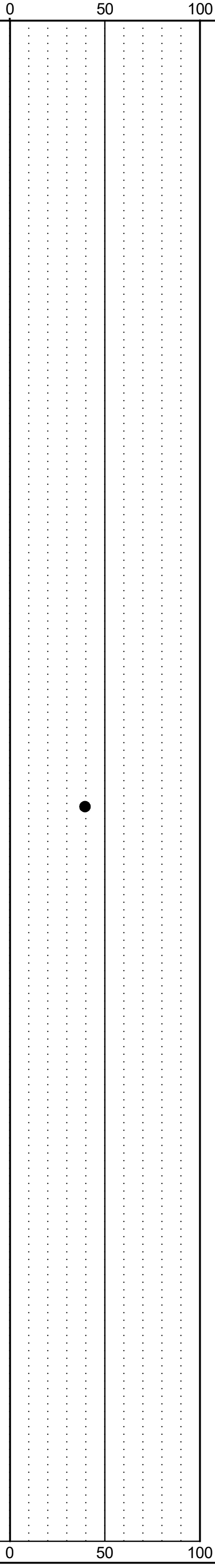
MATERIAL DESCRIPTION

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT %

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			
	Stiff, light brown to gray-orange SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0			
			TOR	☒ S-1	TOR = 0.6 tsf
2.0					
	becomes moist		TOR	☒ S-2	TOR = 0.6 tsf
4.0					
6.0					
	becomes soft, brown-gray; low to medium plasticity		TOR	☒ S-3	TOR = 0.3 tsf
8.0					
10.0					
	Soft, brown-gray, SILT (ML) with sand; low to medium plasticity; fine sand; wet	11.0			
			P200 TOR	☒ S-4	P200 = 73% TOR = 0.2 tsf
12.0	Final depth 12.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	12.0			
14.0					



LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A11
Page 1 of 1

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

TEST PIT TP-2

PBS PROJECT NUMBER:
74217.000

APPROX. TEST PIT TP-2 LOCATION:
(See Site Plan)
Lat: 45.523839 Long: -123.044735

MATERIAL DESCRIPTION

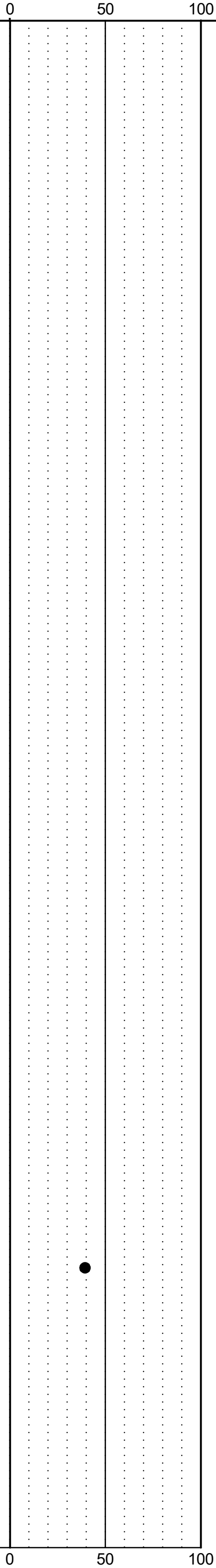
Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT %

COMMENTS

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0	TOR	☒ S-1	TOR = 0.55 tsf
	becomes brown to gray-orange; dry to moist		TOR	☒ S-2	TOR = 0.65 tsf
7.0	Soft, brown-gray SILT (ML) with sand; low to medium plasticity; fine sand; moist	7.0	TOR	☒ S-3	TOR = 0.3 tsf
	becomes wet		TOR	☒ S-4	TOR = 0.15 tsf
12.5	Final depth 12.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	12.5			



LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A12
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 74217.000 20210922.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 10/6/21:RPG

PBS	CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	**TEST PIT TP-3**
	PBS PROJECT NUMBER: 74217.000	APPROX. TEST PIT TP-3 LOCATION: (See Site Plan) Lat: 45.523851 Long: -123.043480

MATERIAL DESCRIPTION

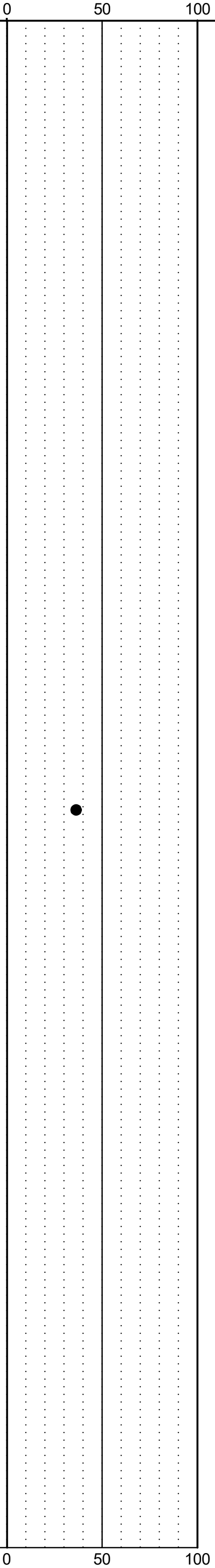
Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT %

COMMENTS

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0			
2.0			TOR	☒ S-1	TOR = 0.6 tsf
3.0	becomes brown to gray-orange; dry to moist		TOR	☒ S-2	TOR = 0.7 tsf
7.5	becomes medium stiff, brown-gray; low to medium plasticity; moist		TOR	☒ S-3	TOR = 0.4 tsf
10.5	Soft, brown-gray SILT (ML) with sand; low to medium plasticity; fine sand; moist to wet	10.5	TOR	☒ S-4	TOR = 0.3 tsf
11.5	Final depth 11.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	11.5			



LOGGED BY: J. Powell COMPLETED: 9/22/2021	EXCAVATED BY: Dan J. Fischer Excavating, Inc. EXCAVATION METHOD: CASE 580N with 24" Bucket	FIGURE A13 **Page 1 of 1**

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

TEST PIT TP-4

APPROX. TEST PIT TP-4 LOCATION:
(See Site Plan)
Lat: 45.423304 Long: -123.043306

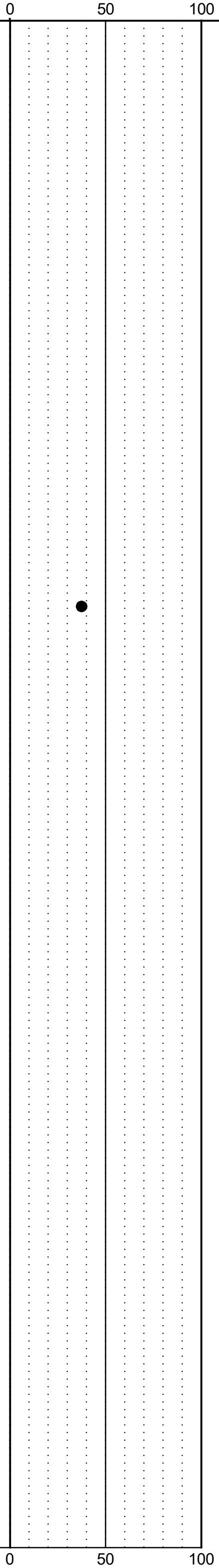
MATERIAL DESCRIPTION

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT %

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0			
			TOR	☒ S-1	TOR = 0.6 tsf
2.0	scattered roots to 2 feet bgs				
	becomes brown to gray-orange; dry to moist		TOR	☒ S-2	TOR = 0.7 tsf
4.0					Infiltration testing completed at 4 feet bgs
			P200 TOR	☒ S-3	P200 = 94% TOR = 0.4 tsf
6.0	becomes medium stiff, brown-gray; low to medium plasticity; moist				
8.0					
10.0					
11.0	Medium stiff, brown-gray SILT (ML) with sand; low to medium plasticity; fine sand; moist to wet	11.0	TOR	☒ S-4	TOR = 0.3 tsf
12.0	Final depth 12.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	12.0			
14.0					



TEST PIT LOG - 1 PER PAGE 74217.000 20210922.GPJ PBS DATATMPL GEO.GDT PRINT DATE: 10/6/21:RPG

LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A14

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

TEST PIT TP-5

APPROX. TEST PIT TP-5 LOCATION:
(See Site Plan)

Lat: 45.522961 Long: -123.042452

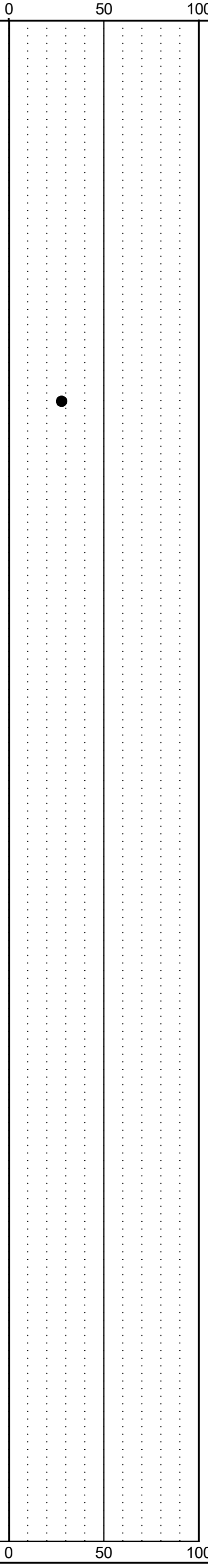
MATERIAL DESCRIPTION

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT %

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry scattered roots to 2 feet bgs	1.0			
2.0			TOR	☒ S-1	TOR = 0.55 tsf
	becomes brown to gray-orange; moist		TOR	☒ S-2	TOR = 0.75 tsf
4.0					Infiltration testing completed at 4 feet bgs
6.5	Medium stiff, brown-gray SILT (ML) with sand; low plasticity; fine sand; moist	6.5	TOR	☒ S-3	TOR = 0.3 tsf
12.0			TOR	☒ S-4	TOR = 0.3 tsf
12.5	Final depth 12.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	12.5			



LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A15

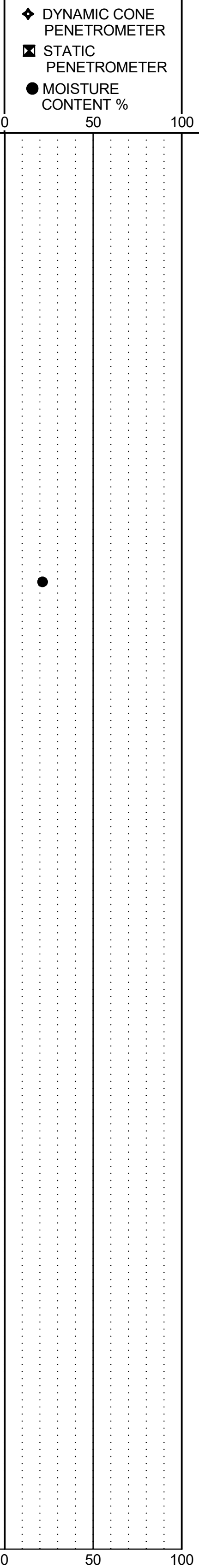
CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON		**TEST PIT TP-6**
PBS PROJECT NUMBER: 74217.000		APPROX. TEST PIT TP-6 LOCATION: (See Site Plan) Lat: 45.522136 Long: -123.043166

MATERIAL DESCRIPTION

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			Deeper root zone near large trees
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0	TOR	☒ S-1	TOR = 0.5 tsf
4.0	scattered roots to 4 feet bgs				
	becomes brown to gray-orange; moist		TOR	☒ S-2	TOR = 0.6 tsf Infiltration testing completed at 5 feet bgs
8.0	Medium stiff, brown-gray SILT (ML) with sand; low plasticity; fine sand; moist	8.0	TOR	☒ S-3	TOR = 0.4 tsf
12.0	grades to low to medium plasticity; moist to wet		TOR	☒ S-4	TOR = 0.3 tsf
13.0	Final depth 13.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	13.0			



LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A16
Page 1 of 1

PBS

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

TEST PIT TP-7

APPROX. TEST PIT TP-7 LOCATION:
(See Site Plan)
Lat: 45.521122 Long: -123.043373

MATERIAL DESCRIPTION

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT % (0 – 50 – 100)

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			Deeper root zone near large trees
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0			
			TOR	☒ S-1	TOR = 0.55 tsf
2.0					
	scattered roots to 3 feet bgs				
	becomes brown to gray-orange; dry to moist		TOR	☒ S-2	TOR = 0.7 tsf
4.0					
6.0					
7.0	Medium stiff, brown-gray SILT (ML) with sand; low to medium plasticity; fine sand; moist	7.0	TOR	☒ S-3	TOR = 0.35 tsf
8.0					
10.0					
	becomes moist to wet		TOR	☒ S-4	TOR = 0.25 tsf
12.0	Final depth 12.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	12.0			
14.0					

LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A17
Page 1 of 1

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

TEST PIT TP-8

APPROX. TEST PIT TP-8 LOCATION:
(See Site Plan)
Lat: 45.520262 Long: -123.042687

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

◆ DYNAMIC CONE PENETROMETER
☒ STATIC PENETROMETER
● MOISTURE CONTENT %
0 50 100

Surface Conditions: Grass

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	COMMENTS
0.0	ROOT ZONE (12 inches)	0.0			Deeper root zone near large trees
1.0	Stiff, brown SILT (ML) with trace sand; low plasticity; fine sand; dry	1.0	TOR	☒ S-1	TOR = 0.5 tsf
2.0					
	becomes brown to gray-orange; dry to moist		TOR	☒ S-2	TOR = 0.6 tsf
4.0					
6.0					
7.0	Medium stiff, brown-gray SILT (ML) with sand; low to medium plasticity; fine sand; moist	7.0			
8.0			TOR	☒ S-3	TOR = 0.45 tsf
10.0					
	becomes soft to medium stiff; moist to wet		TOR	☒ S-4	TOR = 0.25 tsf
12.0	Final depth 12.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	12.0			
14.0					

0 50 100

LOGGED BY: J. Powell
COMPLETED: 9/22/2021

EXCAVATED BY: Dan J. Fischer Excavating, Inc.
EXCAVATION METHOD: CASE 580N with 24" Bucket

FIGURE A18
Page 1 of 1

PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, Oregon 97239
www.pbsusa.com

CPT-1
Total depth: 100.07 ft
Date: 9/14/2021

Project: **74217.000 Cornelius Multi-Family Development**
Location: **Cornelius, Oregon**

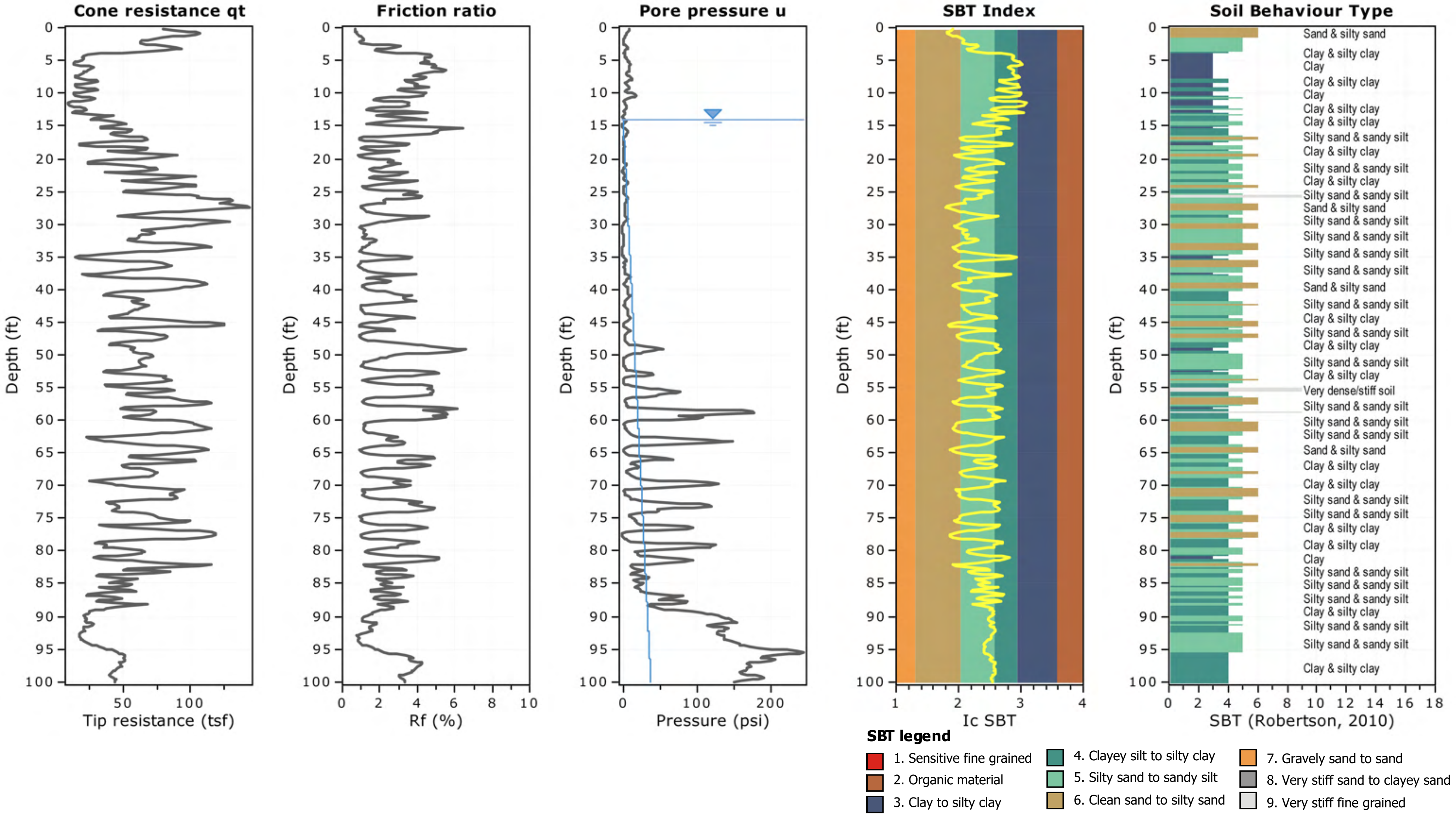


FIGURE A19

PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, Oregon 97239
www.pbsusa.com

CPT-2
Total depth: 81.37 ft
Date: 9/14/2021

Project: **74217.000 Cornelius Multi-Family Development**
Location: **Cornelius, Oregon**

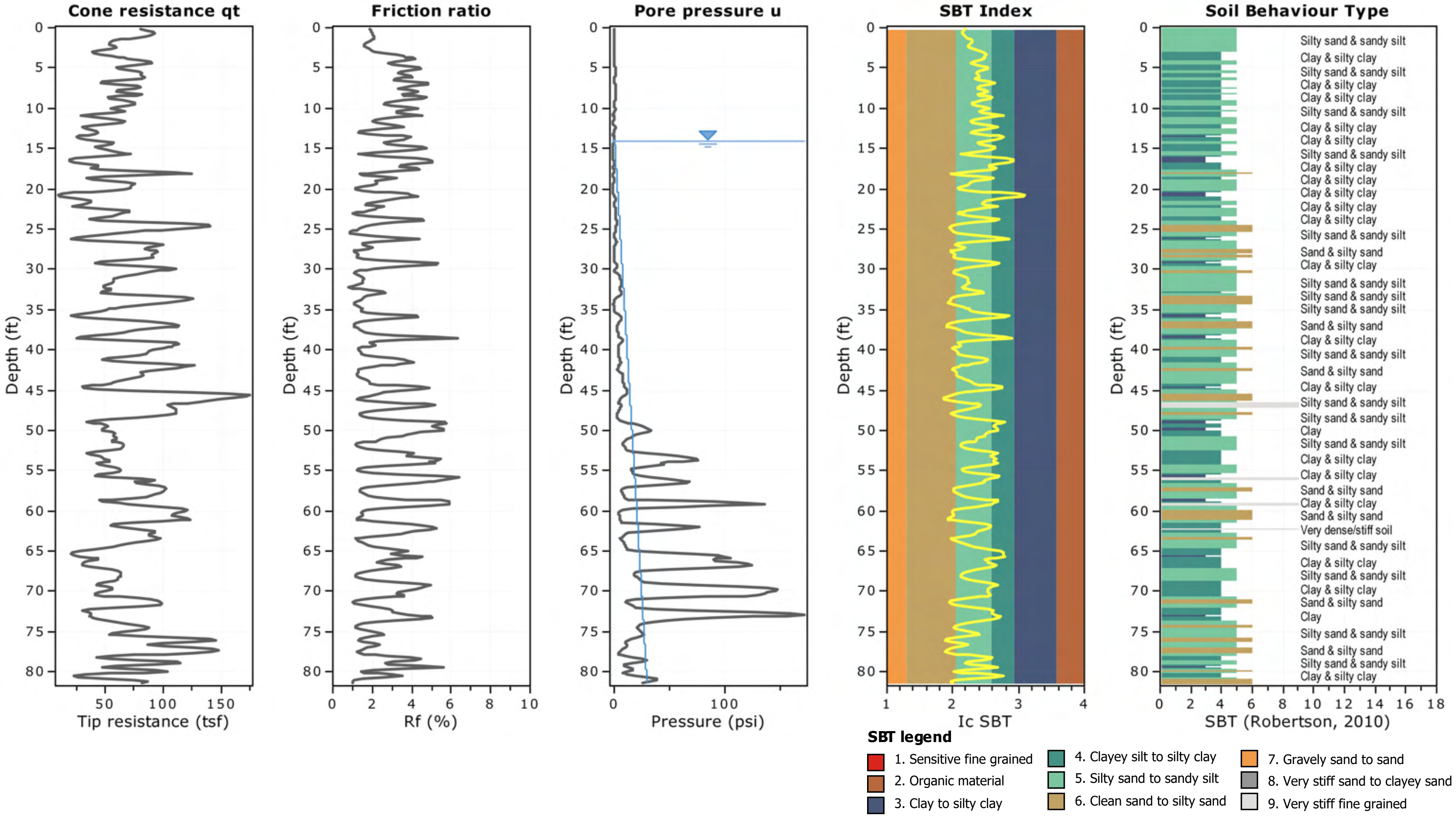
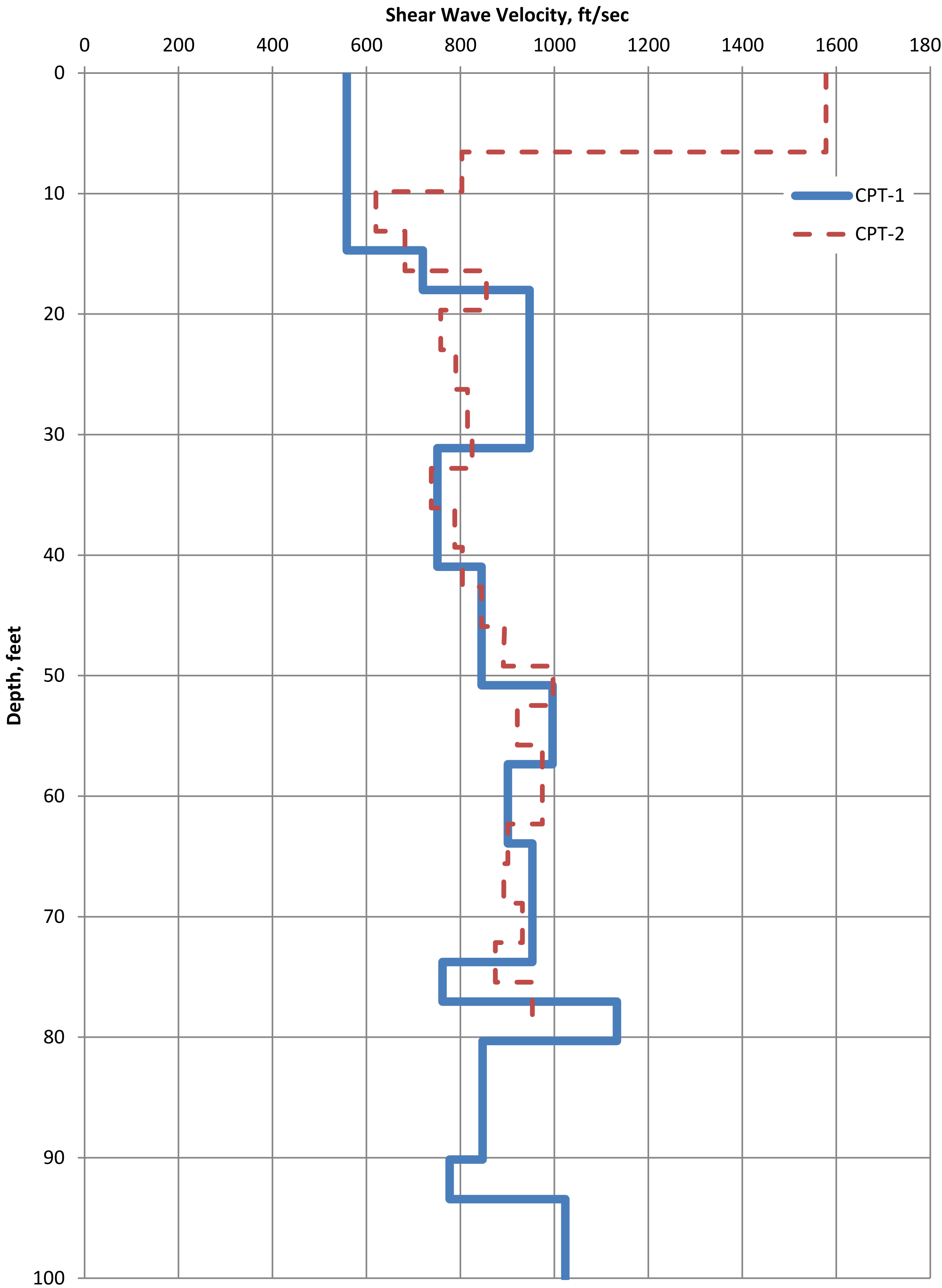


FIGURE A20



PBS

SHEAR WAVE VELOCITY PROFILE

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

OCT 2021
74217.000

FIGURE

A21

Appendix B

Laboratory Testing

Appendix B: Laboratory Testing

B1 GENERAL

Samples obtained during the field explorations were examined in the PBS laboratory. The physical characteristics of the samples were noted and field classifications were modified where necessary. During the course of examination, representative samples were selected for further testing. The testing program for the soil samples included standard classification tests, which yield certain index properties of the soils important to an evaluation of soil behavior. The testing procedures are described in the following paragraphs. Unless noted otherwise, all test procedures are in general accordance with applicable ASTM standards. "General accordance" means that certain local and common descriptive practices and methodologies have been followed.

B2 CLASSIFICATION TESTS

B2.1 Visual Classification

The soils were classified in accordance with the Unified Soil Classification System with certain other terminology, such as the relative density or consistency of the soil deposits, in general accordance with engineering practice. In determining the soil type (that is, gravel, sand, silt, or clay) the term that best described the major portion of the sample is used. Modifying terminology to further describe the samples is defined in Table A-1, Terminology Used to Describe Soil, in Appendix A.

B2.2 Moisture (Water) Contents

Natural moisture content determinations were made on samples of the fine-grained soils (that is, silts, clays, and silty sands). The natural moisture content is defined as the ratio of the weight of water to dry weight of soil, expressed as a percentage. The results of the moisture content determinations are presented on the exploration logs in Appendix A and on Figure B3, Summary of Laboratory Data, in Appendix B.

B2.3 One-Dimensional Consolidation

One-dimensional consolidation testing was conducted on a relatively undisturbed sample collected from B-1 at a depth of 10 feet to obtain quantitative data for use in evaluating potential settlement resulting from loads imposed from the structure. The test specimen was placed in a one-dimensional, fixed-ring consolidometer and loads were applied to the specimen. The resulting change in thickness of the soil sample was monitored with time. Upon completion of primary consolidation, the next load increment was applied. The specimen was kept moist until the first load increment was applied, at which point the specimen was inundated with water. The results of the consolidation tests are presented on Figure B1, Consolidation Test Results. The curve of the plot shows the percent strain that occurred in the test specimen under various magnitudes of applied constant load.

B2.4 Atterberg Limits

Atterberg limits were determined on select samples for the purpose of classifying soils into various groups for correlation. The results of the Atterberg limits test, which included liquid and plastic limits, are plotted on Figure B2, Atterberg Limits Test Results, and on the exploration logs in Appendix A, where applicable.

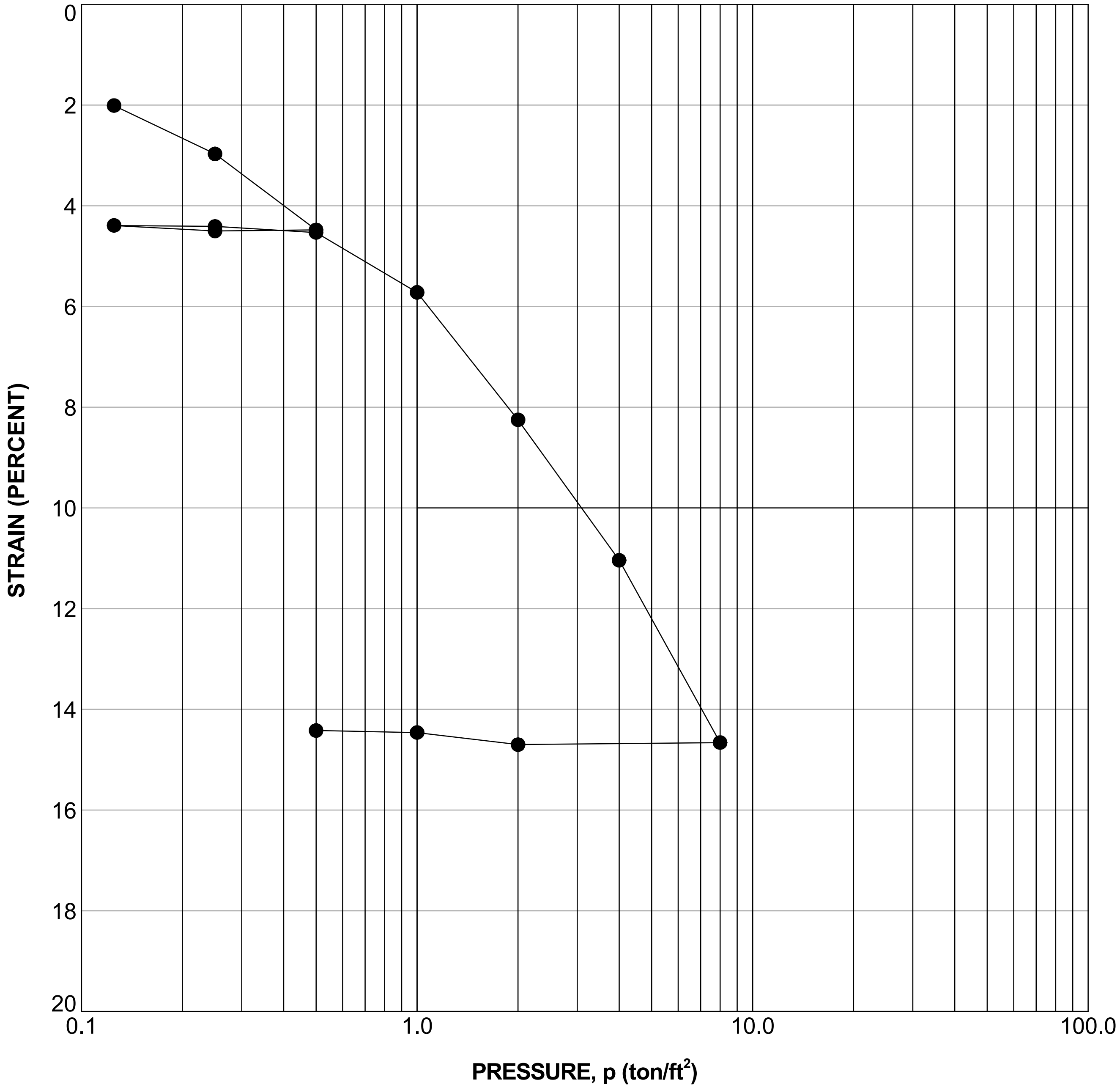
B2.5 Grain-Size Analyses (P200 Wash)

Washed sieve analyses (P200) were completed on samples to determine the portion of soil samples passing the No. 200 Sieve (i.e., silt and clay). The results of the P200 test results are presented on the exploration logs in Appendix A and on Figure B3, Summary of Laboratory Data, in Appendix B.

CONSOLIDATION TEST RESULTS

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

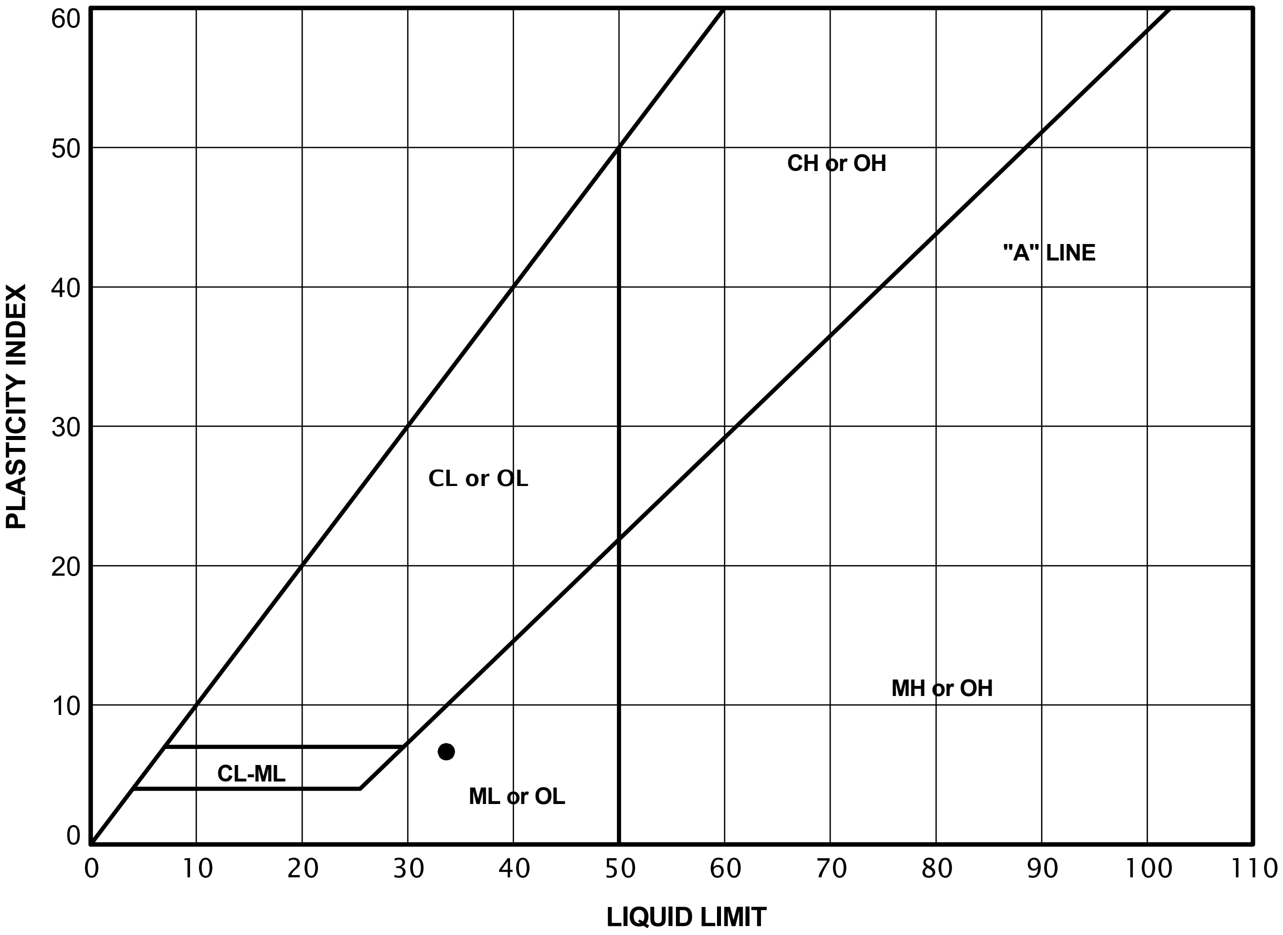


KEY	EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	INITIAL MOISTURE CONTENT (PERCENT)	FINAL MOISTURE CONTENT (PERCENT)	INITIAL DRY DENSITY (PCF)
●	B-1	S-4	10.0	39.8	36.2	78.1

_CONSOLIDATION 74217.000_20210922.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 10/1/21:RPG

ATTERBERG LIMITS TEST RESULTS	
CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	PBS PROJECT NUMBER: 74217.000

TEST METHOD: ASTM D4318



KEY	EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	NATURAL MOISTURE CONTENT (PERCENT)	PERCENT PASSING NO. 40 SIEVE (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
●	B-4	S-4	10.0	34.6	NA	34	27	7

ATTERBERG LIMITS 74217.000_20210922.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 10/1/21:RPG

FIGURE B2

SUMMARY OF LABORATORY DATA

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

SAMPLE INFORMATION				MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT (PERCENT)	PLASTIC LIMIT (PERCENT)	PLASTICITY INDEX (PERCENT)
B-1	S-2	5		36.3							
B-1	S-4	10		39.8	78						
B-1	S-6	20		39.9							
B-1	S-8	30		36.7				85			
B-2	S-3	7.5		35.6							
B-2	S-5	15		41.0				86			
B-3	S-3	7.5		37.8							
B-3	S-5	15		42.8							
B-4	S-4	10		34.6					34	27	7
B-4	S-5	17		31.8	90						
B-4	S-9	35		37.0				72			
C-1	S-1	1		18.3							
C-4	S-1	1.17		22.1							
C-6	S-2	3		27.7							
TP-1	S-3	7.5		39.5							
TP-1	S-4	11.5		39.3				73			
TP-2	S-4	12		39.3							
TP-3	S-3	7.5		36.3							
TP-4	S-3	5.5		37.4				94			
TP-5	S-2	3.5		27.7							
TP-6	S-2	4.5		21.4							

FIGURE B3

Existing Pavement Evaluation

Pavement conditions were evaluated by coring the existing AC and drilling six borings, designated C-1 through C-6, to depths of up to 4.5 feet bgs at the approximate locations shown in Figure 2.

PBS evaluated the existing asphalt condition to select appropriate structural layer coefficients. The structural numbers for the existing pavement section were calculated to determine whether the existing pavement capacity was consistent with the City of Cornelius Public Work Standards for Local Streets and Collectors. The City of Cornelius standard pavement details correspond to structural numbers of 3.24 and 4.6 for Local Streets and Collectors, respectively.

A summary of our evaluation of the existing pavement is included in Table 4 below.

Table 4. Summary of Existing AC and Base Courses Thicknesses

Boring	Roadway Classification	Existing AC Thickness (inches)	Existing Base Course Thickness (inches)	Structural Number of Existing Pavement	Capacity in Accordance
C-1	Collector	6.5	5.0	2.95	No
C-2	Collector	6.75	5.0	3.18	No
C-3	Collector	7.5	5.0	3.45	No
C-4	Collector	7.5	7.0	3.51	No
C-5	Local	8.0	7.5	3.78	Yes
C-6	Local	7.75	7.75	3.91	Yes

EXPLANATION

⊕ B-1 - Boring name and approximate location

△ CPT-1 - Cone penetration test name and approximate location

● C-1 - Pavement core name and approximate location

▣ TP-4 - Test pit name and approximate location with infiltration test

▣ TP-2 - Test pit name and approximate location

▭ Approximate site boundary

SOURCES: Google Earth 2020

1 inch = 200 feet

Feet
0 100 200 400

SITE PLAN

CORNELIUS MULTI-FAMILY
DEVELOPMENT
CORNELIUS, OREGON

DATE: OCT 2021 · PROJECT: 74217.000

PBS

FIGURE
2

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CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

BORING C-1

PBS PROJECT NUMBER:
74217.000

APPROX. BORING C-1 LOCATION:
(See Site Plan)
Lat: 45.523228 Long: -123.045673

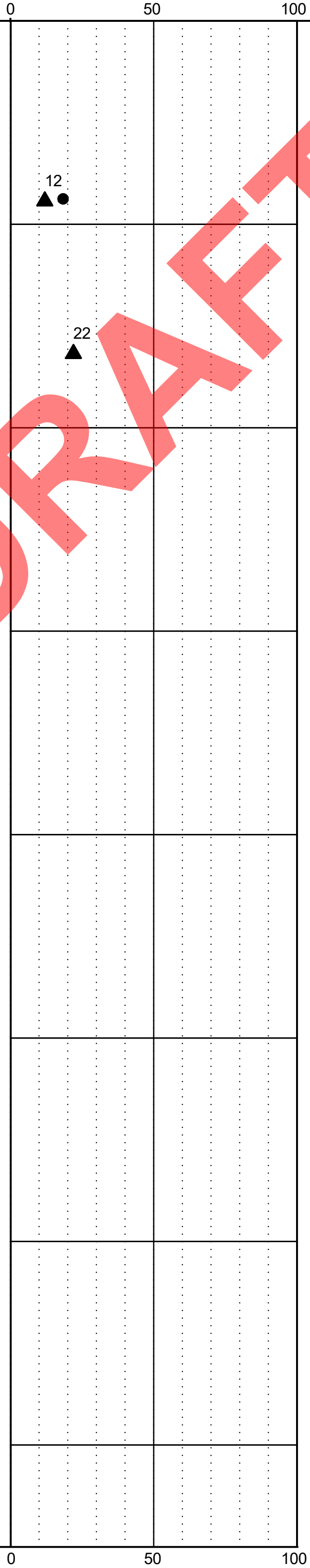
NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✥ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	N-VALUE / MOISTURE CONTENT (0–100)
0.0	ASPHALT (6.5 inches; 3 lifts)	0.0		C-1	
	BASE ROCK (5 inches)	0.5			
	Stiff, light brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	0.9		S-1	▲ 12 ●
2.0	becomes very stiff			S-2	▲ 22
4.0	Final depth 4.0 feet bgs; boring backfilled with AC cold patch.	4.0			
6.0					
8.0					
10.0					
12.0					
14.0					



DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A5
Page 1 of 1

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

BORING C-2

APPROX. BORING C-2 LOCATION:
(See Site Plan)
Lat: 45.523208 Long: -123.044620

▲ UNCORRECTED N-VALUE
✜ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD%
▨ CORE REC%

INSTALLATION AND COMMENTS
Surface Conditions: Asphalt

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE (0–50–100)	INSTALLATION AND COMMENTS
0.0	ASPHALT (6.75 inches; 3 lifts)	0.0		C-1		
	BASE ROCK (5 inches)	0.6				
	Stiff, brown to gray SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.0		S-1	10	
2.0	becomes very stiff, brown to gray-orange			S-2	17	
4.0	Final depth 4.0 feet bgs; boring backfilled with AC cold patch.	4.0				
6.0						
8.0						
10.0						
12.0						
14.0						

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A6
Page 1 of 1

	CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	**BORING C-3**
	PBS PROJECT NUMBER: 74217.000	APPROX. BORING C-3 LOCATION: (See Site Plan) Lat: 45.523217 Long: -123.043766

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD%
▨ CORE REC%

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	0 50 100	INSTALLATION AND COMMENTS Surface Conditions: Asphalt
0.0		ASPHALT (7.5 inches; 3 lifts)	0.0		C-1		
		BASE ROCK (5 inches)	0.6				
		Medium stiff, brown SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.0		S-1	▲ 6	
2.0		becomes very stiff, brown to gray-orange			S-2	▲ 16	
4.0		Final depth 4.0 feet bgs; boring backfilled with AC cold patch.	4.0				
6.0							
8.0							
10.0							
12.0							
14.0						0 50 100	

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A7

CORNELIUS MULTI-FAMILY DEVELOPMENT CORNELIUS, OREGON	**BORING C-4**	
PBS PROJECT NUMBER: 74217.000	APPROX. BORING C-4 LOCATION: (See Site Plan) Lat: 45.422748 Long: -123.043512	

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	▲ UNCORRECTED N-VALUE ✦ DYNAMIC CONE PENETROMETER ● MOISTURE CONTENT % ▥ RQD% ▨ CORE REC% (0–50–100)	INSTALLATION AND COMMENTS
0.0	ASPHALT (7.5 inches; 3 lifts)	0.0		C-1		Surface Conditions: Asphalt
	BASE ROCK (7 inches)	0.6				
	Medium stiff, brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	1.2		S-1	▲ 7 ●	
2.0	becomes very stiff			S-2	▲ 17	
4.0	Final depth 4.17 feet bgs; boring backfilled with AC cold patch.	4.2				
6.0						
8.0						
10.0						
12.0						
14.0						

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A8

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

BORING C-5

PBS PROJECT NUMBER:
74217.000

APPROX. BORING C-5 LOCATION:
(See Site Plan)
Lat: 45.522095 Long: -123.043515

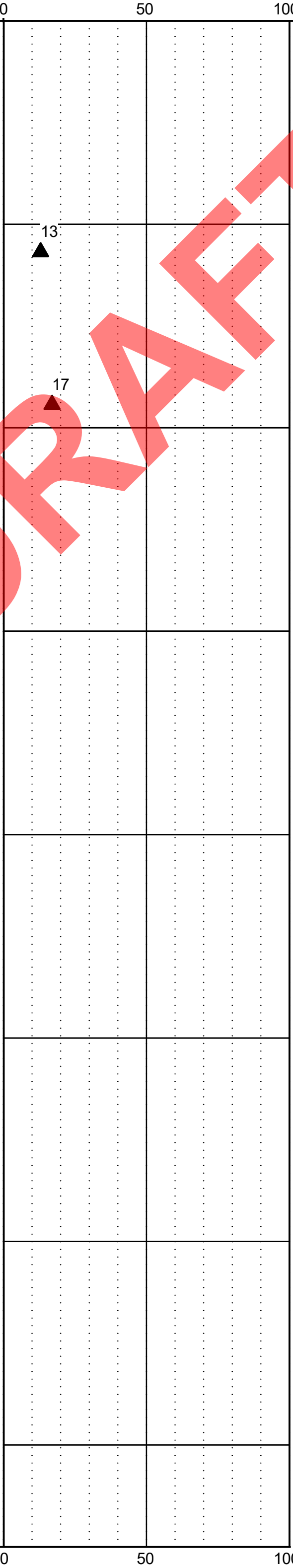
NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD% ▨ CORE REC%

INSTALLATION AND COMMENTS

Surface Conditions: Asphalt

DEPTH FEET	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	UNCORRECTED N-VALUE
0.0	ASPHALT (8.0 inches; 3 lifts)	0.0		C-1	
	BASE ROCK (7.5 inches)	0.6			
	Stiff, gray to orange-brown SILT (ML) with trace sand; medium plasticity; fine sand; moist	1.3		S-1	13
2.0					
	becomes very stiff, with increased sand			S-2	17
4.0					
	Final depth 4.5 feet bgs; boring backfilled with AC cold patch.	4.5			
6.0					
8.0					
10.0					
12.0					
14.0					



DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A9
Page 1 of 1

CORNELIUS MULTI-FAMILY DEVELOPMENT
CORNELIUS, OREGON

PBS PROJECT NUMBER:
74217.000

BORING C-6

APPROX. BORING C-6 LOCATION:
(See Site Plan)

Lat: 45.521548 Long: -123.043457

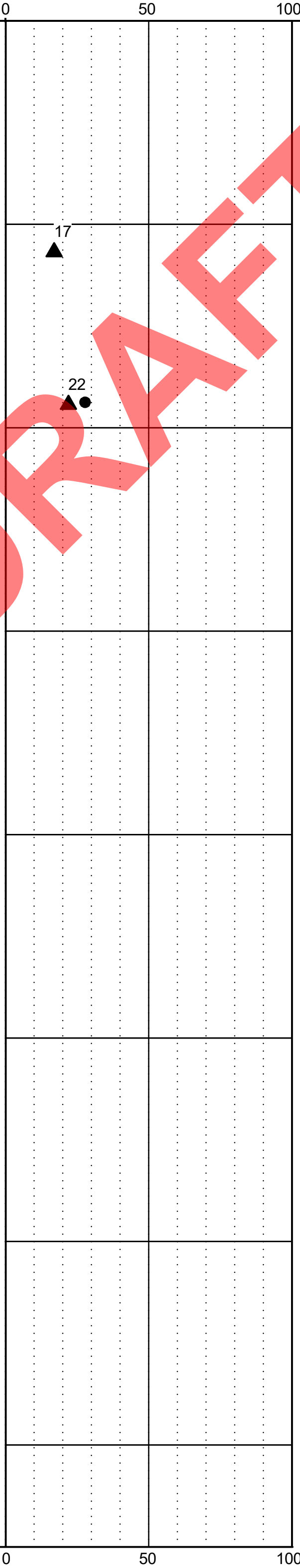
DEPTH FEET | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH | TESTING | SAMPLE TYPE SAMPLE ID | INSTALLATION AND COMMENTS

NOTE: Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

▲ UNCORRECTED N-VALUE
✧ DYNAMIC CONE PENETROMETER
● MOISTURE CONTENT %
▥ RQD%
▨ CORE REC%

Surface Conditions: Asphalt

DEPTH	MATERIAL DESCRIPTION	SAMPLE ID
0.0	ASPHALT (7.75 inches; 3 lifts)	C-1
0.6	BASE ROCK (7.75 inches)	
1.3	Very stiff, brown to gray-orange SILT (ML) with trace sand; low to medium plasticity; fine sand; moist	S-1
	becomes very stiff, with increased sand	S-2
4.5	Final depth 4.5 feet bgs; boring backfilled with AC cold patch.	



DEPTH FEET: 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

DRILLING METHOD: Core Bit/Solid Stem Auger
DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: J. Powell

BIT DIAMETER: 5 inches
HAMMER EFFICIENCY PERCENT: 60
LOGGING COMPLETED: 9/18/2021

FIGURE A10

From: Peter Reich
Sent: Wednesday, April 27, 2022 2:51 PM
To: Peter Reich
Subject: FW: Cornelius Multi-family Development TIA- ODOT review and approval

-----Original Message-----
From: RUSSELL John <John.RUSSELL@odot.oregon.gov>
Sent: Wednesday, April 27, 2022 1:19 PM
To: John A. Manix <John.Manix@pbsusa.com>
Cc: Maureen P. White <Maureen.White@pbsusa.com>; Peter Reich <Peter.Reich@pbsusa.com>; ODOT_R1_DevRev <ODOT_R1_DevRev@odot.oregon.gov>
Subject: RE: Cornelius Multi-family Development TIA- ODOT review and approval

John,

Thank you for taking the time to revise the TIA to satisfactorily address ODOT concerns.

After review of the TIA, ODOT concurs with the report's conclusion that all study intersections will operate within ODOT's mobility targets and that no further mitigation is needed for ODOT facilities. While the most recent PDF does not include appendices, assuming no significant changes from previously reviewed appendices, ODOT has no further comment.

This this email should be sufficient to satisfy the City's requirement for a letter of certification from ODOT relating to the review of these traffic impacts.

Thank you,

John Russell, PE [he/him]
Traffic Analysis Engineer
Oregon Dept of Transportation
John.Russell@odot.oregon.gov
503.731.8282

April 27, 2022

Dear Barbara,

Below, please find our responses to your review letter dated April 21, 2022. Along with these responses you will find an updated Design Review Narrative and associated plans, an updated Land Partition Narrative and associated plans.

1. The narrative does not contain adequate detail to demonstrate compliance with a number of findings, particularly given the magnitude of the proposal. Please add a finding (or, if a finding is included, please add more detail to said finding) for the following Code criteria:
    - Land Partitioning, CMC 17.05.030 Subsections G., H., I., J. and K. (subsection C. is addressed) ***The land partition Criteria have been added to the narrative with findings.***

    - Land Partitioning, CMC 17.05.030 Subsection H. requires that the proposal complies with CMC 18.143.050 – Access standards, please add findings for these criteria. ***Findings for CMC 18.143.050 have been added to the land partition narrative.***

    - Gateway Mixed Use Zone, CMC 18.75.050(1) requires front setbacks between 0 and 10 feet; however, buildings 15, 14, 12, 10, 7 and 6 do not comply and the finding is based on the enhanced setback requirements of 18.75.060, which the narrative states are only applicable to Building 1. Please revise the finding to CMC 18.75.050(1) to state that the applicable setback standards are found in 18.75.065(G)(4). ***The finding to CMC 18.75.050(1) has been revised.***

    - Gateway Mixed Use Zone, CMC 18.75.065(N)(1)(a) requires one *covered* off-street parking space per dwelling unit and the finding reads, “There are 349 dwelling units resulting in 349 covered spaces required. 349 parking spaces are provided.” It is not clear from the narrative or the plans that covered parking is provided. In addition, the details of the carports/covered parking will be needed to determine access throughout the site for fire department access, particularly the ladder truck access to the 3-story buildings and how maneuverability and clearance is provided. Will bollards be added to assist with this***? The narrative has been updated to clearly demonstrate that 349 covered spaces are provided. The carport detail has been added to the narrative and the location of the detail on the plans has been added for reference.***

  - Gateway Mixed Use Zone, CMC 18.75.070 Parking and Access allows a reduction in the minimum required off-street vehicle parking requirements for shared uses but there is no analysis of what percentage reduction is being requested. Parking requirements are also addressed in CMC 18.145.020 but again, no clear percentage of reduction is identified. Also, please see comment below regarding security gates and discuss the impact of the security gates on shared parking. ***Additional clarification has been added to address CMC 18.75.070 and 18.145.020***

- Site Design Review, CMC 18.100.40(7), the finding states that a security gate and fencing is proposed for the development. However, this is not addressed elsewhere in the narrative. This may need to be addressed in several locations. Please add detail regarding the proposed security gates, which appear to enclose all of the buildings, parking and amenities in Zones A and B. This seems to conflict with the GMU purpose statement in 18.75.010, especially this sentence, "The district welcomes users arriving by vehicle, bicycle, transit, and on foot by accommodating multiple modes of access and providing cross-circulation within the district through a mix of public and private streets, sidewalks, pathways, and connections." Please provide more detail as to how the security gates support access to buildings, businesses, parking, pathways and amenities throughout this gateway site. Also, please address public access (such as Cornelius Public Works) to utilities within easements and how queuing will be addressed at gated entries, especially as it affects public right-of-way. ***Additional detail has been added to Sheet A0.10 to show the extent of the fencing. The fencing does not enclose the entirety of the development and the gates will remain open during the daytime hours. The fencing and gates as proposed do not limit access throughout the site, except to amenities that are for resident use only.***

- Transportation Facilities, CMC 18.143, particularly as it pertains to access and maneuvering areas. ***Findings for CMC 18.143 have been added to the Design Review Narrative.***

- Off-street Parking and Loading, CMC 18.145.070 generally, and specifically Subsection D.2. ***Findings for CMC 18.145.070 have been added to the Design Review Narrative. Subsection D(2) does not apply to this development as there are no parking areas greater than 3 acres as demonstrated on Sheet A0.10.***

2. The narrative findings refer to an additional narrative that pertains to Land Partition requirements; however, it does not appear that this additional narrative was submitted. ***Originally the narrative was a single document addressing Design***

Review and Land partition requirements. We are resubmitting two separate documents for review.

3. There are existing easements that will be affected by the land partition. Please submit new easement language with the partition plat application. Final easement documents will be due with final plat review. ***Proposed and existing easements are shown, noted, and dimensioned on the preliminary land partition.***

4. Plan documents for the partition need to be separate with just survey and partition lines. The partition application materials need to be submitted a separate electronic file folder with the narrative and the plans. ***A separate file will be submitted containing the partition application materials.***

5. Pursuant to Item J. on the Design Review Submittal Checklist, please provide information on the site plan showing the location and state the duration of the temporary construction office. ***The location is shown on A1.01 and the duration has been added as well. The duration will be 20 months.***

6. Per the pre-application notes, please provide a 'certification letter' or documentation from ODOT that it is not necessary. ***We have correspondence from ODOT that they agree with the findings of the TIA. This information is included in our resubmission.***

7. Per the pre-application notes, please provide a geotechnical report. This report should contain an analysis of the existing pavement along the Fred Meyer drive (which will need to be dedicated as right-of-way), as well as for the subject site itself. ***The geotechnical report, including the pavement analysis is included in our resubmission.***

8. In your application, include a separate section that addresses the criteria of CMC Chapter 15 regarding Swimming Pools. ***A permit for the swimming pool will be submitted at a later date once the design of the pool is finalized. The pool design will comply with the criteria of CMC Chapter 15.***

9. Update your Land Use Application with the correct tax lot numbers (1N3 34CD 00600 is not correct, it should be 1N3 34CD 06700, 1N3 34CD 00100, and 1N3 34 CD 00200). ***The application has been updated with the correct tax lot numbers.***

10. When submitting your final packet, you will need to submit the following:

    - Swimming Pool Permit fee: $45.00
    - Preliminary Land Partition fee: $1,325.00
    - Type III Design Review fee: $3,314.00
    - One unbound 8 ½" x 11" copy of the full application packet
    - One 11" x 17" set of plans

- 12 sets of full-size plan sheets
- A thumb drive with all application materials.

A check for the above referenced fees, excluding the swimming pool permit fee will be mailed to the City.

Thank you for your comments.

Sincerely,

Calida Residential, LLC

Cornelius
Oregon's Family Town

Land Partition - Preliminary Plat Submittal Checklist

LAND PARTITION (Preliminary Plat)
Written Narrative Requirements

__X__ A. **Checklist:** Please provide one completed and signed copy of this four page checklist.

__X__ B. **Description of proposal:** Please describe what the existing conditions are on-site and the changes proposed to the site, structure, landscaping, parking, and land use, including the number of parcels created. Provide findings verifying that the intended use is allowed by the City's *Development Code*.

__X__ C. **Approval criteria findings:** Please provide a narrative that evaluates and verifies the proposal meets the approval criteria identified below:

Section 17.05.030(C) of the Development Code

1. *The proposal conforms with the City's Comprehensive Plan.*

   Please note when making findings, the applicant shall address all applicable Comprehensive Plan policies.

2. *The proposal complies with all applicable statutory and ordinance requirements*.

   Please note when making findings, the applicant shall address all applicable Development Code requirements. Specify conformance or proposed variance request from the requirements of the Development.

3. *Adequate public facilities are available to serve the proposal; and*
4. *All proposed lots conform to the size and dimensional requirements of this ordinance; and*
5. *All proposed improvements meet City standards*.

Section 18.155 of the Development Code

1. If the subject parcel is located in the R-10 or R-7 the proposal shall meet the Solar Access Protection design standards identified in *Section 18.155* The applicant will state which option, exemption or both is chosen and describe how it complies.

__Forthcoming__ D. **Additional Requirements:** Please be advised that special studies, investigations and reports may be required to ensure that the proposal does not adversely affect the surrounding community, does not create hazardous conditions for persons or improvements on the site. These studies may include investigations and reports on noise attenuation, air quality, traffic control, soil conditions, flooding of waters and storm water run-off, natural resources, tree preservation, and other concerns.

N/A ____ E. **Fee Ownership:** If applying for a Fee Ownership Land Division please Provide findings specifically addressing each of the approval criteria found in *Section 17.05.050*, of the City's *Development Code*. The criteria below are required in addition to the evaluation of the Land Partition criteria.

1. *As a whole, the development of which the unit is a part meets ordinance criteria for lot area, lot dimensions, setbacks, parking, lot coverage, landscaping, public facilities and street frontage.*

2. *The development as a whole, the unit for which fee ownership is desired and any unit affected by the division shall meet all building, plumbing and fire code standards.*

3. *Ingress and egress is provided to all lots.*

4. *Parking is provided in accordance with ordinance standard for the individual unit either on the new lot or through easements as described in subsection 6, below. If assigned parking is provided, it shall meet ordinance standards.*

5. *Adequate public facilities are provided to the new lot.*

6. *The applicant provides deed covenants required that address: parking, maintenance of buildings and utilities, landscaping and common areas, ingress and egress. The deed covenants must be approved by the City Attorney and Planning Director.*

Forthcoming ____ F. Sensitive Area Pre-Screening Site Assessment Letter: Please provide a copy a completed and signed Sensitive Area Pre-Screening Site Assessment Letter from the City of Cornelius City Engineer.

Plan Requirements

All plans shall be presented at a minimum scale of 1” = 20’, and on a maximum sheet size of 24” x 36”. Please include all of the following information on the plan.

☒ A. **Existing Conditions Plan** includes the following:

x 1. North arrow, scale and date of plan.
x 2. Vicinity map.
x 3. All existing and proposed lot sizes, lot lines and dimensions.
x 4. Points of existing access, interior streets, driveways, and parking areas.
x 5. Location of all existing buildings and structures, including refuse storage locations and pedestrian/bike paths.
___ 6. Existing right-of-way and improvements, including sidewalk dimensions.
x 7. Dimension from right-of-way centerline to edge of existing property line and to required right-of-way dedication.
x 8. Dimensions of all improvements, including setbacks.
x 9. Location of existing public and private utilities, and 100-year floodplain.
x 10. Topographical information, (2 ft. contour lines) of existing grades.

☒ B. **Proposed Preliminary Plat** includes the following:

x 1. Location, widths and names of all existing, proposed streets and public ways within or adjacent to the plat. Illustrate easements for utilities, other encumbrances and railroad right-of-ways. New streets shall be designated with proposed street names.
x 2. Dimension from right-of-way centerline to edge of existing property line and to required right-of-way dedication.
x 3. Location of existing and proposed easements.
x 4. Location of at least one temporary bench mark within the plat boundaries.
x 5. Square footage of all proposed lots.
x 6. The total gross acreage of the partition plat.
n/a 7. Identify and label on the plat conformance with the Solar Ordinance requirements.

☒ C. **Preliminary Plat Reduction** includes the following:

x 1. Provide one proposed preliminary plat reduced to 8.5” x 11”.

☒ D. **Proposed Improvement Plan** includes the following:

x 1. North arrow, scale and date of plan.
x 2. All proposed lot sizes, lot lines and dimensions.
x 3. Dimension from right-of-way centerline to edge of existing and proposed property line and to required right-of-way dedication.
x 4. Existing and proposed right-of-way and improvements, including sidewalk dimensions.
x 5. Topographical information, (2 ft. contour lines) of existing and proposed grades.
x 6. Location of proposed public and private utilities, proposed easements, and 100-year floodplain.

__x__ 7. Plans and profiles of proposed sanitary and storm sewers, showing that gravity service is feasible for all lots.

__x__ 8. Cross-section of all street and bike path improvements.

☒ E. **Landscape Plan**:

__x__ 1. Submit proposed landscaping of water quality, water quantity, wetland mitigation, common space and other non-buildable tracts. Plantings of water quality or quantity facilities shall be designed in accord with Clean Water Services (CWS) standard plant list.

I have provided the items required in this four page submittal checklist. I understand that any missing information, omissions or both may deem my project incomplete, which may lengthen the time to process the request.

Rebecca Wahlstrom
Print name

360.567.2116 / Fax N/A
Telephone Number /FAX Number

Signature

March 8, 2022
Date

Cornelius Multifamily Project Narrative – Type II Land Partition – Preliminary Plat

Section I - Project Description

The applicant proposes a land division to adjust the boundaries of the existing lots to include a commercial development pad at the southern edge of the site fronting E Baseline Street, which will be separate from the residential mixed-use development. The applicant is not proposing to develop that commercial pad as part of this application. The multifamily development will be located on two parcels which are bisected by the N Davis Street extension. The project will improve N Davis Street and extend this public street through the site. The project also creates two private access ways, a private extension of Davis along the western edge of part of the development and an access way bisecting the commercial development pad from the mixed-use residential project.

Section II - Approval Criteria

The application meets the applicable approval criteria under the Cornelius Development Code as demonstrated below.

CHAPTER 17.05 LAND DIVISIONS

17.05.030 Land partitioning

(C) Approval Criteria. A request to partition land must meet all of the following criteria:

(1) The proposal conforms with the city's comprehensive plan; and

> Response: **The proposed project conforms to the city's comprehensive plan by supporting the plan goals of citizen involvement, urbanization, land use, housing, economy, natural and cultural resources, public facilities and services, and transportation.**
>
> ***Citizen Involvement*: The applicant will follow the city's review guidelines which address the city's comprehensive plan, with neighborhood meetings, environmental, engineering, and transportation reviews. Following these guidelines will ensure that the project serves the residents of Cornelius in the best manner possible.**
>
> ***Urbanization & Land Use*: A mixed-use development within a mixed-use zone, within the City limits and UGB is in line with the Metro 2040 Regional Growth Concept. The urbanization goal identifies a dwelling unit capacity of 515 units. The proposed development contains 327 residential units and 22 live-work units. The proposal complies with the maximum building height and goal of including retail, office and residential uses in a single development.**
>
> ***Housing:* The addition of 349 dwelling units will benefit the City of Cornelius by keeping residents within close proximity to local services and to work opportunities. The plan indicates the housing market trend has shifted away from multifamily to single family units but does not identify multifamily market demand. The developer of the proposed project has done their due diligence in determining demand for this type of housing in Cornelius.**
>
> ***Economy:* We estimate that approximately 663 people will occupy the 349 proposed units (an average of 1.9 people per unit) and will necessarily shop, eat, and patronize local businesses,**

supporting the local economy. A portion of the units offered in this project are live/work and retail spaces, which will provide spaces for small neighborhood scale businesses.

Public Facilities and Services: **This is addressed in section 3, below.**

Transportation: **The traffic study demonstrates that the proposed development can be safely accommodated by the transportation system. The proposed development provides bicycle parking facilities for residents, is located near several existing transit stops and proposes pedestrian connections to existing sidewalks along E Baseline Street. The proposal includes the extension of Davis Street to the East through the site, connecting to N 26th Avenue.**

(2) The proposal complies with all applicable statutory and ordinance requirements and regulations; and

Response*:* **Proposed development on the northern parcel is under review through this application and will meet all required standards as demonstrated herein. Development of the southern parcel is not proposed at this time but will be required to show compliance with all applicable regulations at the time of development. The applicant proposes a project that meets the applicable statutory and ordinance requirements. The ordinances to be met include Ordinance 2019-10.1 (Exh. A), 2019 that relates to the development within the Gateway Mixed Use (GMU) zone. The required city review process will further ensure that the project has met the applicable statutory and ordinance requirements.**

(3) Adequate public facilities are available to serve the proposal; and

Response: **The project will be adequately served by existing public facilities.**

Water: **The project proposes to loop an 8" water main from: a 12" public water main that runs north/south in the existing N. Davis Street Right of Way near the southern corner of the western-most property line; the existing 12" water main at the intersection of the private access road and E Baseline Street. A fire flow hydrant test was done on the existing fire hydrant located along the southern property boundary fronting E Baseline Street. This hydrant test yielded a static pressure of 56 pounds per square inch (psi) and a flow rate of 1640 gallons per minute (gpm).**
Sanitary Sewer: **The proposed sanitary sewer system has been divided, north and south, by the proposed N Davis St that runs east and west. The northern part of the system will be served by two connections to the existing 10" public sanitary sewer main that flows from east to west along the northern boundary of the site. The southern part of the system will be served by a single connection to the existing 8" sanitary sewer line that flows from west to east in E Baseline Street. This connection will be routed north through the neighboring future development property in a public sewer easement. Once this proposed 8" public sewer main has reached the subject property, a manhole will be installed and the sewer main will become private and will be routed through the multi-family development.**

Stormwater: **a 42" public storm sewer runs along the northern boundary and along the northern 470-ft section of the eastern boundary. Pipe flow generally runs towards the west and ultimately discharges to Council Creek. There is also a 12" line along the south side of the project in the Oregon Department of Transportation Right of Way. The project's post-**

development flow rates will match pre-developed flow rates and will discharge into the 42" pipe described above.

(4) All proposed lots conform to the size and dimensional requirements of this chapter; and

> **<u>Response:</u> The project is within the Gateway Mixed Use zone which has no minimum lot size. CMC 18.75.050(A) says that "All lots must be functional and meet the minimum setback and parking requirements." As seen on the Preliminary Plat submitted with this application, Parcel 1 is 378,311 square feet (8.68 acres), Parcel 2 is 230,426 square feet (5.29 acres) and Parcel 3 is 81,046 square feet (1.86 acres). The approximate dimensions of Parcel 1; 270' x 960', Parcel 2; 345' x 650', and Parcel 3; 366' x 230'. Each parcel provides a reasonable and functional building area.**

(5) All proposed improvements meet city standards.

> **<u>Response</u>: The proposed public improvements are designed to meet the City of Cornelius standards. One Sanitary connection is proposed to an existing sanitary manhole in E. Baseline Street and two sanitary connections are proposed to the sanitary line that runs east-west along the northern property line. The proposed storm system's emergency overflows will connect at various locations to the existing 42-inch storm line that runs along the northern property line and then south along the eastern property line for 470-ft. The project's proposed water connections are in E. Baseline Street, near the SW corner of the property, and approximately 20-feet west of the proposed N. Davis Street right-of-way dedication. Site improvements are designed and subsequently reviewed following city code and standards. All development will be required to meet City standards.**

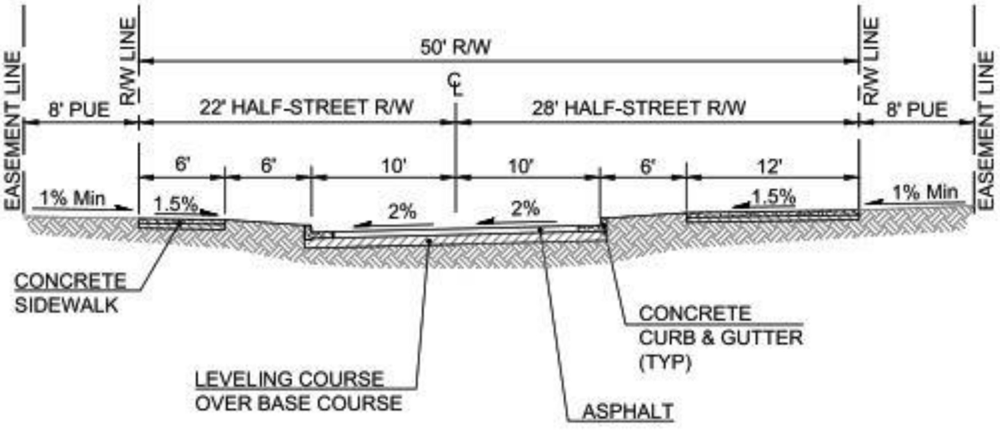
D) Required Improvements. For any partitioning of land, where applicable, the following design and development standards and requirements may apply to partitions. These standards shall apply at the point of construction of improvements and/or land developments. The community development director shall have the authority to impose any such standards or requirements as conditions of approval.

(E) Streets. The location, width and grade of streets shall be considered in relation to existing and planned streets, to topographical conditions, to public convenience and safety, and to the proposed use of the land to be served by such streets. Where location is not shown in the comprehensive plan, the arrangement of the streets in a land division shall either:

(1) Provide for the continuation or appropriate projection of existing principal streets in surrounding areas; or

(2) Conform to standards adopted by the city. All streets shall be designed in accordance with standards set forth in the adopted Cornelius public works standards.

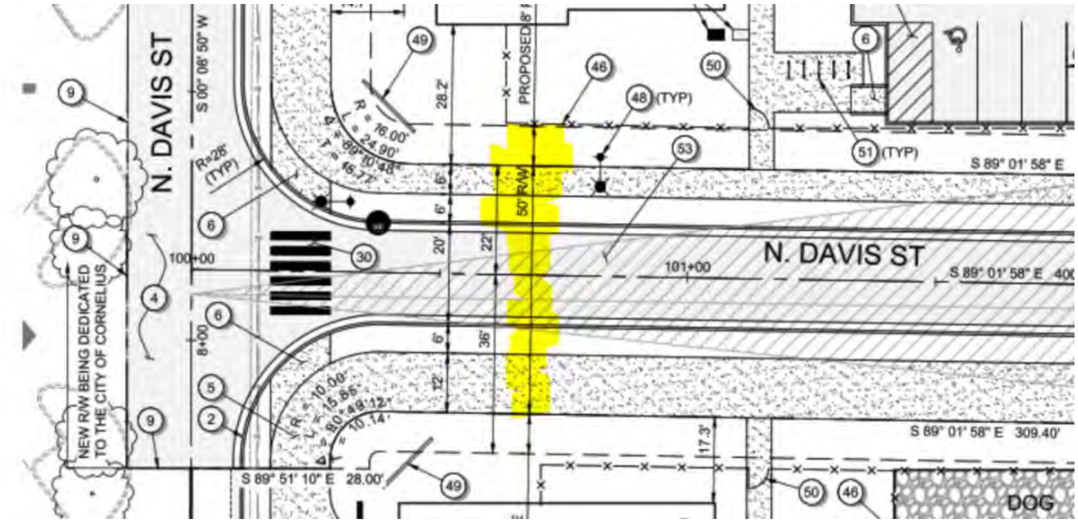
> **<u>Response:</u> The project proposes to extend the public N. Davis street to the East to provide for future connectivity with the development of the adjoining properties. The following public street sections demonstrate compliance with public works standards.**

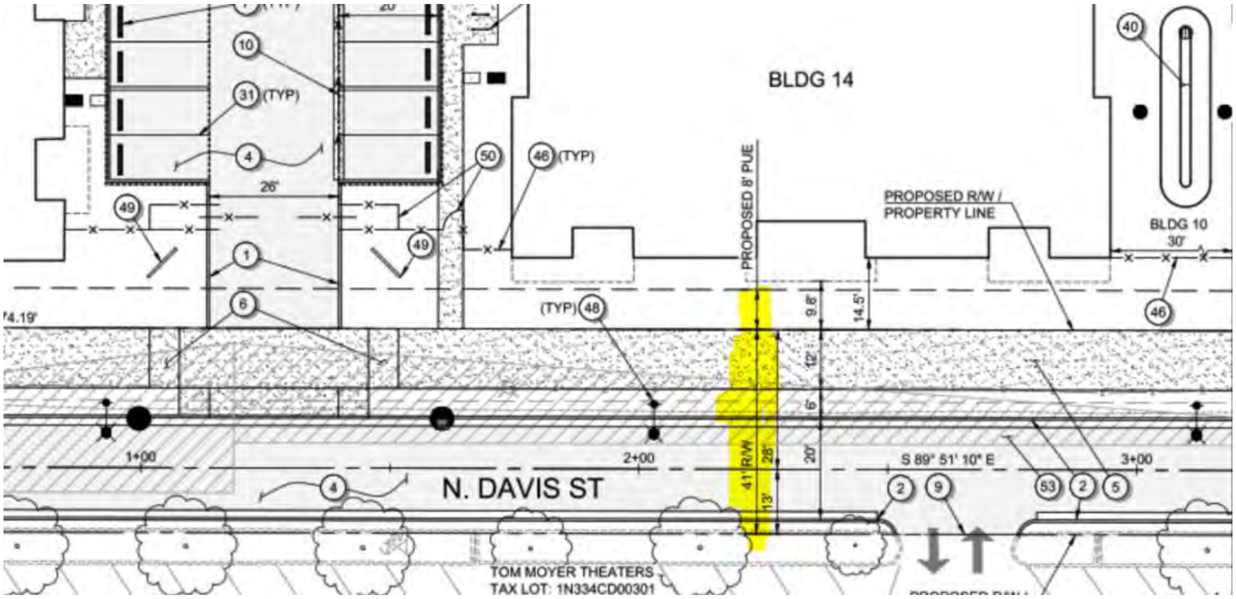


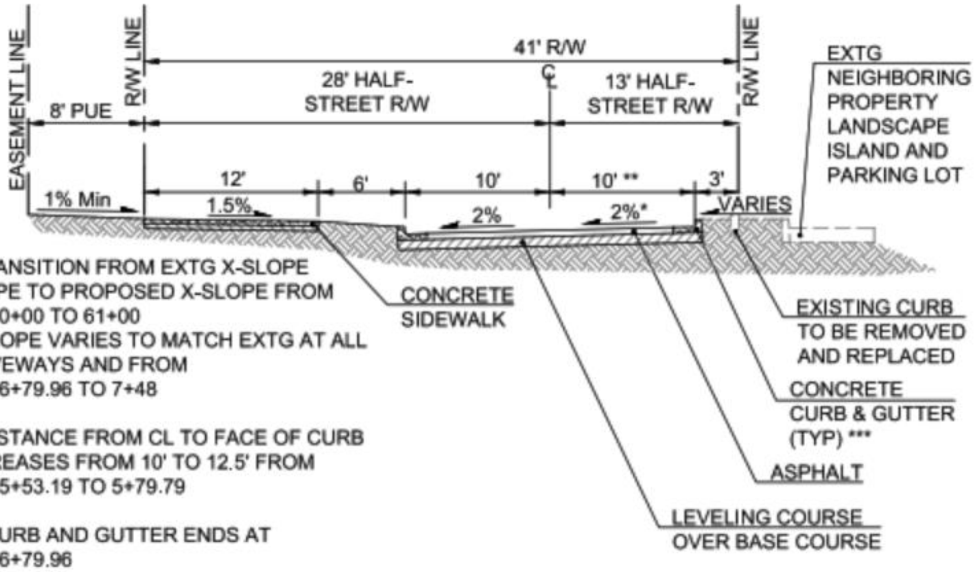
1/C204 N DAVIS STREET (PUBLIC) SECTION

STA 100+38 TO 103+45

Scale: 1"=10'







1 C201 N DAVIS STREET (PUBLIC) SECTION

STA 0+00 TO 7+48 Scale: 1"=10'

All streets and alleys within the development and those adjacent streets which directly serve the development shall be fully improved, including grading, base grade, paving, and installation of curbs, all constructed to design specifications as approved by the city engineer. All streets to be constructed and/or improved shall comply with the minimum street improvement standards contained in this title. In cases where physical conditions warrant it, special soils analysis or engineering designs may be required by the city engineer. In addition, where a proposed partition abuts a substandard arterial or collector street, the developer shall provide to the community development director, prior to final plat approval, adequate guarantees that, within one year from the issuance of a building permit for construction within the development, such abutting arterial or collector street or streets shall be improved in a manner which is compatible with the standards for streets contained in this title. Adequate guarantee shall *consist of formation of a local improvement district or provision of a security in an amount sufficient to cover the estimated actual improvement cost, plus 15 percent.*

> **Response: All public improvements will comply with the applicable standards. A separate analysis of the pavement that will be dedicated right of way is included in the application materials as requested by the City. The developer will provide the appropriate security.**

(F) Easement.

(1) Utility Lines. Easements for sewers, drainage, water mains, electric lines, or other utilities shall be dedicated. Easements for water, sewer, or drainage on interior lot lines shall be 20 feet in width, the center line of which shall be the lot lines. Easements for water, sewer, or drainage along exterior lot lines shall be 20 feet in width, except no easement will be required for those lot lines paralleling a street or other public way. Tie-back easements shall be six feet wide and 20 feet long along lot side lines at change of direction points of the lot lines. Easements for utilities such as electrical, gas, cable, and fiber optics (public utility easement, or PUE) shall be dedicated along all right-of-way frontages, including woonerfs, and shall be eight feet in width. A PUE is not required along the right-of-way of an alley, unless a parcel on an alley does not also front on a street or woonerf directly.

> **Response: An 8 foot PUE is provided along the frontage abutting the public N Davis Street extension. Sanitary sewer and water easements are proposed to be 20 feet wide. Sheet C300 of the Preliminary Plat Plans demonstrates compliance with this standard.**

(2) Watercourses. Where a land division is traversed by a watercourse, drainage way, channel, or stream, a storm water easement or drainage right-of-way conforming substantially to the lines of such watercourse, and such further width as will be adequate for the purpose, may be required. Streets or parking ways parallel to watercourses may be required. Watercourse easements and drainage rights-of-way shall be consistent with Clean Water Services (CWS) standards.

> **Response: There are no watercourses on the property requiring an easement.**

(G) Lot Size and Shape. Lot size, width, shape and orientation shall conform to the requirements of this title for the applicable zoning district.

> **Response: The applicable dimensional standards for the lots are provided in CMC 18.75.065(G).**
>
> ***(1) The minimum lot size shall be 10,000 square feet.***
>
> > **Proposed parcel#1 is 327,906 square feet**
> >
> > **Proposed parcel#2 is 230,426 square feet**
> >
> > **Proposed parcel #3 is 81,330 square feet**
>
> ***(2) The minimum lot width shall be 30 feet.***
>
> > **All proposed lots have a width of greater than 30 feet as demonstrated on the Preliminary Plat plans, Sheet C300.**

(H) Access. Each lot shall abut upon a public street, for a distance of at least 20 feet, and comply with CMC 18.143.050, Access standards.

> **<u>Response:</u> All proposed lots abut a public street for more than 20 feet. Compliance with CMC 18.143.050 is addressed below.**

18.143.050 Access standards

Access standards establish requirements and regulations for safe and efficient vehicle access to and from a site and enhance general circulation within a site.

> **<u>Response:</u> The Traffic Impact Analysis (TIA), prepared by PBS and dated October 28, 2021, addresses Access and Circulation for the proposed development.**

(A) Access Spacing. Access spacing shall be designed in conformance with the adopted Cornelius public works standards.

> **<u>Response:</u> Site access spacing meets or exceeds 100 feet per City Public Works Standard 5.03(c)(3) on the east/west section of Davis Street. On the north/south section of Davis the existing Fred Meyers access spacing makes meeting the 100 feet spacing infeasible as no improvements can be made to private property. See Figure 2 of the TIA below for the driveway alignment.**

(1) Access spacing for all state facilities shall be coordinated with the Oregon Department of Transportation (ODOT).

<u>Response:</u> No new access is proposed on state facilities.

(B) An access report shall be submitted with all new development and/or redevelopment proposals that demonstrates the street/driveway is safe as designed and meets adequate stacking, site distance, deceleration distance, on-site circulation and deceleration requirements as set by the city, American Association of State Highway and Transportation Officials (AASHTO), and relevant agencies.

<u>Response:</u> Section 4 of the TIA provides an access report addressing safety and access evaluation.

(*C) Driveway/Access Points. The location and number of driveways or access points have a direct effect on safe and efficient traffic flow. The following access management standards shall apply toward new driveways:*

(1) Driveway spacing shall be designed in accordance with adopted public works standards. In some cases, driveway setbacks may be greater than the standard depending upon the influence area, as determined by city engineer review of a traffic impact report submitted by the applicant's traffic engineer. If the subject property has less than 150 feet of street frontage, the applicant shall first investigate a shared access as an option. If a shared access is not possible, the driveway shall be placed as far from the intersection as possible.

<u>Response:</u> Driveway spacing meets or exceeds 100 feet per City Public Works Standard 5.03(c)(3) on the east/west section of Davis Street. On the north/south section of Davis the existing Fred Meyers driveway spacing makes meeting the 100 feet spacing infeasible. See Figure 2 of the TIA for the driveway alignment.

(2) Based on the applicants' proposal and its compliance with the comprehensive plan, transportation system plan and the development and zoning code, the city shall require the closing or consolidation of existing driveways or other vehicle access points, the recording of reciprocal access easements (i.e., for shared driveways), and installation of traffic control devices or other measures as a condition of approval to mitigate the impacts of the development.

<u>Response:</u> Based on the analysis provided, consolidation of existing driveways is not required for the development.

(3) New developments shall provide cross-over easements to ensure potential shared driveway access points where existing conditions (i.e., surrounding land uses, lot configurations, physical characteristics, etc.) warrant consideration.

<u>Response:</u> Shared Access easements will be provided between the proposed parcels to facilitate reciprocal access along the private street that extends south to E Baseline Street and East between the new Parcel 2 and Parcel 3.

(4) Access to arterials shall only be from public streets. When a site that has private access onto a principal arterial is redeveloped, the private access shall be eliminated if alternate access exists or can be developed to the site.

<u>Response:</u> The proposed parcels do not have access from an arterial.

(5) Direct access to a collector street shall only be considered if there is no alternative way to access the site. If direct access is permitted by the city, the applicant shall be required to mitigate for any safety or neighborhood traffic management impacts deemed applicable by the city engineer. In no case shall the design of driveways, drive aisles or service drives require or encourage the backward movement or other maneuvering of a vehicle within a street, except for single-family and duplex residences.

> **Response:** **The site does propose access to N. Davis Street, which is a collector and will be permitted by the City. Driveways have been designed to avoid the need for vehicle maneuvering within the street.**

(6) Proposed shared-use paths shall be located to provide access to existing or planned commercial services and other neighborhood facilities, such as schools, shopping areas and park and transit facilities. To the greatest extent possible, access shall be reasonably direct, providing a route or routes that do not deviate unnecessarily from a straight line or that do not involve a significant amount of out-of-direction travel.

> **Response:** **A 12 foot wide multi-use path is proposed along the public Davis Street extension.**

(I) Dedications. Public streets, sidewalks, pedestrian ways, bike paths, parks, open space, and other public rights-of-way required by or reasonably related to the development shall be dedicated or otherwise conveyed to the city or the appropriate jurisdiction for maintenance. Further, any park or open space proposed may be required to be dedicated to the public if it is designated in the city's comprehensive plan. An appropriate instrument granting or conveying the park or open space must be approved by the jurisdiction to whom the park or open space is being dedicated prior to final plat approval.

> **Response:** **As noted on Sheet C300 of the Preliminary Plat Plans, 50,404 square feet is being dedicated to the City of Cornelius for the public right-of-way. No parks or open space is proposed for dedication.**

(J) Utilities. All utilities shall be placed underground per standards identified by the city engineer.

> **Response:** **All new services will be located underground as required.**

(K) Street Trees. Trees shall be installed along street frontages in accordance with the adopted Cornelius public works standards. Actual location and spacing of trees shall be at the discretion of the city engineer.

> **Response:** **Street trees are proposed along the frontage of all parcels. A preliminary planting plan is being submitted for review with the Design Review Application and shows the proposed location, sizing, and type of the street trees.**

Cornelius
Oregon's Family Town

CWS File Number

Sensitive Area Pre-Screening Site Assessment

Jurisdiction: CITY OF CORNELIUS

Property Information: (*example 1S234AB01400*)
Taxlot ID(s): 100, 200 AND 6700, located at 1N334CD

OR Site Address: 2200 E Baseline Street
City State Zip: Cornelius, Oregon 97113
Nearest Cross Street: N Davis Street

Owner Information:
Name: Bill Hardt
Company: Calida Residential, LLC.
Address: 1077 W Twain Ave, Suite 115
City State Zip: Las Vegas, Nevada 89135
Phone/Fax: 702.947.2000
E-mail: bhardt@thecalidagroup.com

Development Activity: Check all that apply
Addition to Single Family Residence (*rooms, deck, garage*) ☐
Lot Line Adjustment ☐
Residential Condominium ☐
Residential Subdivision ☐
Single Lot Commercial ☐
Minor Land Partition ☐
Commercial Condominium ☐
Commercial Subdivision ☐
Multi Lot Commercial ☐
Other Multi-family residential

Applicant Information:
Name: Bill Hardt
Company: Calida Residential, LLC.
Address: 1077 W Twain Ave, Suite 115
City State Zip: Las Vegas, Nevada 89135
Phone/Fax: 702.947.2000
E-mail: bhardt@thecalidagroup.com

Will the project involve any off-site work: YES ☐ NO ☒ Unknown ☐ **Location and description of off-site work:**

Additional comments or information that may be needed to understand your project: N/A

This application does NOT replace the need for Grading and Erosion Control Permits, Connection Permits, Building Permits, Site Development Permits, DEQ 1200-C Permit or other permits as issued by the Department of Environmental Quality, Department of State Lands and/or Department of the Army COE. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

By signing this form, the Owner or Owner's authorized agent or representative, acknowledges and agrees that employees of The City of Cornelius and Clean Water Services have authority to enter the project site at all reasonable times for the purpose of inspecting project site conditions and gathering information related to the project site. I certify that I am familiar with the information contained in this document, and to the best of my knowledge and belief, this information is true, complete, and accurate.

Print/Type Name: ______ Print/Type Title: ______

Signature: ______ Date: ______

FOR CITY AND CLEAN WATER SERVICES (CWS) USE ONLY

☒ Sensitive areas potentially exist on site or within 200' of the site. **THE APPLICANT MUST PERFORM A SITE ASSESSMENT PRIOR TO ISSUANCE OF A SERVICE PROVIDER LETTER.** If Sensitive Areas exist on the site or within 200 feet on adjacent properties, a Natural Resources Assessment Report may also be required.

☐ Based on review of the submitted materials and best available information Sensitive areas do not appear to exist on site or within 200' of the site. This Sensitive Area Pre-Screening Site Assessment does **NOT** eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by CWS Resolution and Order 07-20, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, State, and federal law.

☐ Based on review of the submitted materials and best available information the above referenced project will not significantly impact the existing or potentially sensitive area(s) found near the site. This Sensitive Area Pre-Screening Site Assessment does **NOT** eliminate the need to evaluate and protect additional water quality sensitive areas if they are subsequently discovered. This document will serve as your Service Provider letter as required by CWS Resolution and Order 07-20, Section 3.02.1. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

☐ **This Service Provider Letter is not valid unless ______ CWS approved site plan(s) are attached.**

☐ The proposed activity does not meet the definition of development or the lot was platted after 9/9/95 ORS 92.040(2). NO SITE ASSESSMENT OR SERVICE PROVIDER LETTER IS REQUIRED.

Reviewed By: ______ **Agency:** ______ **Date:** ______

City of Cornelius: 1300 S. Kodiak Circle • Cornelius, Oregon 97113
Phone: (503) 357-3011 • Fax: (503) 357-3424 • www.ci.cornelius.or.us
Revised: March 7, 2018

CWS: 2550 SW Hillsboro Highway • Hillsboro, Oregon 97123
Phone: (503) 681-5100 • Fax: (503) 681-4439 • www.cleanwaterservices.org

Clean Water Services

March 30, 2022

BILL HARDT
THE CALIDA GROUP
5000 CARILLON POINT, STE 400
KIRKLAND, WA 98033
(425) 576-4041

RE: **Multi-Family Residential Development at 2300 E Baseline Street, Cornelius.**
CWS file 21-003156 (Tax map 1N334CD Tax lot 00100, 06700, 00200)

Clean Water Services has received your Sensitive Area Certification for the above referenced site. District staff has reviewed the submitted materials including site conditions and the description of your project. If a concurrence letter from Oregon Department of State Lands (DSL) documents a non-jurisdictional wetland onsite, then staff concurs that the above referenced project will not significantly impact water quality. In light of this result, this document will serve as your Service Provider letter as required by Resolution and Order 19-5, Section 3.02.1, as amended by Resolution and Order 19-22. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

Prior to issuance of development or construction permits, a concurrence letter from DSL, documenting the jurisdictional status of the onsite artificial wetland, is required. If the concurrence determines a jurisdictional onsite wetland, updated documentation and amendment to this Service Provider Letter will be required.

This letter does NOT eliminate the need to protect Sensitive Areas if they are subsequently identified on your site.

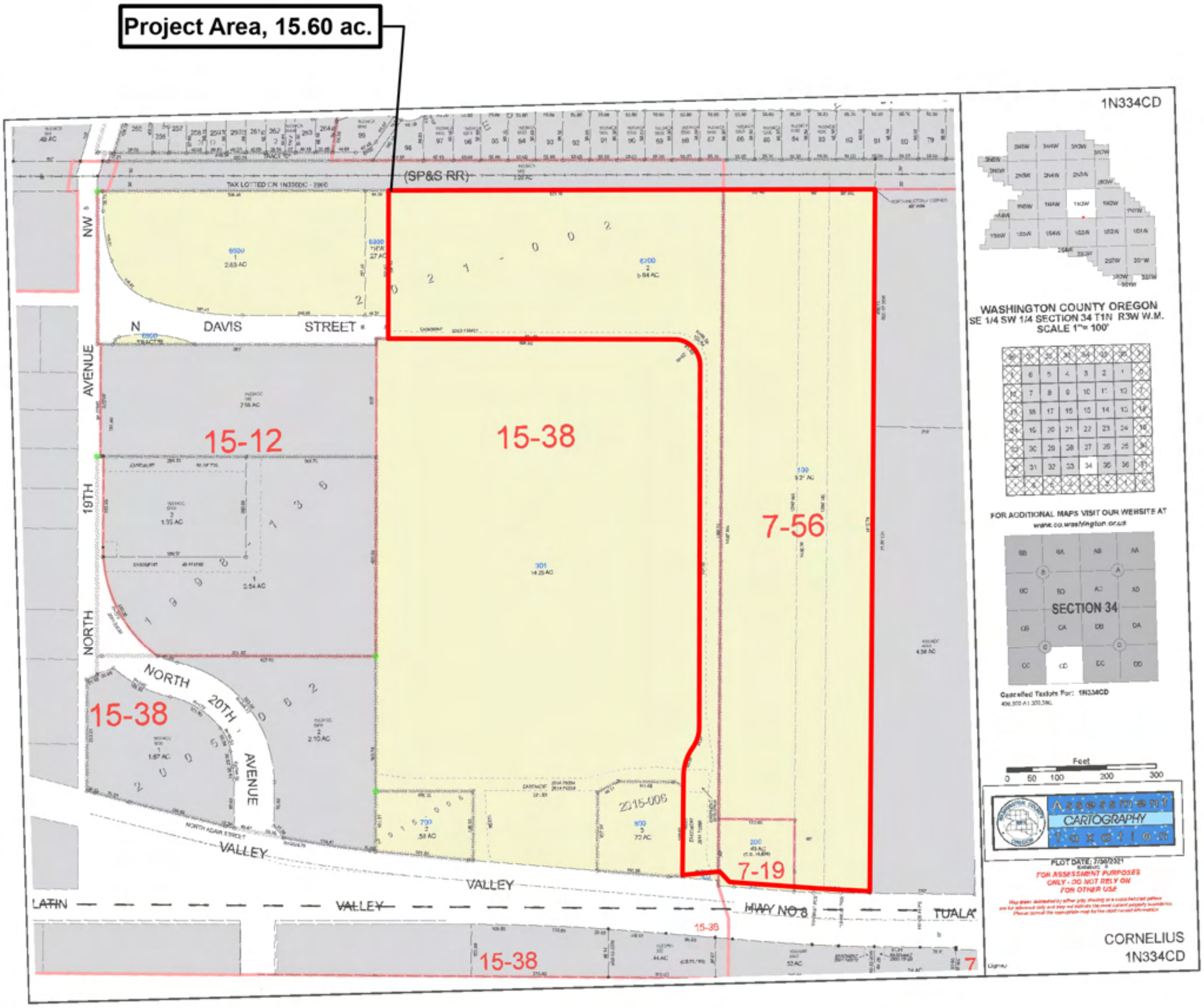
Sincerely,

Lindsey Obermiller

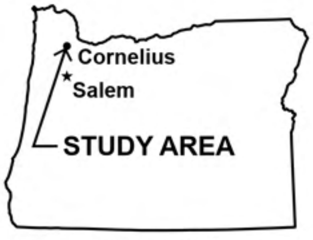
Lindsey Obermiller
Environmental Plan Review

Attachments (7)

2550 SW Hillsboro Highway, Hillsboro, Oregon 97123 p: 503.681.3600 f: 503.681.3603 cleanwaterservices.org



SOURCE: ORMAP (2022).



COLOR COPY

CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LD Date 03/30/2022
SPL ATTACHMENT 1 OF 7

SCALE: 1" = 340' (8.5X11 SHEET)

0' 170' 340' 680'

PREPARED FOR: THE CALIDA GROUP.

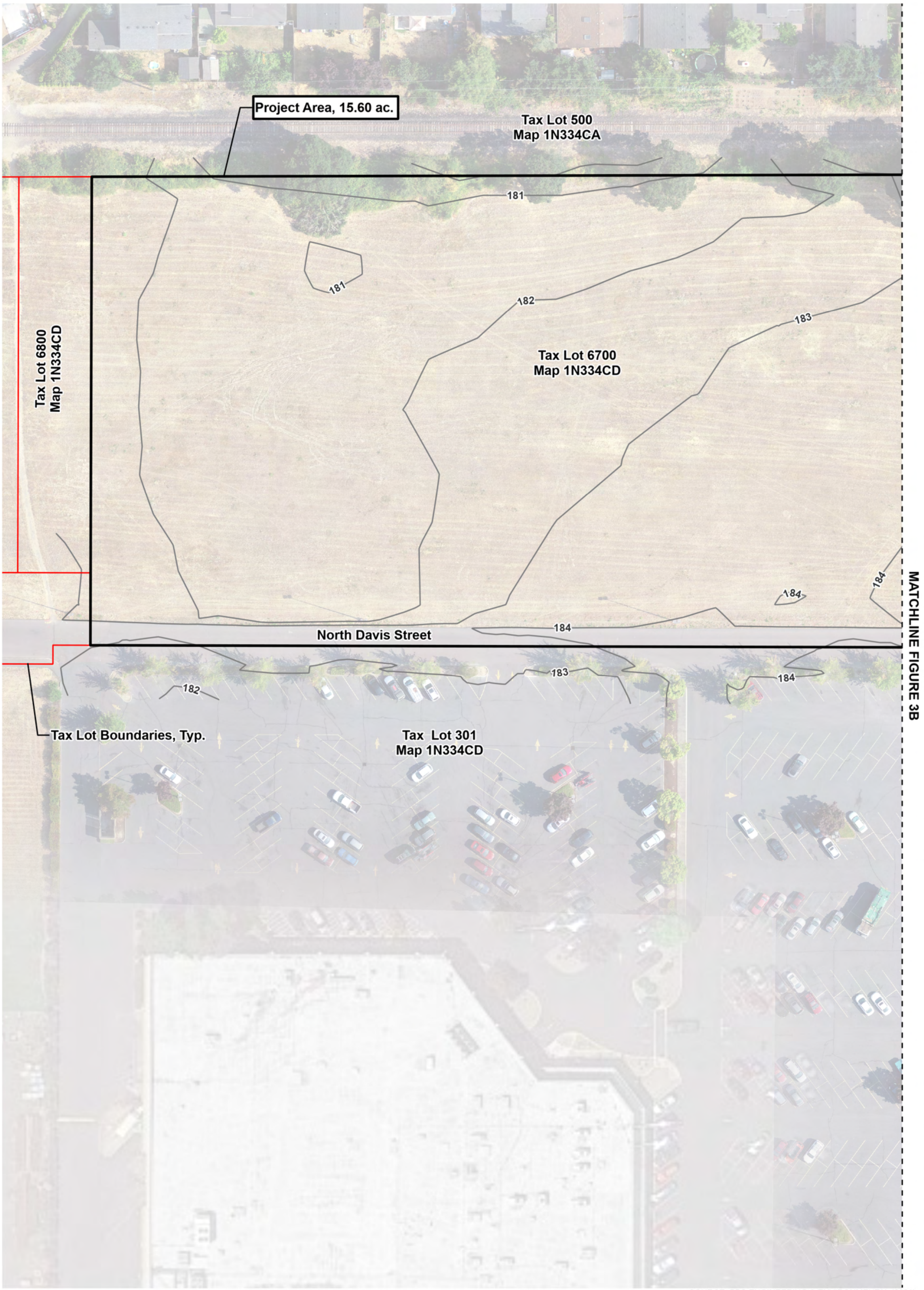
PBS

TAX LOT MAP 1N334CD

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
2

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:43 PM



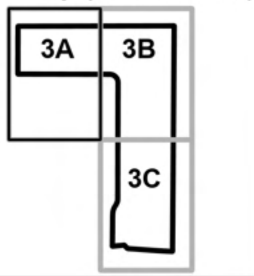
SOURCE: PBS ENGINEERING & ENVIRONMENTAL (2021).

Legend

Plot 1	Data Plot Locations
1	Ground Level Photograph Locations
🟩	Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

CWS FILE NO. 21-003156
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 2 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

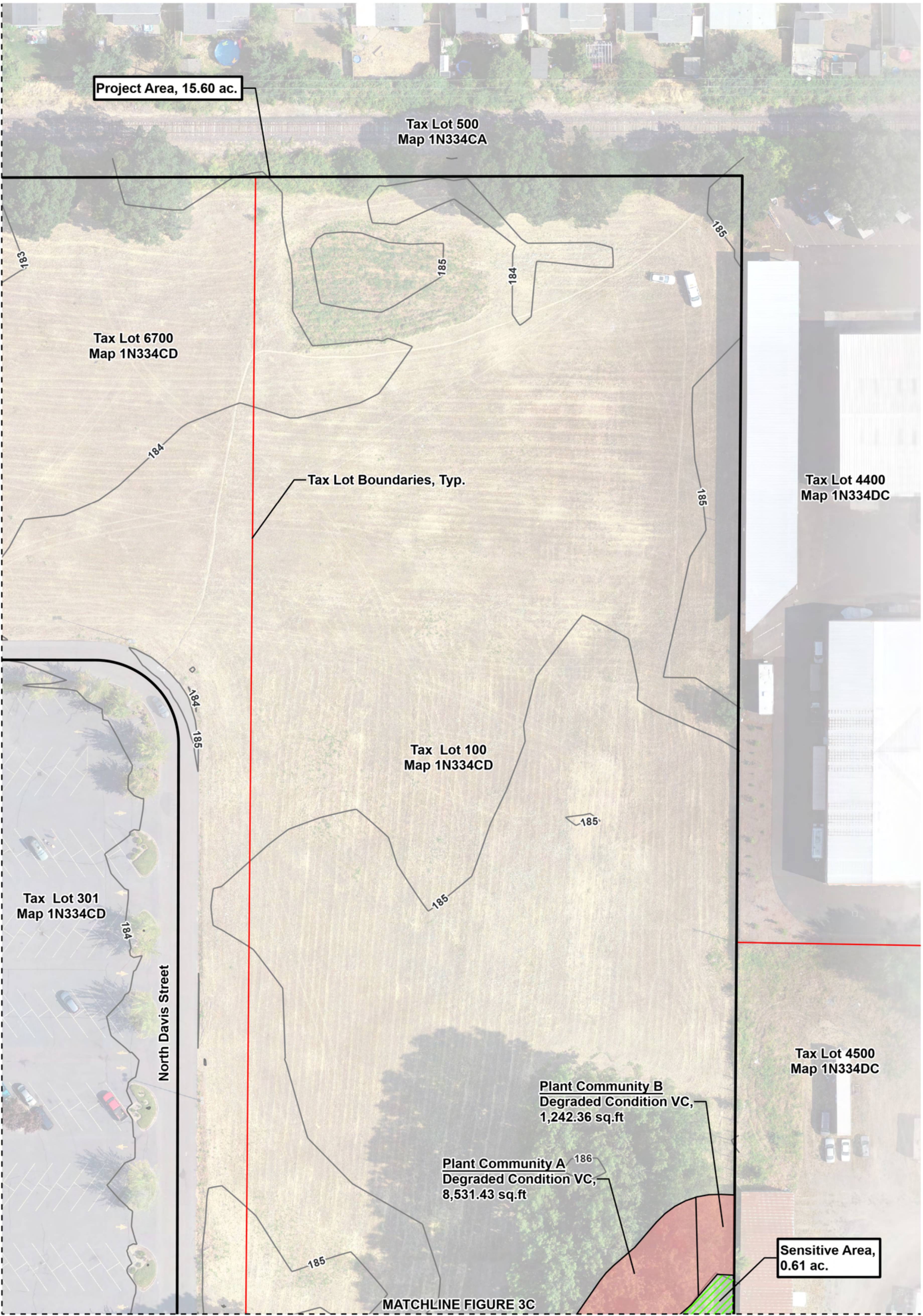
Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:47 PM

PBS

EXISITING CONDITIONS MAP

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
3A



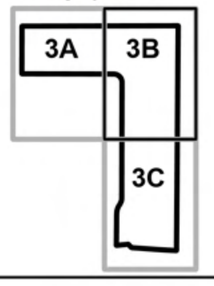
SOURCE: PBS ENGINEERING & ENVIRONMENTAL (2021).

Legend

Plot 1 ⊕	Data Plot Locations
▶ 1	Ground Level Photograph Locations
▨	Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

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Clean Water Services
FOR ENVIRONMENTAL REVIEW
By LO Date 03/30/2022
SPL ATTACHMENT 3 OF 7

PREPARED FOR: THE CALIDA GROUP.

PBS

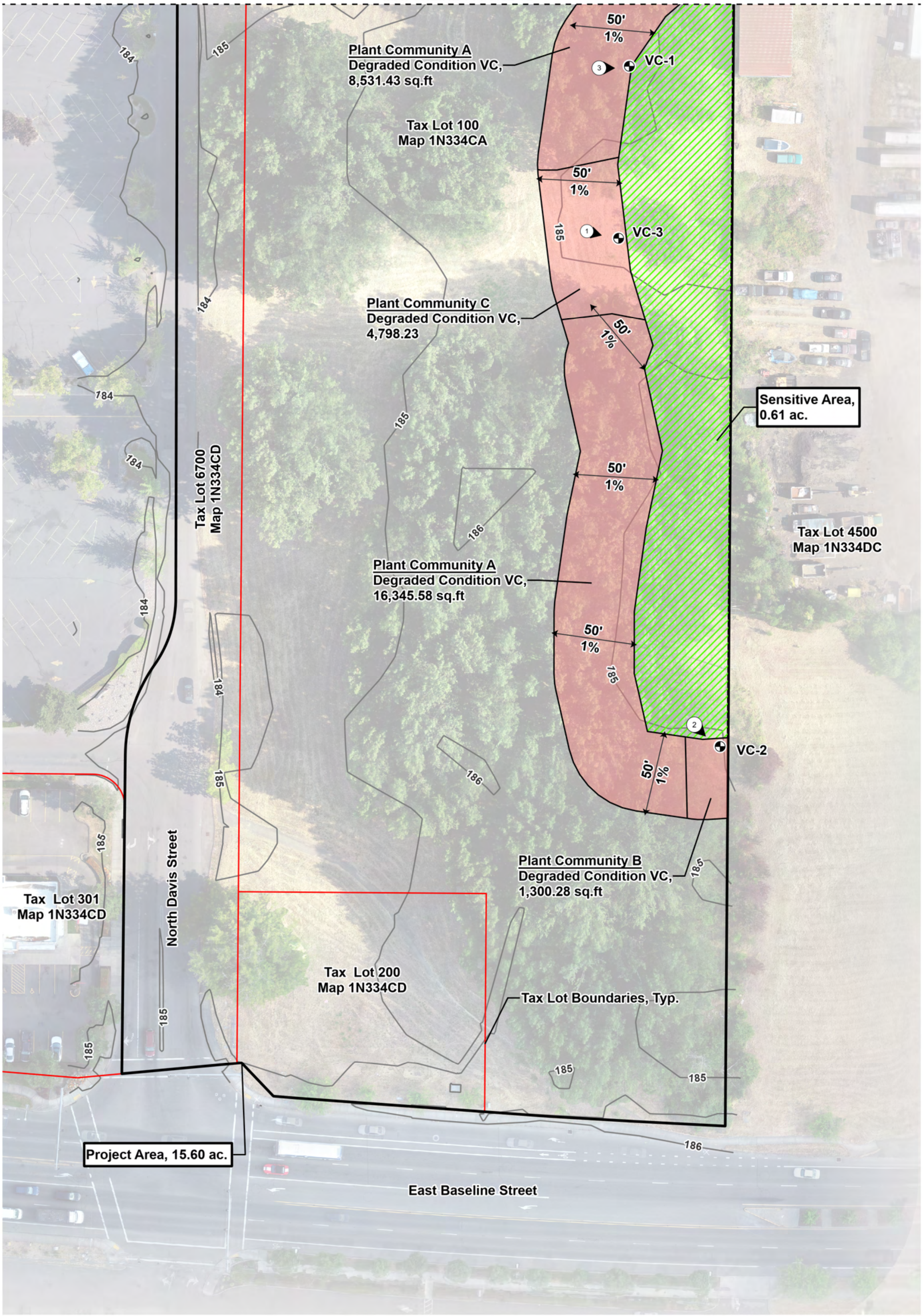
EXISTING CONDITIONS MAP

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
3B

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx   Plot Date/Time: 3/4/2022 3:43 PM

MATCHLINE FIGURE 3B



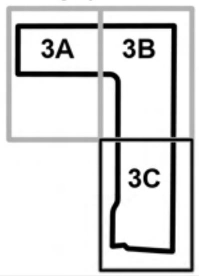
SOURCE: PBS ENGINEERING & ENVIRONMENTAL (2021).

Legend

- Plot 1 ⊕ Data Plot Locations
- ▶ ① Ground Level Photograph Locations
- ▨ Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

CWS FILE NO. 21-003156
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By Date 03/30/2022
SPL ATTACHMENT 4 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

PBS

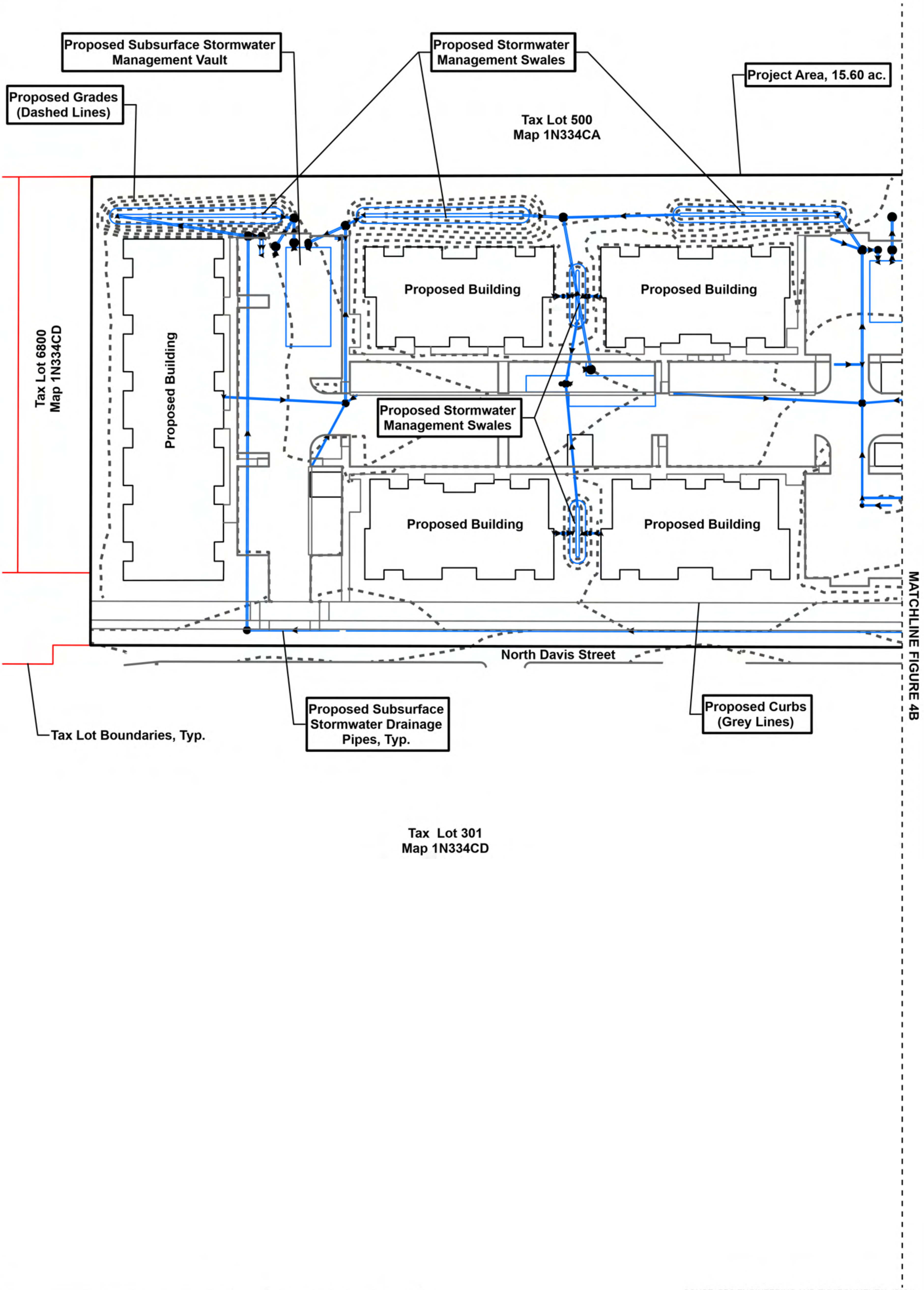
EXISTING CONDITIONS MAP

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000

FIGURE
3C

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:43 PM



SOUCE: PBS ENGINEERING AND ENVIRONMENTAL (2021).

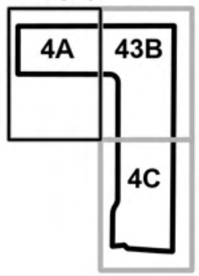
Legend

● Proposed Stormwater Inlet

▨ Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

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By Date 03/30/2022
SPL ATTACHMENT 5 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

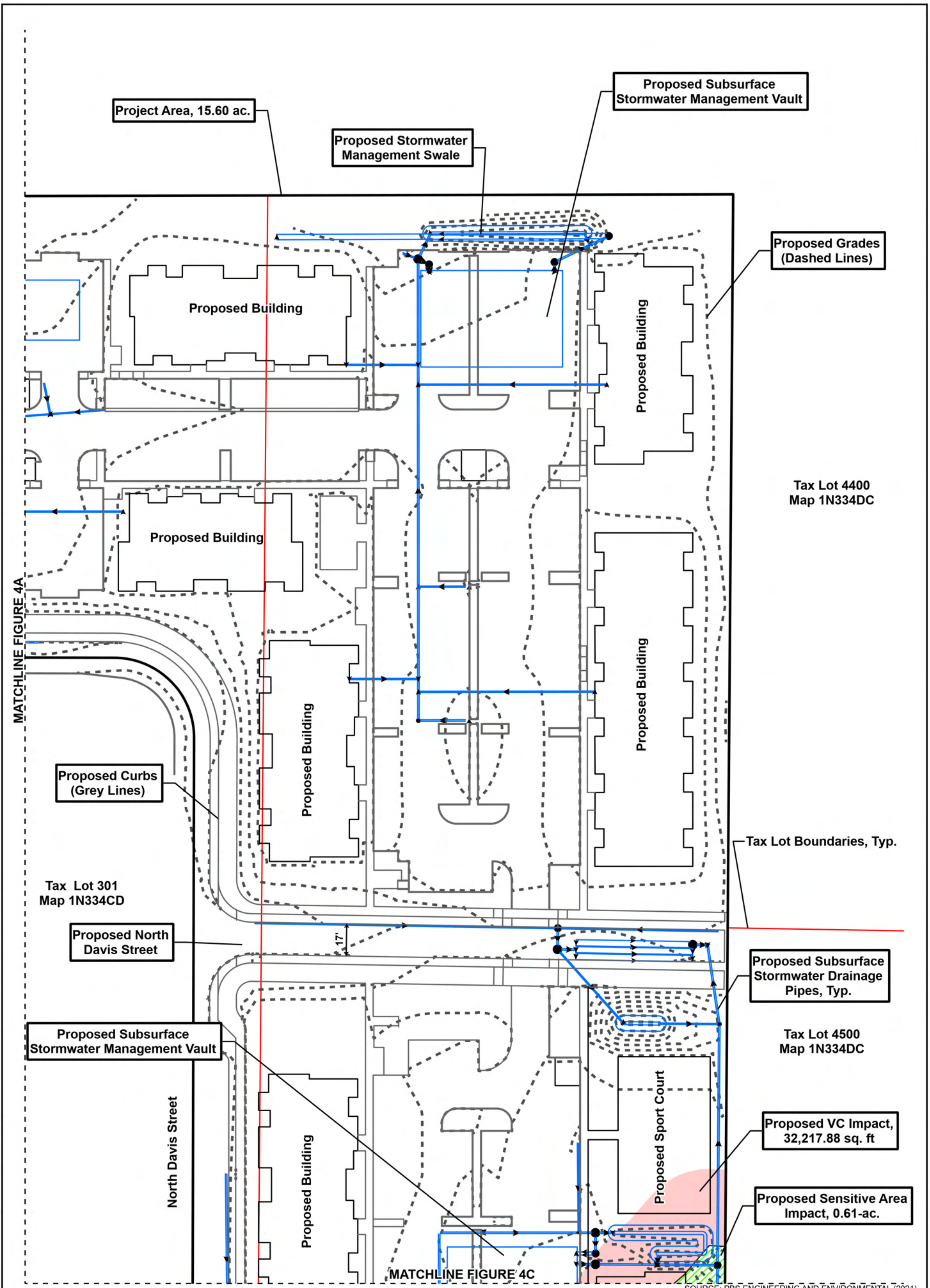
PBS

PROPOSED DEVELOPMENT

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
4A

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:44 PM



SOURCE: PBS ENGINEERING AND ENVIRONMENTAL (2021).

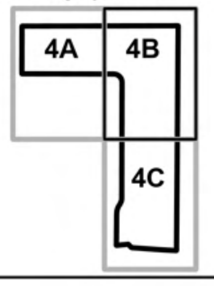
Legend

● Proposed Stormwater Inlet

▨ Sensitive Area, 0.61-ac. (total)

Sample plots, wetland boundaries, and study area boundaries were surveyed by professional surveyors.

Inset Map (Not to Scale)



COLOR COPY

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By LO Date 03/30/2022
SPL ATTACHMENT 6 OF 7

SCALE: 1" = 60' (11x17 SHEET)

0' 30' 60' 120'

PREPARED FOR: THE CALIDA GROUP.

Plot Date/Time: 3/4/2022 3:46 PM

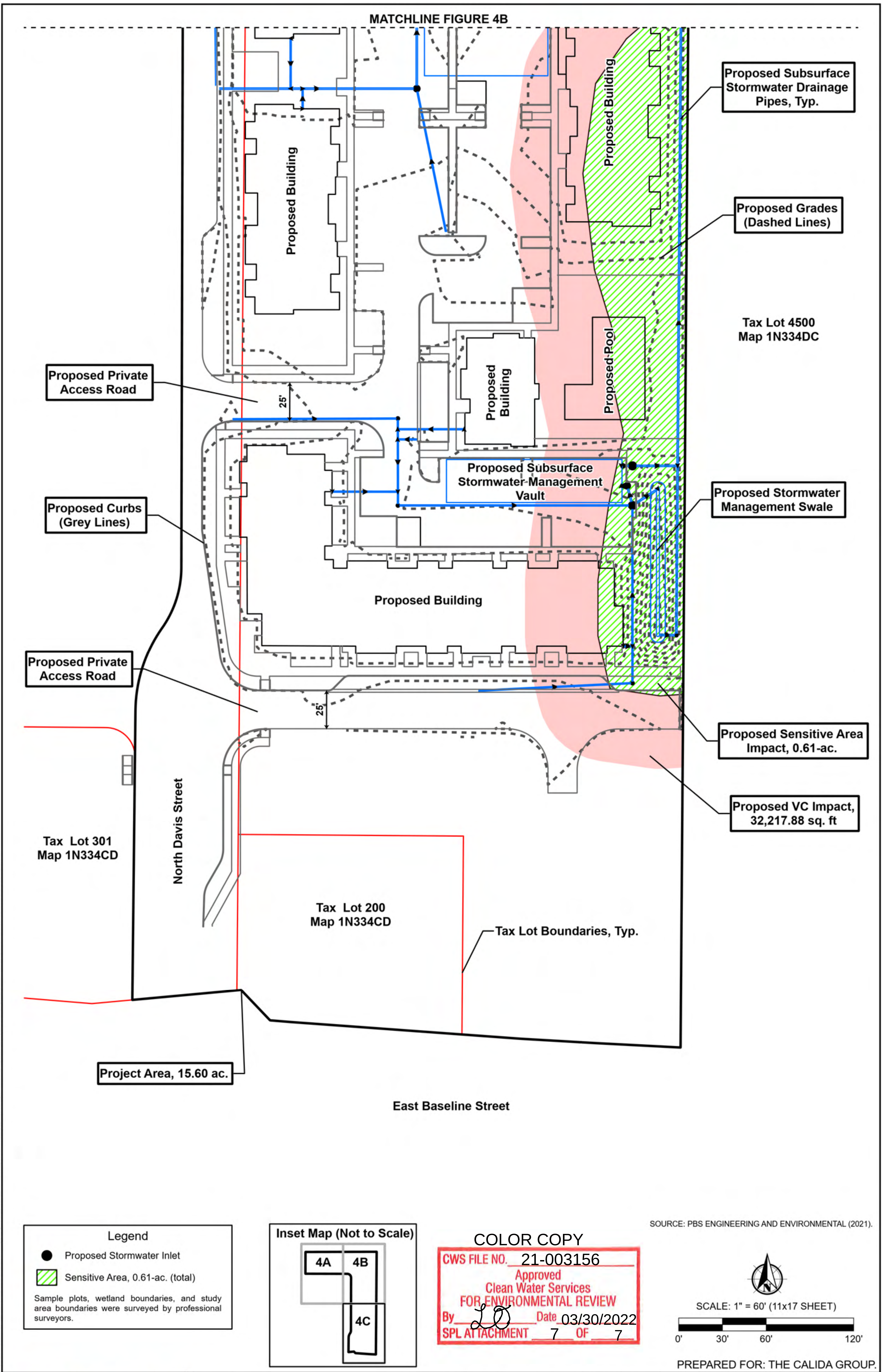
Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx

PBS

PROPOSED DEVELOPMENT

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
4B



COLOR COPY

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By LO Date 03/30/2022

SPL ATTACHMENT 7 OF 7

PREPARED FOR: THE CALIDA GROUP.

Filename: L:\Projects\74000\74217\74217-000\NR\Mapping\GIS\APRX\Calida_MultiFamily_Housing\Calida_MultiFamily_Housing.aprx Plot Date/Time: 3/4/2022 3:47 PM

PBS

PROPOSED DEVELOPMENT

SITE ASSESSMENT FOR ELYSIAN AT CORNELIUS
CORNELIUS, WASHINGTON COUNTY, OREGON

MAR 2022
74217.000
FIGURE
4C